

**COMMON EDIBLE MOLLUSCS
OF THE PHILIPPINES
A FIELD GUIDE**

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Common Edible Molluscs of the Philippines

The Molluscs comprise the largest phylum of marine invertebrates, with over 80,000 species described (Barnes, 1974). They are soft-bodied animals, which, in most cases, secrete a protective outer "shell." Two major classes of molluscs, the Bivalvia and Gastropoda (or univalves), are covered in this work, as they contain most of the edible and economically important species. Class Cephelopoda is represented by the Chambered Nautilus.

Because of the huge number of molluscan species inhabiting Philippine waters (over 20,000 by some estimates) this study has been limited to the most common edible ones existing on and around the island of Panay in the Western Visayas region. This region was selected as representative because some species unique to the Philippine co-exist here with many that are commonly found throughout the Indo-Pacific (Abbott, 1979) and because Panay is located in the geographic center of the Philippines. The species described here are primarily marine, with a few brackish and fresh water varieties included. Marine species predominate in local diets, partly as a result of the increased use of chemical pesticides and fertilizers in recent years in ricelands and fishponds, which were once prime habitats for many edible fresh and brackish water species.

As our world becomes more polluted and populous, edible molluscs,

which serve as a major source of protein for many millions of people (Abbott, 1976), are becoming a primary focus of those involved in mariculture activities. This field guide is intended not only for them, but also for students, shell collectors, travelers, and anyone interested in molluscs and how they benefit the people of the Philippines.

This work consists of a series of identification sheets which contain the following basic information:

1. Pen and ink drawings and photographs of each species
2. Scientific classification
3. Common names in English and Philippine dialects
4. Brief description of shell color and form
5. Ecological and habitat description
6. Collection and/or culture techniques
7. Market price
8. Preparation as food

Supplementary or unusual information about each species is also included where appropriate. Appendices covering more detailed information on food preparation will be included towards the end of the series. Those seeking additional information about molluscs are encouraged to consult the following list of references.

Notes on Presentation

1. Only the most common edible species of the Western Visayas are presented and not all are of commercial importance: many are only collected by barrio inhabitants near their homes (for use as protein supplements to a largely carbohydrate diet) and are not usually marketed.
2. All drawings and photographs were done by the author.
3. The metric system is used exclusively; measurements are given in cm.

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SYSTEMATIC RESUME

Phylum Mollusca

Class Bivalvia

Subclass Lamellibranchia

Order Taxodonta

Family Arcidae

Anadara granosa Linne
Arca antiquata Linne
Anadara sp.

Order Anisomyaria

Family Mytilidae

Modiolus metcalfei Hanley
Perna viridis Linne
Brachidontes sp.

Family Pectinidae

Amusium pleuronectes Linne

Family Ostreidae

Crassostrea iredalei
Saccostrea sp.

Family Placunidae

Placuna placenta Linne

Order Heterodonta

Family Cardiidae

Cardium subrugosum

Family Garfidae

Soletellina elongata Lamarck

Family Isognomonidae

Isognomon sp.

Family Mactridae

Mactra mera Deshayes
Mactra maculata Linne

Family Solenidae

Pharella acutidens Broderip and
Sowerby

Family Veneridae

Donax sp.
Geloina striata
Paphia exavata
Circe gibba Lamarck

Order Adapedonta

Family Teredinidae

Teredo sp.

Class Gastropoda

Subclass Prosobranchia

Order Archaeogastropoda

Family Trochacea

Trochus niloticus Linne
Turbo chrystostoma Linne

Family Angariidae

Angaria delphinus Linne

Order Mesogastropoda

Family Cypraeidae

Cypraea moneta Linne
Cypraea tigris Linne

Family Potamididae

Telescopium telescopium Linne
Potamides sp.

Family Strombidae

Lambis lambis Linne
Strombus aurisdianæ Linne
S. bulla Roding
S. lentiginosus Linne
S. luhuanus Linne
S. spp.

Family Turitellidae

Turritella terebra Linne

Order Neogastropoda

Family Conidae

Conus leopardus (Roding)
Conus omaria Hwass
Conus spp.
Conus striata

Family Muricidae

Ocenebra sp.

Family Olividae

Oliva annulata

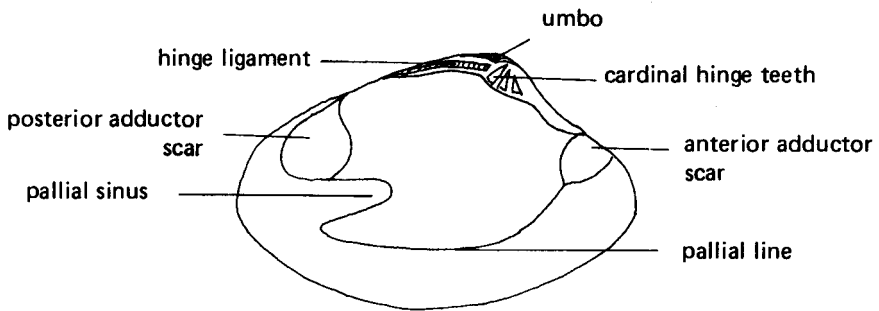
Family Volutidae

Cymbiola vespertilio Linne

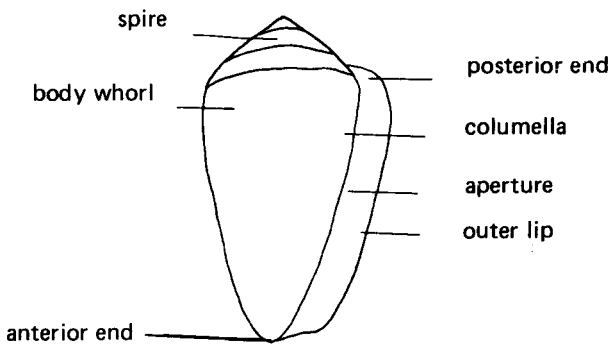
Class Cephalopoda

Subclass Nautilodiae

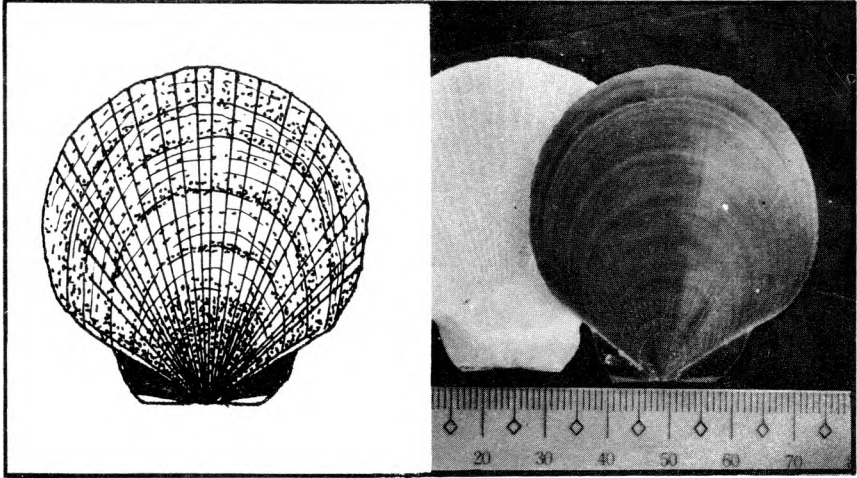
Nautilus pompilius Linne



Diagrammatic Heterodont Bivalve



Diagrammatic Prosobranch Gastropod



Family Pectinidae

Scientific name: *Amusium pleuro-nectes* Linne

English name: Asian Moon Scallop

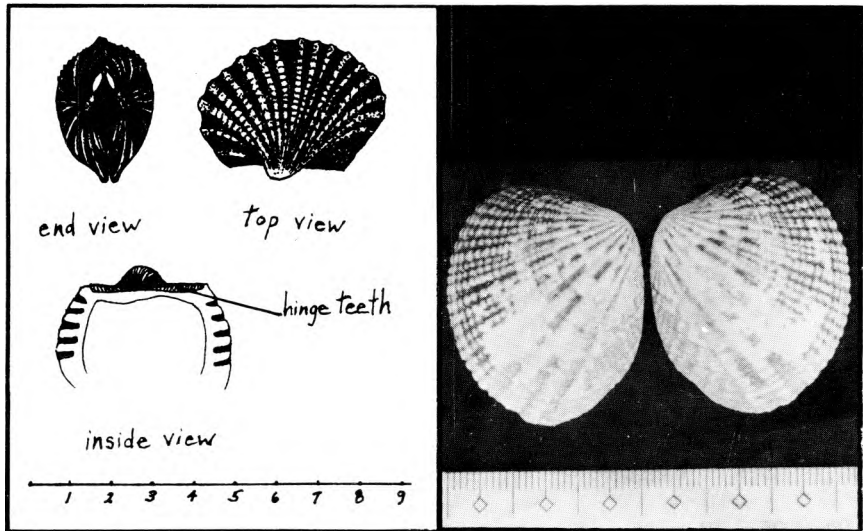
Philippine name: Lampirong (Visayan)

Scallops are among the few bivalves which live unattached (or weakly attached by byssal threads) on the surface of the ocean floor. The members of this strange, smooth-shelled group have evolved the ability to swim by clapping their shells together and expelling water rapidly from their mantle cavity. They use this swim-

ming ability to escape predators such as starfish.

The upper valve of the Asian Moon Scallop is purple or red, while the bottom valve is colorless, evidently a form of protective camouflage. These animals occur in large schools at depths of 8 to 20 fathoms.

These molluscs are considered a delicacy and are found only rarely in the marketplace. Scallops command a high price in seafood restaurants throughout the world.



Family Arcidae

Scientific name: *Anadara granosa*
Linne

English name: Ark shell, "Cockle"
(used in Malaysia but with no taxonomic significance), Blood Clam

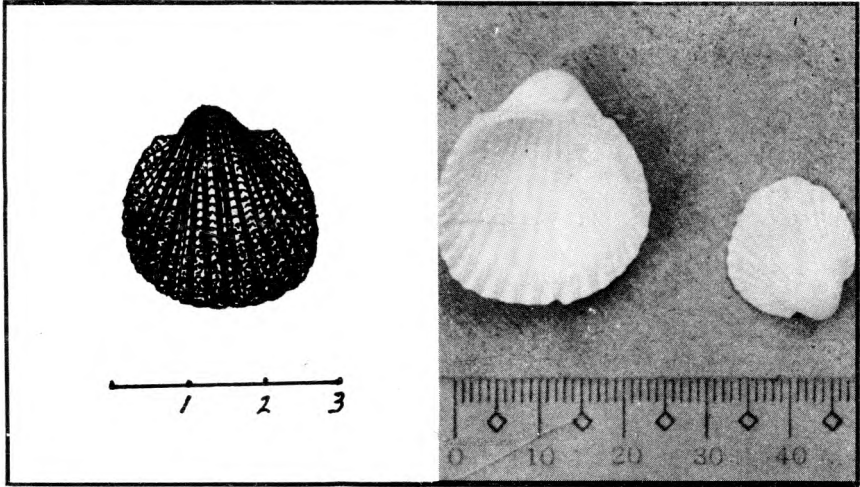
Philippine name: Litob (Visayan)
Hala-an (Tagalog)

This greyish, heavily ribbed shell belongs to the order Taxodonta, which is distinguished by their numerous and similar hinge teeth.

The true Litob is bigger and meatier than its Litob-litob cousins, and lives in the brackish mud flats instead of in the rocky marine environment. It is

also bilaterally symmetrical, whereas the shell of *Arca antiquata* is flared slightly at the posterior end. It is gathered at low tide by barrio inhabitants who sell it in the market place for P2.00/5 pcs.

Since *A. granosa* is not only cheap and tasty but richer in protein than most other shellfish, its culture should be encouraged as a means of partially supplying the increasing need for high-protein foods in Southeast Asia. (Bardach, Ryther, & Mc Larney, 1972). This mollusc is cultured extensively in Malaysia and workers at the University of the Philippines' Marine Science Center at Diliman have spawned it in the laboratory as part of a program to develop suitable culture techniques in the Philippines.



Family Arcidae

Scientific name: *Anadara sp.*

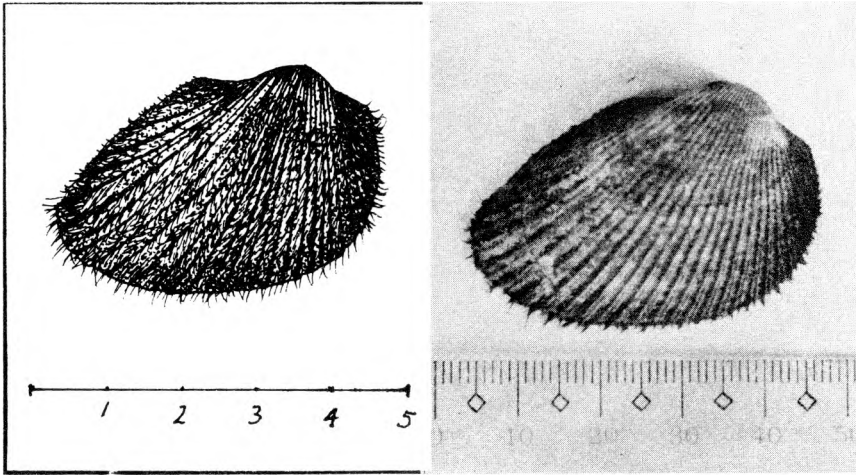
English name: Ark Shell

Philippine name: Hungkay-hungkay
(Aklanon)

Shells of this small white bivalve are extremely common on the beaches of the province of Aklan.

Fishermen from the barrio dive in the sea to collect these bottom dwellers. They are not generally seen in the marketplace, but are consumed in barrio homes.

Hungkay-hungkay are used in soup and noodle dishes as well as for "gina-mus," a salty dish that is served as a viand or as an appetizer.



Family Arcidae

Scientific name: *Arca antiquata* Linne

English name: Ark Shell, Blood Clam

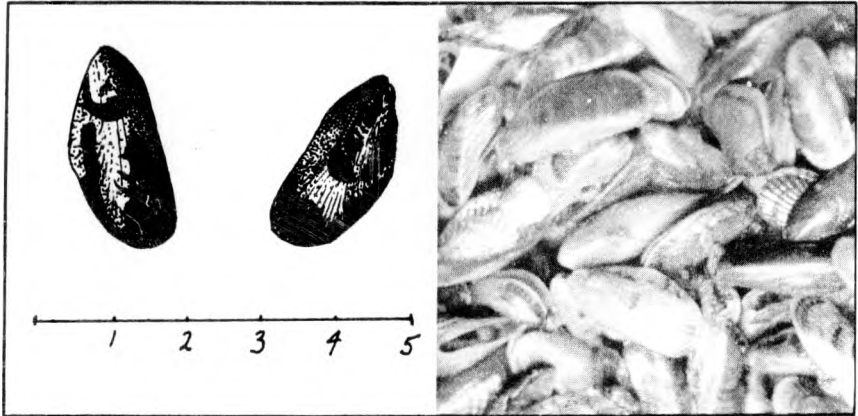
Philippine name: Litob-litob or silutan (Visayan), Kamot-pusa (Tagalog).

These small marine clams live in algae-rich areas and attach themselves to rocks, where they are gathered at low tide by barrio inhabitants.

They are called the Blood Clam because their blood is rich in hemog-

lobin, giving it a distinctive red color and adding substantially to the clams nutritive value.

Where abundant, the empty ark shells are utilized in the manufacture of lime. They are available year-round in the wet markets of the Western Visayas for P2/10-20 pcs. They can be prepared as an appetizer, in soups, and in noodle dishes. When served as an appetizer, the shells are generally steamed open with slices of ginger to flavor the resulting juice or broth.



Family Anisomyaria

Scientific name: *Brachidontes* sp.

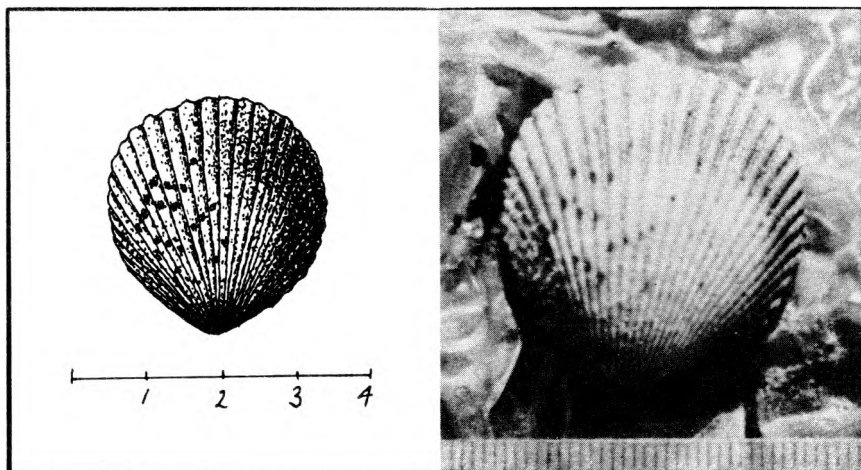
English name: Small mussel

Philippine name: Barko-barko (Buruanganon) Kilaput (Aklanon)

These small mussels are quite common throughout northern Panay and elsewhere in the Visayas. They are collected in great numbers from rocky-sandy intertidal areas at low tide to supplement diets and for sale

in the marketplace. In Makato, Aklan, great twenty kilo sacks of these mussels may be seen on market day. They sell for about P0.50/one-half kg bag, unshelled, and are available the year round.

In Buruanga, Aklan, they are collected daily to supplement family diets, and are served primarily in soups.



Family Cardiidae

Scientific name: *Cardium subrugosum*

English name: Cockle

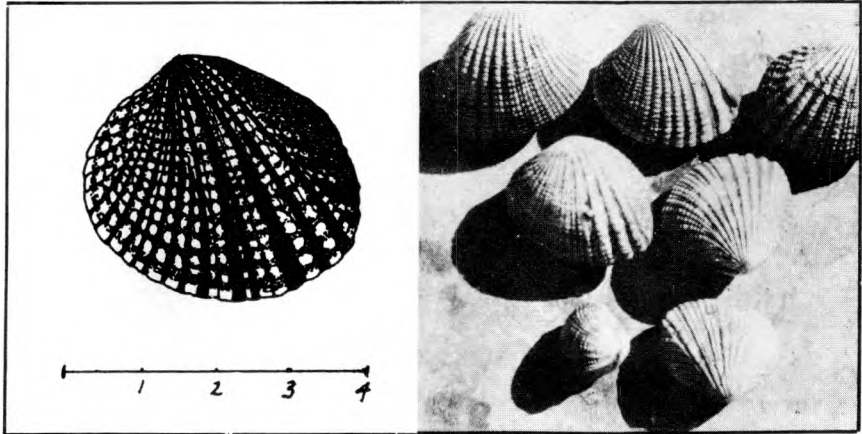
Philippine name: Punaw (Buru-
anganon)

This small cockle lives in the sandy-rocky intertidal areas of northwestern Panay and elsewhere in the Visayas. It is adapted to wiggling into the sand and has a long siphon which is used for gathering food.

In Buruanga, Aklan, a large intertidal area just behind the public

market provides local inhabitants with these and other molluscs which are collected daily at low tide. Because people can collect their own, very few are marketed. When collecting shells in the rocky intertidal zone, care should be taken to replace overturned rocks to their original position, thus preserving the fragile habitats of mollusks and other marine life.

This shell is prepared in the same manner as the ark shells; in noodle dishes, soups, and as an appetizer and viand.

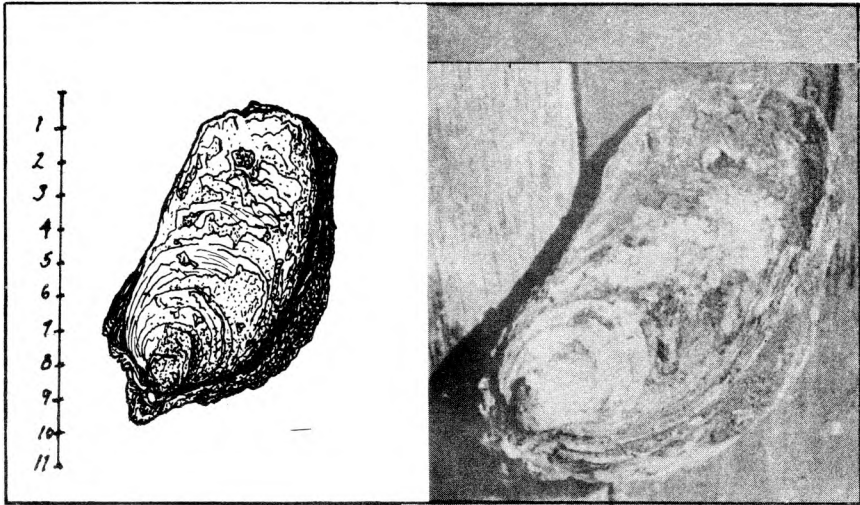


Family Veneridae

Scientific name: *Circe gibba* Lamarck
English name: Sand Clam
Philippine name: Bugaton (Visayan)
Saropsaropan (Tagalog)

This small cream-colored marine

clam is found in the sand near the seashore. They are collected for sale in the market at low tide by barrio inhabitants throughout the Philippines. They sell for P2/50 pcs, and are served boiled as an appetizer or viand.



Family Ostreidae

Scientific name: *Crassostrea iredalei*

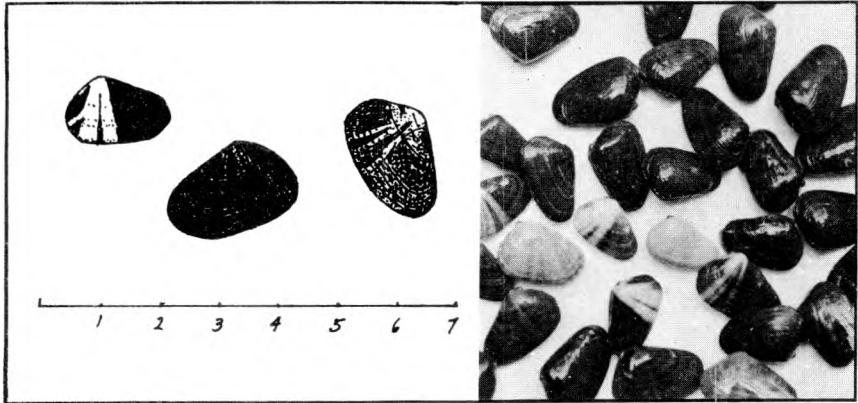
English name: Slipper oyster

Philippine name: Talaba (Tagalog, Visayan), Tirem (Ilongo)

Crassostrea iredalei has a generally ovoid shape with irregular surface features and is grey and white. It is cultured extensively throughout the Philippines. There are three main culture methods currently in use in this country. These include the *tulos* (stake), *bitin* (hanging), and *sabog* (broadcast) methods. The *tulos* is similar to the bamboo staking method used in mussel farming, the difference being that the stakes should extend about 1 meter above the low-water mark for oyster culture. The *bitin* is

more intensive and uses oyster and coconut shells strung on thick, nylon monofilament, suspended vertically from horizontal braces or rafts. *Sabog* is the traditional method of oyster farming where hard, smooth objects such as tin cans or oyster shells are scattered over a sandy, hard bottom where spatfall is known to occur. While this method is the least labor intensive, it yields fewer oysters than the other two methods because the area for spat attachment is limited. In all three methods the oysters are ready for harvest in 6-12 months.

Oysters are sold in the Iloilo City market for P5 per group of 15. They are enjoyed as an appetizer or viand.



Family Donacidae

Scientific name: *Donax sp.*

English name: Wedge or Bean Clam

Philippine name: Agihis (Visayan)

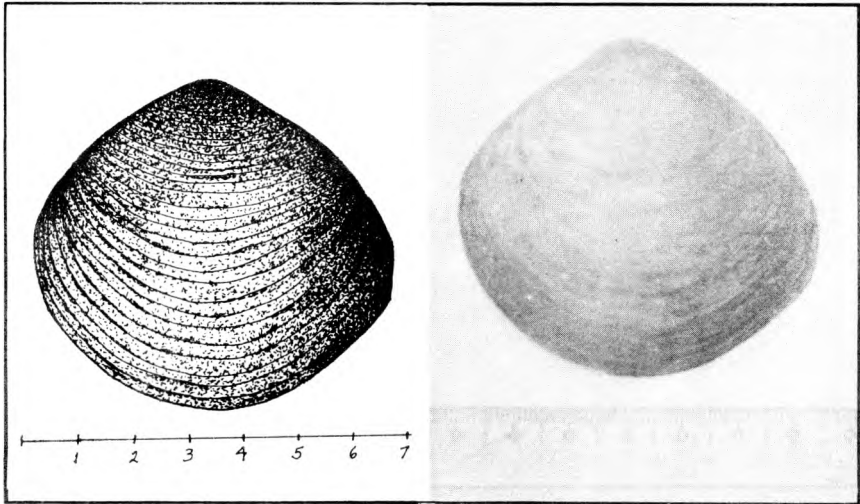
These small blue, brown, and grey clams occur throughout the world on the slopes of sandy beaches at the point where the waves break and slide over the sand.

When they are accidentally uncovered by wave action, these animals burrow rapidly back into the sand. This burrowing is facilitated by their pointed foot and the anterior portion of their shell.

As the wave temporarily covers the clam it extends its long siphon for a few seconds to feed. This inhalant siphon is specially equipped with margins that are fringed with infolded tentacles which serve to keep out swirling sand grains.

Agihis are collected by barrio inhabitants at low tide and are available in the marketplace year round, but are larger in size from October to February. They fetch a market price of P0.50/one-half liter bag, unshelled.

They are tasty if cooked in a soup, but the preferred preparation in the Visayas is to salt them for 24 hours and eat them as viand.



Family Veneridae

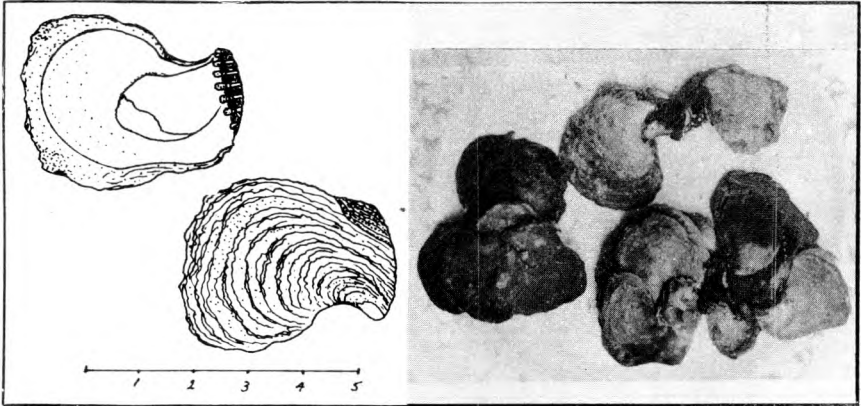
Scientific name: *Geloina striata*
Linne

English name: Mud Clam

Philippine name: Tuway (Visayan)

This thick shelled clam is found 8 to 10 cm beneath the surface of mud flats near mangrove swamps at low tide, where they are collected by barrio inhabitants to be sold in the market. They sell for 3 to 5 pesos per kilogram, unshelled. They are served boiled or broiled as an appetizer or viand.

Scientists at the Oregon State University Marine Science Center in Newport, Oregon, have recently taken an interest in culturing this clam because of its large size, hardness and popularity as a food item in the Philippines. The author sent a shipment of 50 of these molluscs from Kalibo, Aklan to OSU in early 1981 and attempts to spawn them in captivity have been started and are continuing there. Technology developed at OSU could be transferred to the Philippines providing increased income, employment and protein for local inhabitants.



Family Isognomonidae

Scientific name: *Isognomon* sp.

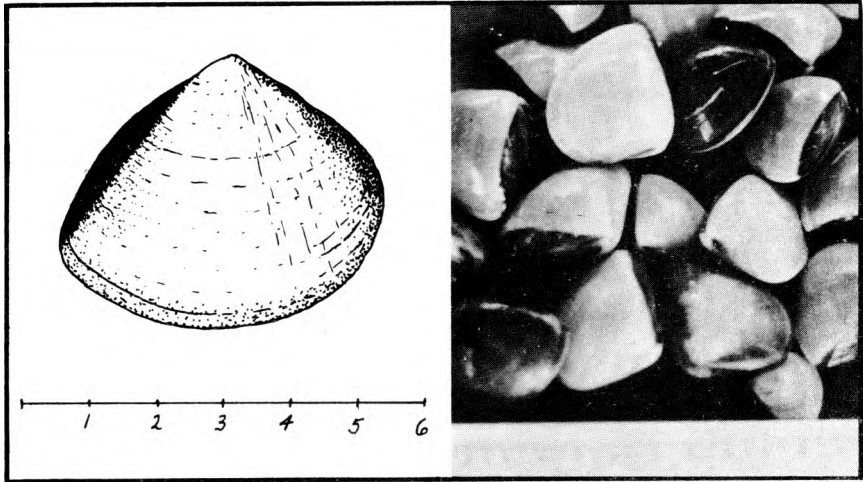
English name: unknown

Philippine name: Capiz-capiz (Ilongo),
Ilokon it Bakhaw (Aklanon)

Because of its resemblance to the Capiz shell (*Placuna placenta*), the Ilongos have named this bivalve Capiz-capiz. In Aklan, however, it is named for its habitat: Ilokon it Bakhaw means literally "armpit of the

mangrove," and it is at the juncture of the limbs and trunk that this mollusc attaches itself by its long byssal threads. They are covered at high tide, but as the tide recedes they are collected for home use and for sale in the marketplace. They cost P0.50/bag in the Makato, Aklan wet market.

These shells are used primarily for making a flavorful soup.



Family Mactridae

Scientific name: *Mactra maculata*
Linne

English name: Surf or Hen Clam

Philippine name: Kagaykay (Visayan)

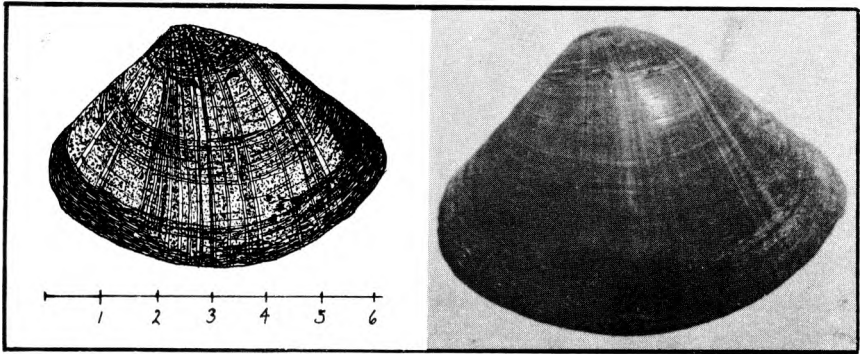
These marine clams are found on sandy beaches in the Visayas, 2 to 4 cm below the surface. Their average length is 5 to 6 cm and they vary in color from yellow-cream to orange-brown.

Kagay-kay are harvested at low tide with either a rake, which is tied to the

operators waist and pulled back and forth along a section of beach, or by twisting ones' feet back and forth in the sand, thereby uncovering the clam. If collected in the afternoon, they are placed in a bucket of fresh water and kept alive until market time the next morning.

They sell in the Kalibo, Aklan wet market for P2.00/20 pcs.

These clams are served in soups and as an appetizer or viand.



Family Mactridae

Scientific name: *Mactra mera*
 Deshayes
 English name: Hen clam
 Philippine name: "Punaw (Visayan)
 Katakaw (Tagalog)

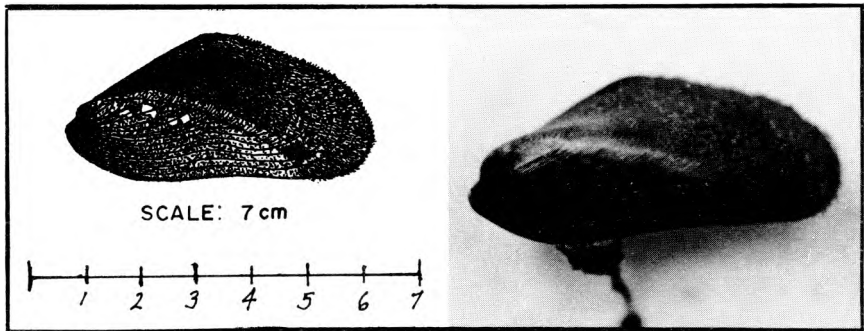
This is one of many hen clams that are used as a diet supplement in the Philippines. It lives a few centimeters below the sand, and is collected at low tide by barrio inhabitants.

These clams are rather migratory in

habit, moving upon down the shore in accordance with the direction of the current (Talavera, 1933).

Although found in the Iloilo City market, this specimen came from the island of Negros, a few hours away by boat.

Punaw are either boiled or prepared in the "ihaw" method, where they are placed on hot coals and broiled until the shells open. They are then served as an appetizer or viand.



Family Mytilidae

Scientific name: *Modiolus metcalfei*
 Hanley
 English name: Brown mussel
 Philippine name: Abahong (Visayan)

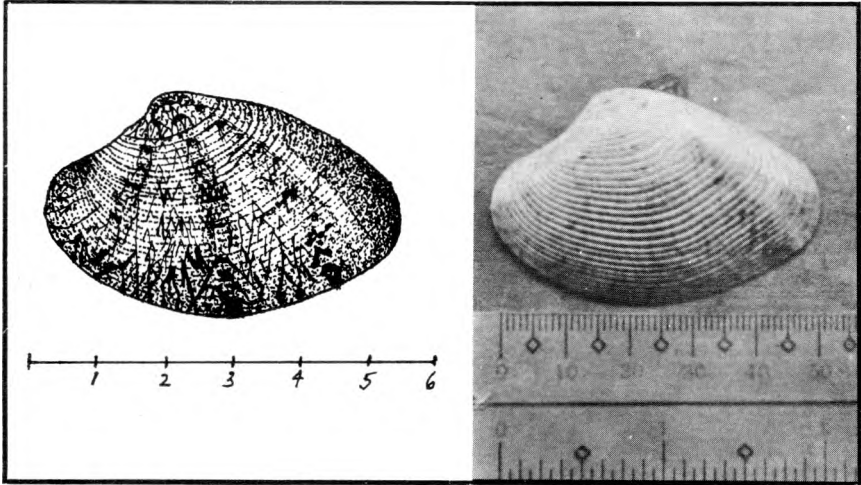
The Abahong has a very prominent umbo and is dark brown in color.

It dwells in the mud bottoms of estuaries such as Batan Bay in Aklan. It attaches itself to the bottom by its byssal threads. Unlike the green mussel, however, it seems to prefer horizontal surfaces to vertical ones, making field culture more difficult.

Modiolus metcalfei Hanley has

spawned spontaneously in captivity at SEAFDEC's Batan sub-station. The larvae were raised to the early veliger stage, and further research should lead to the development of practical methods for field culture.

These mussels sell in the Batan market for 50 centavos per glass, unshelled. They can be served boiled, but are preferred as "gina-mus." "Gina-mus" is prepared by shelling the mussel and placing the meat in a closed container with salt for 7-10 days. It is served as a condiment, appetizer or viand with rice.



Family Veneridae

Scientific name: *Paphia exavata*

English name: Venus or Surf Clam

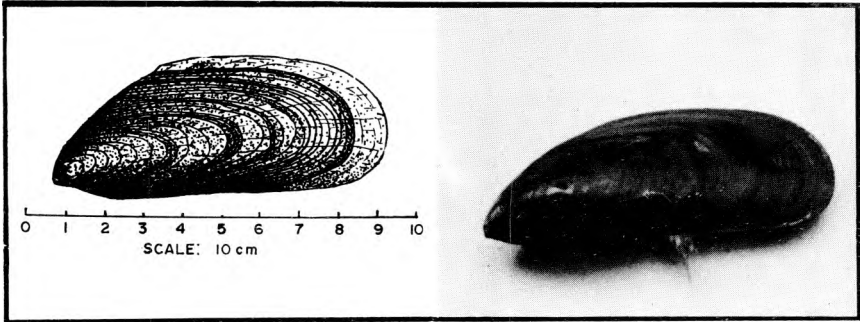
Philippine name: Balinday (Ilongo)

This marine clam exists 6-8 cm under the sand on the ocean bottom. The Balinday clams come from the island of Negros, where the coastal inhabitants dig them up at low tide, or dive for them in 1-2 m of water. They are available during the months of March, April and May and again from September to December. The rest

of the year they are considered too small for collection.

They have distinct inhalant and exhalant siphons which are used for food intake and expellation of salt water.

Balinday is available in the Iloilo City market for P2.00/20 pcs. They can be prepared by simply boiling in salted water. The "kilaw" preparation is also popular, where the clam is placed in a mixture of vinegar, onions, and ginger, and eaten raw.



Family Mytilidae

Scientific name: *Perna viridis* Linne

English name: Green mussel

Philippine name: Tahong, Amahong
(Tagalog, Visayan)

The shell of this mussel, as implied by its name, is a bright green on the outer margin, tending to a darker shade towards the center.

The green mussel is one of the most popular shellfish in the Philippines and is cultured extensively. Culture methods rely on the fact that at a certain point in development, the planktonic larvae settle on any suitable substrate present.

Bamboo staking is the most widespread method at present, bamboo being both readily available and inexpensive. The stakes are placed $\frac{1}{2}$ to 1 meter apart in "farms" located in

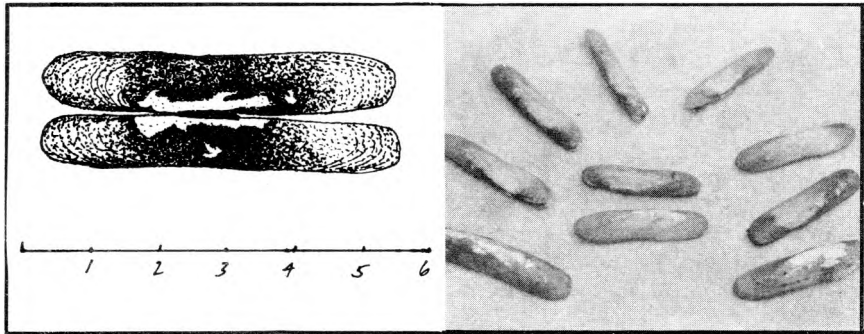
estuaries and bays along the coast. These farms can have a deleterious effect on the ecology of such an estuary as silt from the rivers builds up around the stakes, decreasing the depth and hence the production area.

Experimental methods designed to avert siltation without sacrificing production levels, utilize a variety of rope materials, floats and rafts, and are being tested in several locales.

The green mussel attaches itself to these substrates by its long byssal threads, and is ready for harvest in 6-10 months.

They sell for one to two pesos per kilo locally and are exported to Manila and abroad where they command a much higher market price.

Tahong is popular as an appetizer, in noodle dishes, and as a viand.



Family Solenidae

Scientific name: *Pharella acutidens*
Broderip and Sowerby

English name: Razor or Jacknife clam

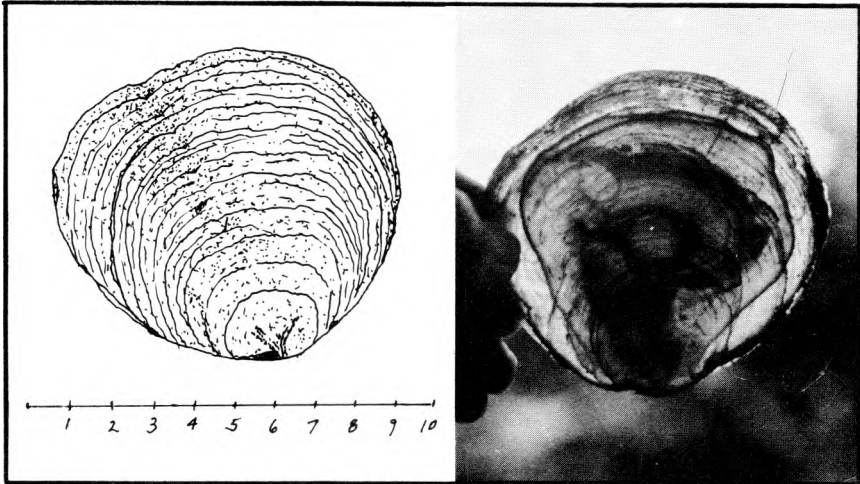
Philippine name: Tik-han (Aklanon, Ilongo), Bilaog (Visayan)

This family of clams occurs throughout the world on sandy beaches. They are collected during low tide by digging with the hands (or an old bolo knife) in the sand wherever a slight hole or depression indicates their presence. They are sold in the wet markets of Aklan and other Visayan provinces for P5.00/50 pcs, unshelled. They are brown and

black in color and range in size from 4 to 5 cm as adults.

Solenid clams are filter feeders and have an inhalant and exhalant siphon for taking in food and expelling seawater. They use their long, plunger-like foot for moving up and down in their semi-permanent burrow which extends 15-40 cm into the sand. If dislodged from this burrow, they can swim very fast by shooting water out one end of their shell.

These clams are boiled in saltwater and served in their own soup as an appetizer or viand.



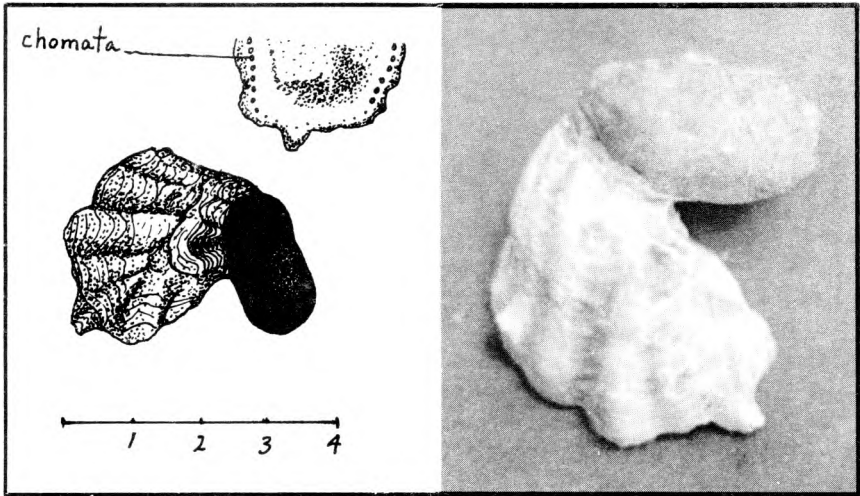
Family Placunidae

Scientific name: *Placuna placenta*
 Linne
 English name: Window Pane Shell,
 Saddle Oyster
 Philippine name: Capiz (Ilongo),
 Kapis (Tagalog), Lampirong
 (Ilongo), Pi-us (Aklanon)

This translucent bivalve is one of the most economically important molluscs in the Philippines. Its shell is used extensively for shellcraft and forms the basis for an extensive cottage industry throughout the coastal areas of Panay and elsewhere in the Visayas. The meat is popular as a viand and appetizer and the discarded, crushed shells make an excellent

calcium supplement for home-formulated hog feed.

Capiz live unattached on the surface of sandy mud beaches and mud flats in estuaries such as the "Tinagong Dagat" in Batan, Aklan. Inhabitants of Bo. Ipil, Tabon Island in Batan have developed a culture technique for these shells, which, though once abundant, are now scarce due to over-fishing. They collect them from one area when they are 4 to 5 cm in diameter and transplant them on the mud bottom near their homes where they can be protected from poachers. Nine months later they are harvested and sold in the wet market for approximately P1.00/25 pcs.



Family Ostreidae

Scientific name: *Saccostrea sp.*

English name: Oyster

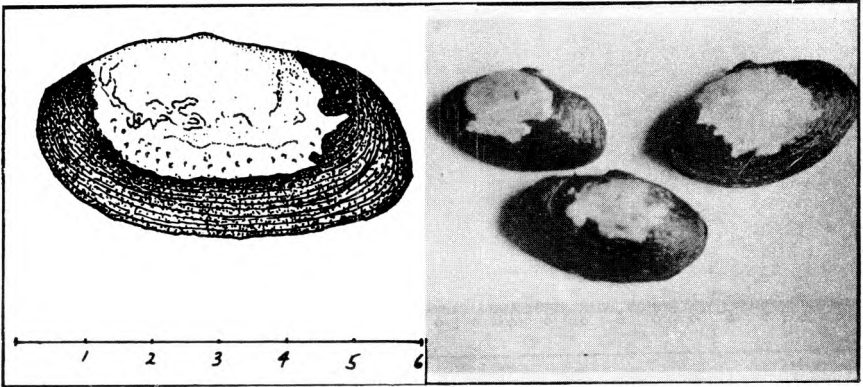
Philippine name: Si-si (Ilongo, Aklanon)

These small oysters are found attached to rocks and pilings in coastal areas throughout the Western Visayas, where they are collected to supplement family diets and for sale in the wet market. They fetch a market

price of P0.50/100 pcs., unshelled, or P2.00/quart bottle, shelled as ginamus.

Saccostrea sp. is distinguished from *Crassostrea sp.* by its smaller size and the small depressions called chomata that line the inner margins of the shell. The smooth shell margins of *Crassostrea spp.* are without chomata.

They are usually boiled in salt water and served as an appetizer or viand. Si-si is also prepared as ginamus.



Family Gariidae

Scientific name: *Soletellina elongata*
Lamarck

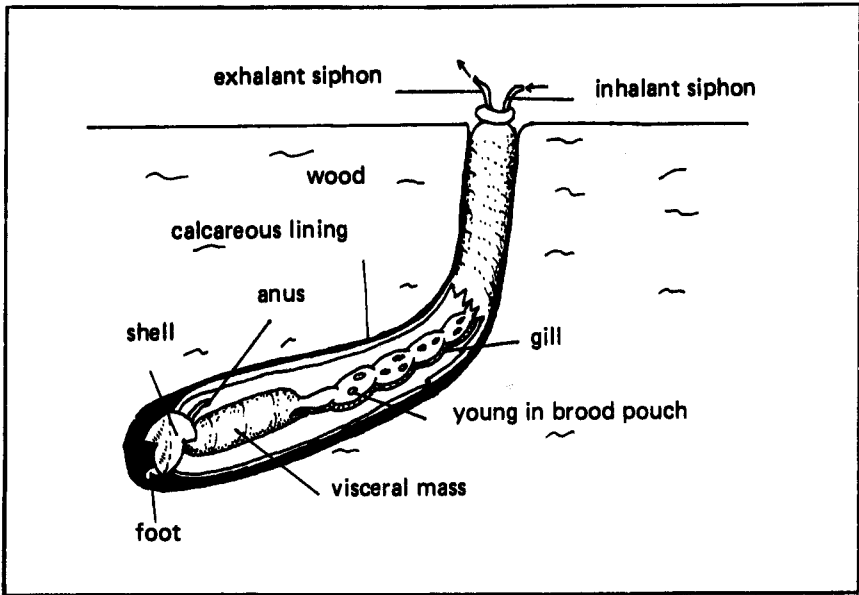
English name: Mud Clam

Philippine name: Bayuyan (Aklanon)
Paros (Tagalog)

Mud clams inhabit the mangrove mud flats where barrio folks collect

them at low tide. They are seen year round in the markets of Aklan and other Visayan provinces.

Ba-yu-yan sells for P2.00/20 pcs and is used to enhance the flavor and protein content of noodle dishes such as pancit or bijon, and may also be served boiled as an appetizer or viand.



Family Teredinidae

Scientific name: *Teredo* sp.

English name: Shipworm

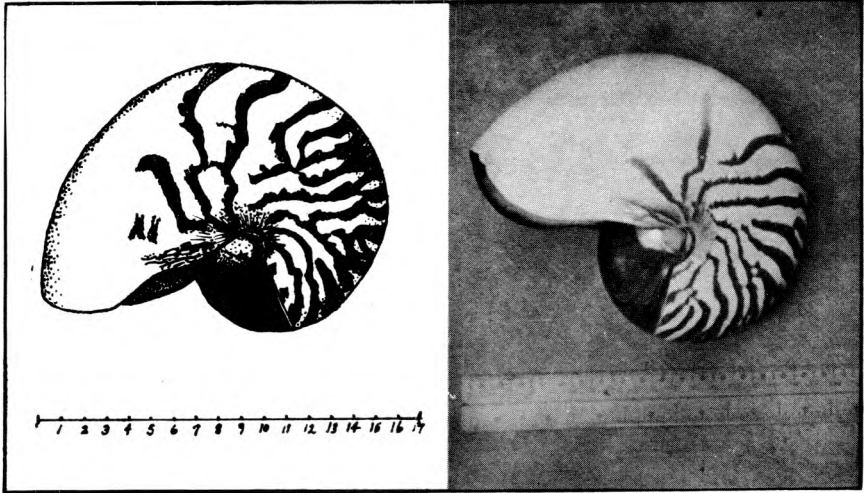
Philippine name: TAMILOK (Visayan)

These unlikely looking bivalve molluscs live in the wood of the Mangrove tree known locally as "bak-how" or "bakawan" which occurs in great swamps throughout the coastal areas of the Visayas and other parts of the Philippines and SE Asia. Because of the widespread destruction of mangrove swamps for fishpond development and the subsequent increased use of pesticides and fertilizers, the shipworm has suffered a decrease in numbers in the last ten

years and no longer appears in the marketplace. They can be obtained by special order in some areas, however.

If living in the "tabig-i" mangrove, these molluscs become poisonous to man.

Tamilok is served raw in its own fluid and is considered a fine treat by some non-squeamish souls, especially if it is served with beer. It can also be boiled or prepared in the popular "kilaw" style, where it is soaked in vinegar, soy sauce, pepper, ginger, and onion.



Family Nautilodidae

Scientific name: *Nautilus pompilius*
Linne

English name: Chambered Nautilus

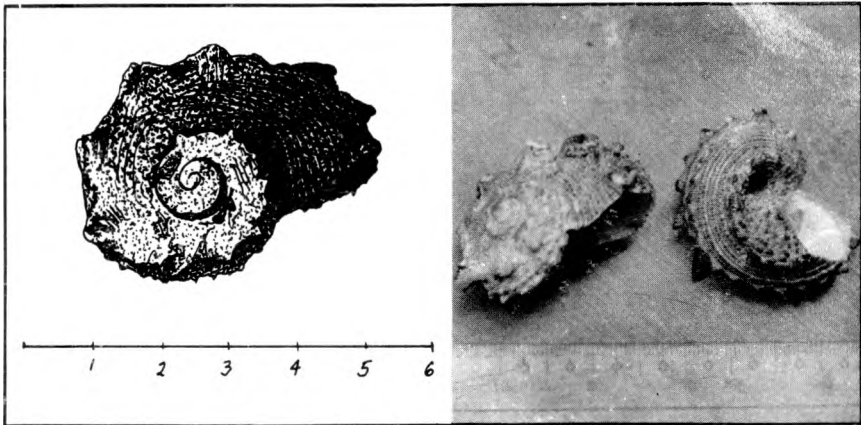
Philippine name: La-gang (Visayan)

These ancient molluscs have lurked on the ocean bottom since the Cambrian period, some 500,000,000 years ago (Barnes, 1974). They have the ability to swim very slowly, and can regulate the pressure of the gas in their chambers in order to control the depth at which they swim. The chambered nautilus feeds on crustacea. The cryptic design and red-brown coloration of its shells allows it to swim among schools of lobsters at

great depths, apparently without being detected by its prey.

They are fished for off the coast of northwestern Panay by lowering a wooden or wicker frame, baited with the entrails of one chicken, 30 to 40 fathoms into the ocean's depths.

The flesh is sold locally for P2.00/pc., but the shell is sold to commercial shell dealers from Cebu for around P7.50 each. The Chambered Nautilus shell is sold in shell shops throughout the Philippines and may also be made into pearly buttons and small table lamps.



Family Angariidae

Scientific name: *Angaria delphinus*
Linne

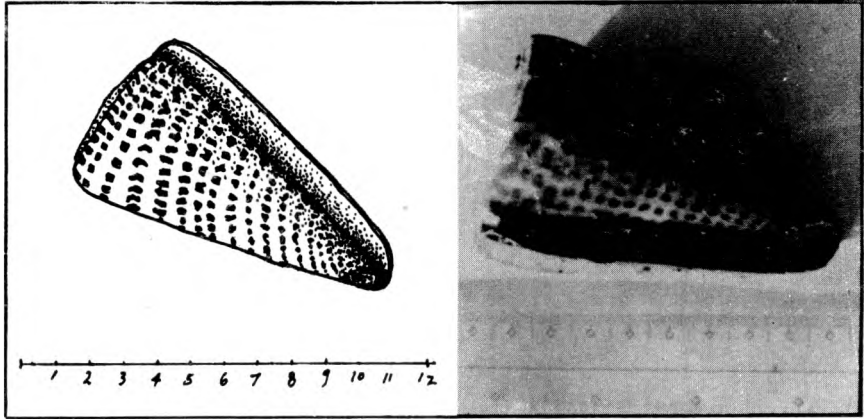
English name: Reef Dolphin or
Delphinula Shell

Philippine name: Lusob (Buruangan,
Kinaray-a)

These medium sized (average length is 5 cm) molluscs are very common in northwestern Panay, where they inhabit the coral reefs and rocky intertidal zones. At low tide they are collected for home use and for sale in the market.

Diet and local water conditions are responsible for a great variation in spine production in the Delphinula shell. In quiet waters this snail produces very long, curved spines. In shallow waters, where wave action is strong (as in the coral reef areas) the spines are very short and blunt, as illustrated above.

They are served in soups, as an appetizer and as a viand prepared in the pinayukan manner (boiled in coconut milk) or as eam-hay in vegetable dishes.



Family Conidae

Scientific name: *Conus leopardus* (Roding) nut chowers.

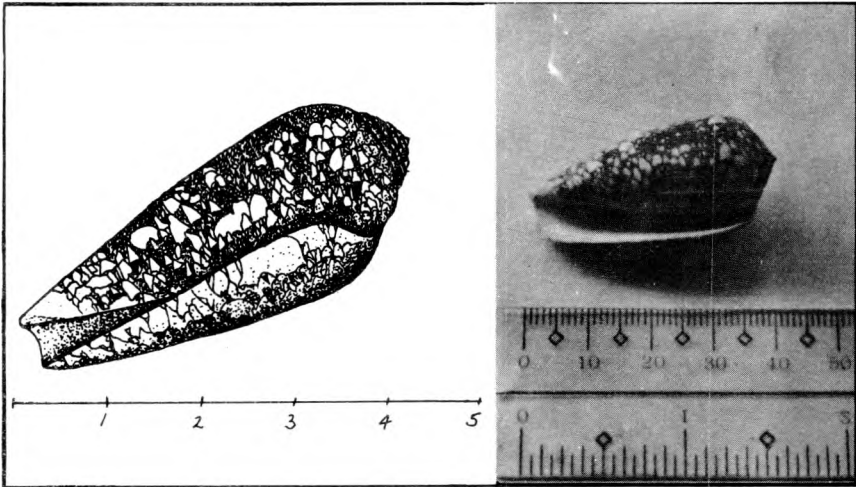
English name: Leopard Cone

Philippine name: Apugan (Visayan)

The Leopard Cone is the heaviest cone shell in the world, reaching weights of up to 4 kg.

The shell is often cut in half and used as a container for lime by betel

The Leopard Cone is seldom seen in the marketplace but is caught quite often by speargun fishermen diving around coral reefs throughout the Philippines. The meat is quite tasty and is either broiled ("ihaw") or boiled and served as an appetizer (pulutan — Tagalog; sumsuman — Aklanon) or viand (ulam — Tagalog; sula — Aklanon).



Family Conidae

Scientific name: *Conus omaria* Hwass
 English name: Unknown

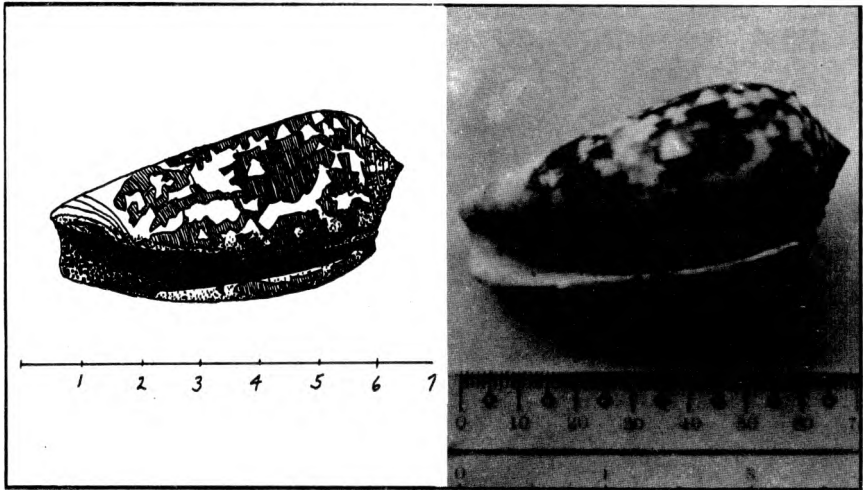
Philippine name: Apugan (Aklanon, Bulak-lak (Buruanganon), Ma-ma (Tagalog)

This beautiful brown and white cone has an average length of 5 cm. It is one of the poisonous toxoglossans, immobilizing its prey with a neurotoxic poison which enters the wound through the hollow cavity of the (radula) tooth. Its primary prey are polychaete worms, other gastropods, and fish; it is also capable of stinging humans, and care should be

taken when handling these and all other live cones.

Cone shells are often cut in half and used to store lime by betel nut users in the Philippines. Apugan means container for lime, and "ma-ma" is the Tagalog term for the betel nut chewing process.

These cones live in rocky intertidal areas in northeastern Panay and are gathered at low tide for home use. They are prepared by boiling in salted water and are popular as an appetizer, in noodle dishes and as a viand.



Family Conidae

Scientific name: *Conus striata*

English name: Striated Cone

Philippine name: Lak-lak (Visayan),
Bulak-lak (Tagalog)

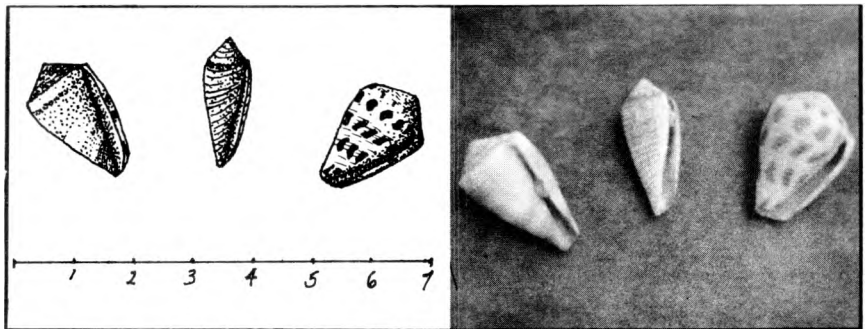
This brown and white cone, though edible, is nonetheless capable of inflicting a painful sting if handled carelessly. Cone shells should be picked up from the posterior or wide end only, and placed in a bag of thick material or a basket. It is advisable to wear gloves when handling cones as a further precaution against their poisonous sting. The striated cone lives in rocky intertidal areas and coral reefs throughout the Philippines. Its average length is 7.5 cm.

Conus striata is a piscivorous (fish-eating) species and will regur-

gitate a mucous-covered bundle of bones and fatty substances some six hours after ingestion of its prey.

The spires of many cones become the coveted "puka" shells of the Philippines. As wave action wears the shell down, the point is blunted and the body disintegrates, leaving only a small round shell bead. These are collected in great numbers on Boracay Island, Malay, Aklan, where they support a small cottage industry.

Barrio inhabitants throughout the Visayas collect the live shells for home consumption. They are usually prepared in the pinayukan (ginata-an) style and are served as an appetizer or viand.



Family Conidae

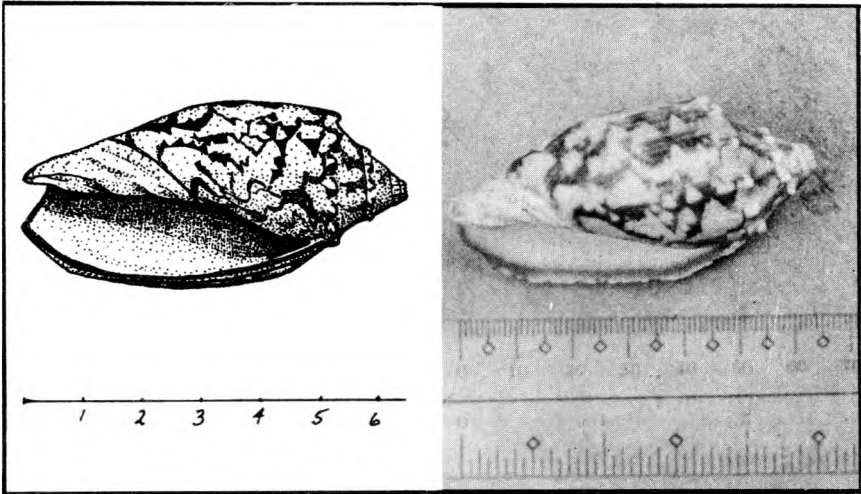
Scientific name: *Conus spp.*

English name: Cone shells

Philippine name: Dalu-dalu (Buru-anganon)

The rocky intertidal areas of northwestern Panay are littered with several different species of small

juvenile cones known locally as Dalu-dalu. Small children from coastal barrios collect these cones on a daily basis for use in home dishes such as pinayukan or for eam-hay in vegetable dishes. The shells are shattered to obtain the meat, which serves as an important protein supplement for many families in this area.



Family Volutidae

Scientific name: *Cymbiola vespertilio*
Linne

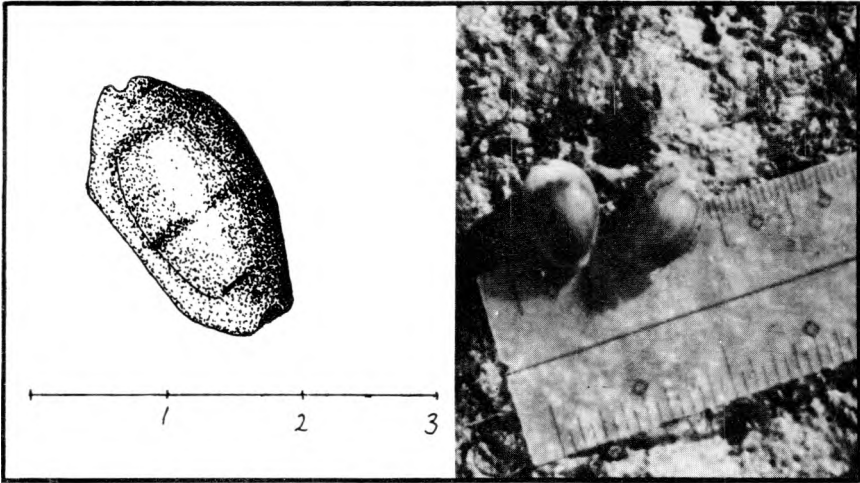
English name: Bat Volute

Philippine name: Sobra-sobra (Aklanon)

This brown colored volute is quite common in the rocky intertidal areas of northwestern Panay, where it is collected by barrio people to supplement their protein-deficient diets.

Most volutes are coiled dextrally, or in a clock-wise direction, but a genetic aberration in about one in ten thousand Bat Volutes results in sinistral coiling (counter-clockwise). The shell of such a freak animal will have its opening on the left side if held with the anterior end up.

These molluscs are usually prepared in the pinayukan style or as eam-hay.



Family Cypraeidae

Scientific name: *Cypraea moneta*
Linne

English name: Money Cowrie

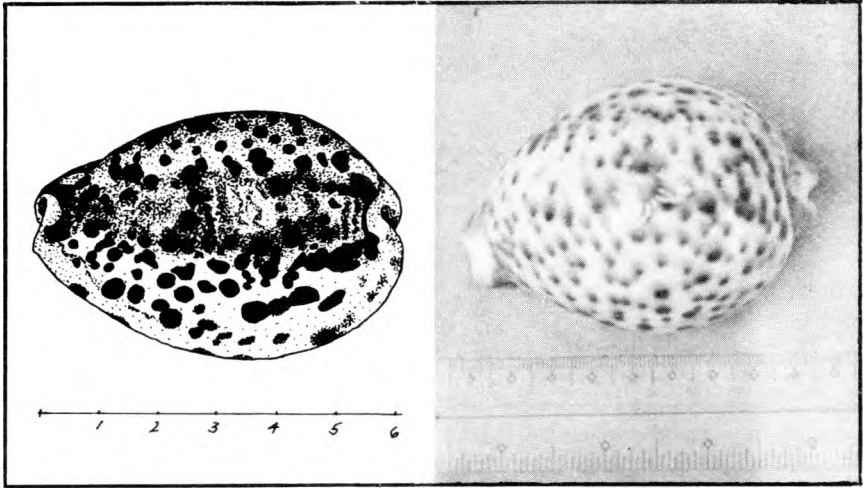
Philippine name: Sigay (Visayan)

This small (average length is 3 cm) cowrie varies in color from grey to yellow and may have obscure yellow spiral bands. It is found attached to

the underside of rocks in intertidal areas and is collected by women and children at low tide for home use.

The money cowries were used for centuries as currency throughout much of the Indo-Pacific region.

Sigay is served in a tasty seafood soup.



Family Cypraeidae

Scientific name: *Cypraea tigris* Linne

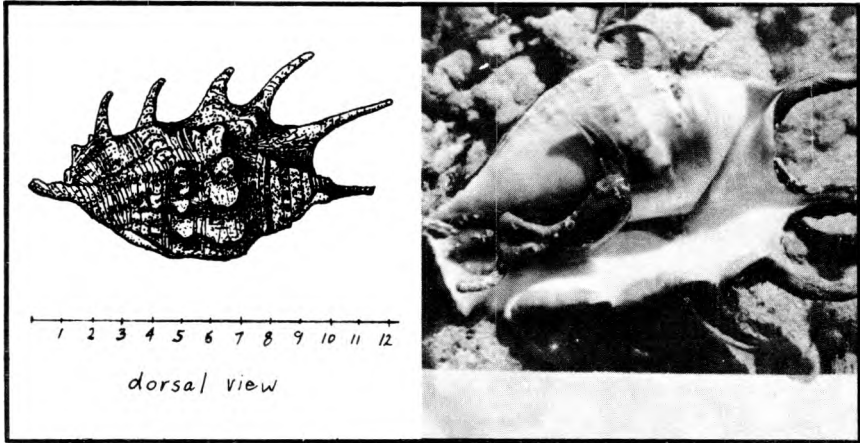
English name: Tiger Cowrie

Philippine name: Batotoy (Visayan)

These beautiful shells are found near coral reefs and in rocky intertidal areas on Borocay Island, Malay, Aklan, and other places throughout the Visayas. On Borocay, they are collected at night during the first two quarters of the moon when the tide is low.

The Tiger Cowrie was considered a symbol of sex and fertility in ancient times, and even today in the Ryukyu Islands of Japan a woman giving birth holds one in each hand to assure easy delivery of her child.

The meat of this cowrie is boiled and eaten as an appetizer and the shells are sold in rest houses and shell shops on Borocay and throughout the Philippines.



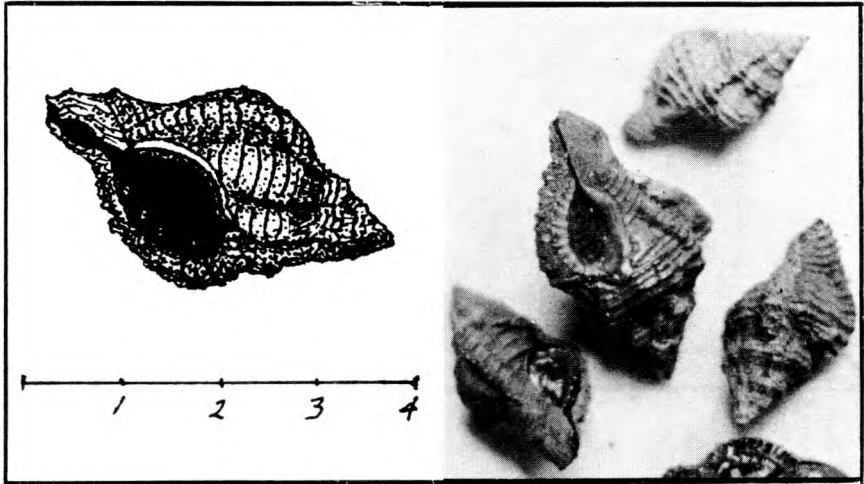
Family Strombidae

Scientific name: *Lambis lambis* Linne
 English name: Common Spider conch
 Philippine name: Baka-baka (Visayan)

dorsal surface is covered with a cryptically colored periostracum which hides a beautiful dark red and white striped shell. Its average length is 13 cm.

This conch gets its English name from its arachnid-like appearance, but the Filipinos have named it for its means of locomotion: Baka-baka means "resembling a cow," and as it plods slowly along over the ocean bottom, the image it provokes is indeed bovine. *Lambis lambis* has a salmon pink colored underside but its

These common conches are collected by divers on and around shallow coral reefs throughout the Visayas. They are usually consumed in the home but are occasionally sold in the wet market. They are very meaty and are either broiled ("ihaw" method) or boiled and served as a viand with rice or as an appetizer.



Family Muricidae

Scientific name: *Ocenebra sp.*

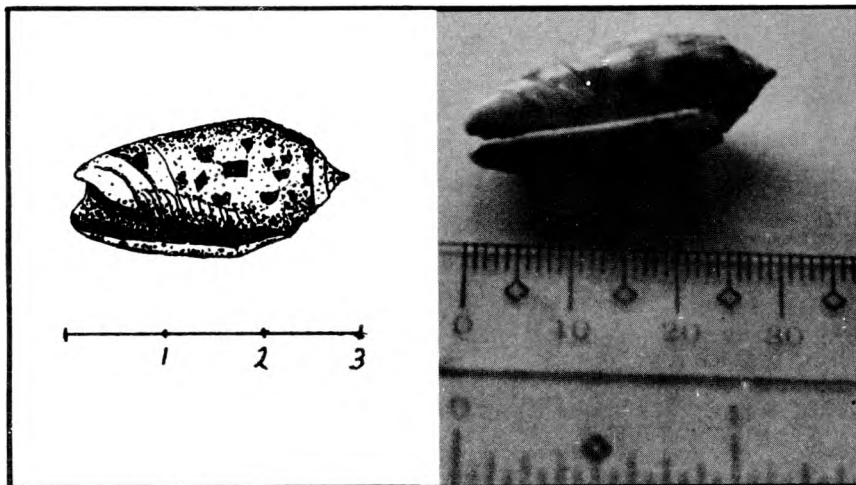
English name:

Philippine name: Hale-hale (Aklanon)

This common snail is collected from brackish water mangrove swamps near fishponds throughout the Visayas. The shell is dull grey, with a

purple colored aperture.

Hale-hale sells for P2.00/20 pcs in the wet market and is usually boiled and eaten as an appetizer, or if abundant, for viand. The meat is removed from the shell with a pointed object such as a pin, the thorn from a local orange tree, or a sliver of bamboo.



Family Olividae

Scientific name: *Oliva annulata*
Gmelin

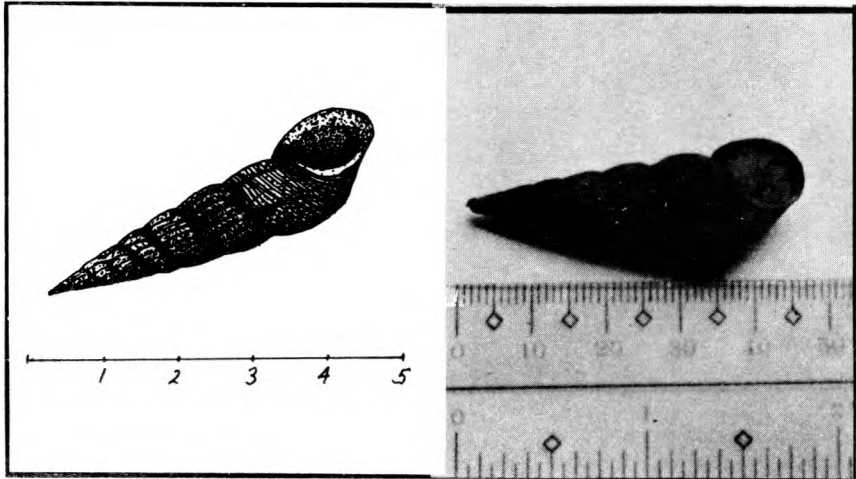
English name: Olive Shell

Philippine name: Bibi-bibi (Buruangan), Lak-lak (Aklanon)

Olive shells live on sandy bottoms and feed on bivalve molluscs, other gastropods, and echinoderms. They are common throughout the Philippines. In Buruanga, Aklan, this brown

and white speices is collected at low tide for home use, but is not usually found in the marketplace.

The meat is removed from the shell with a pin after boiling and is cooked in the eam-hay (Aklanon) or sahob (Tagalog) manner where it is mixed with root crops like gabi and kamote and the Filipino squash, kalabasa.



Family Potamidae

Scientific name: *Potamides sp.*

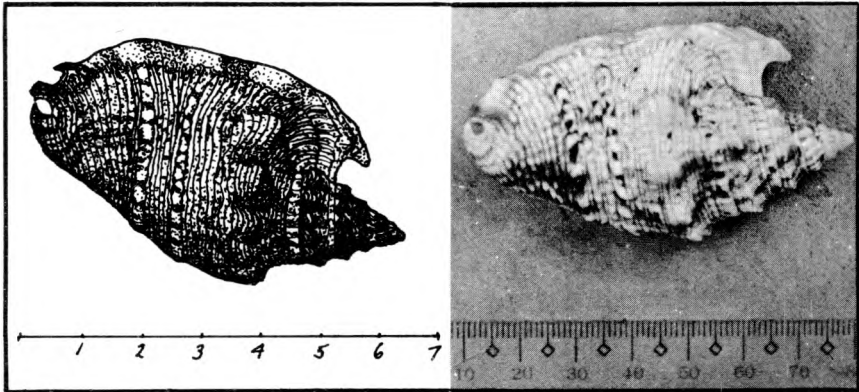
English name: Unknown

Philippine name: Banag (Kinaray-a)

This freshwater snail is found in colonies in fresh water areas such as rivers and ponds, in Antique province

and throughout the Visayas.

They sell for P1.00/100 pcs in the Culasi, Antique market and are cooked in coconut milk in the "pinayukan" style. The flesh is then sucked out of the shell in the "sup-sup" manner.



Family Strombidae

Scientific name: *Strombus bulla*
Roding

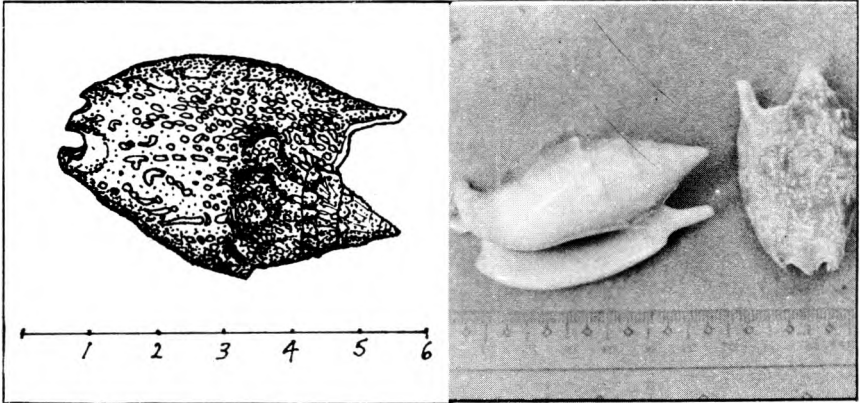
English name: Stromb-type Conch

Philippine name: Baka-baka (Aklanon,
Buruanganon)

This is another common stromb living in the Philippines and other Indo-Pacific countries. Like *Strombus*

aurisdiane Linne which it closely resembles, it lives in sandy lagoons and intertidal areas near coral reefs.

In the Philippines it is a common protein source and is cooked in vegetable dishes as eam-hay and in coconut milk in the pinayukan style.



Family Strombidae

Scientific name: *Strombus aurisdianae*
Linne

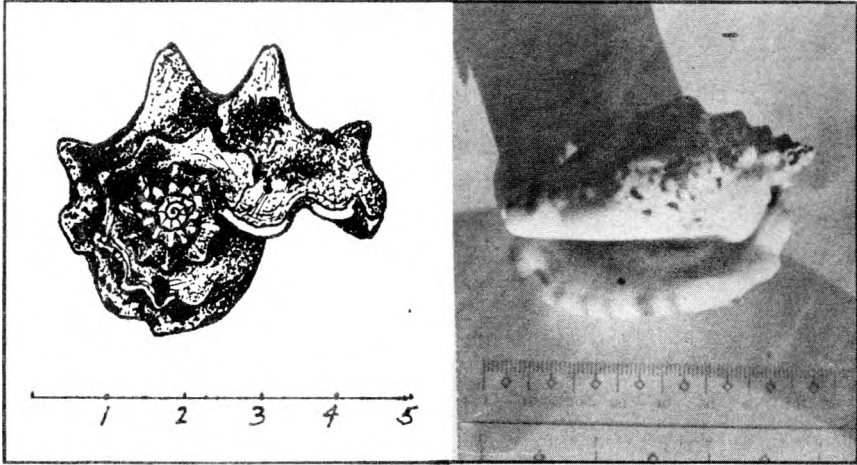
English name: Stromb-type Conch

PHilippine name: Baka-baka (Aklanon, Buruanganon)

sandy lagoons close to coral reefs. It may grow to as long as 8 cm, and is found throughout the Indo-Pacific region which stretches from the Indian Ocean to the islands of Fiji and beyond.

This attractive species is commonly collected from intertidal zones and

This Baka-baka shell is used in local dishes as eam-hay, and may also be cooked in the pinayukan style.



Family Strombidae

Scientific name: *Strombus lentiginosus*
Linne

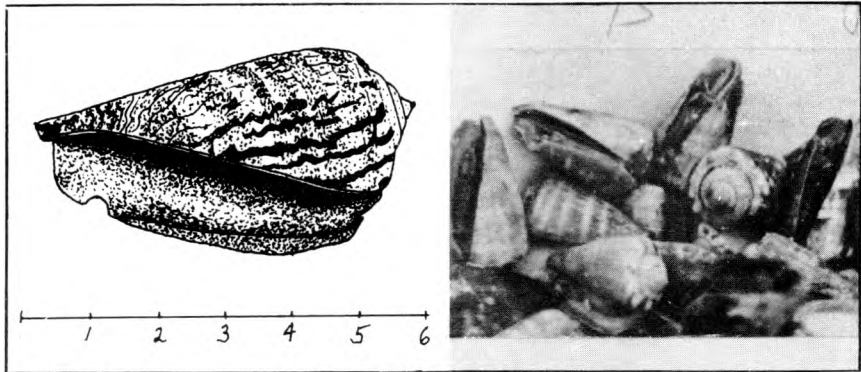
English name: Mercenary Conch

Philippine name: Kanding-kanding
(Kinaray-a), Lusob-lusob (Buru-
anganon)

This attractive conch is named Kanding-kanding (goat-like) for the two prominent "horns" on the dorsal side of its shell. Fittingly, it is also a vegetarian. It has brown and white markings and a pink-colored aperture. Its average length is 7.5 cm.

It is quite common in the wet market of Culasi, Antique in Panay Island where it sells for P0.20/3 pcs. Inhabitants of two offshore islands (Mararison and Batbatan) collect them on intertidal sand flats near a large coral reef. During low tide gatherers simply walk onto the flats (using a flashlight if collecting at night) and pick them up. At high tide, they are gathered by divers.

The meat is boiled or broiled as viand or appetizer.



Family Strombidae

Scientific name: *Strombus luhuanus*
Linne

English name: Strawberry or Luhu
Conch

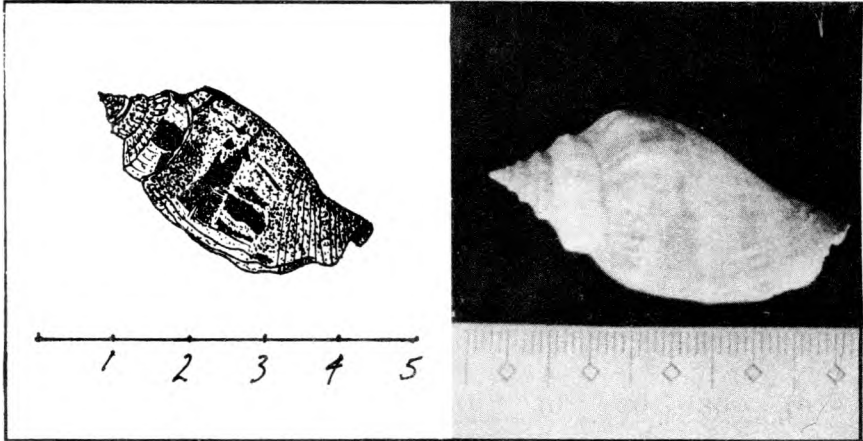
Philippine name: Pasyak (Buruanga-
non, Kinaray-a), Kidokay (Aklanon)

This colorful (brown-red and white body, chocolate brown columella and red outer lip) shell is extremely common in rocky intertidal areas and coral reefs near Culasi, Antique

on Panay Island.

Barrio women gather them at low tide and sell them in the wet market where they are available throughout the year for P0.20/5 pcs. Their shells are utilized by local fishermen as weights for their small beach seines.

Pas-yak are considered the tastiest shell in Culasi and are served boiled as an appetizer or viand.



Family Strombidae

Scientific name: *Strombus spp.*

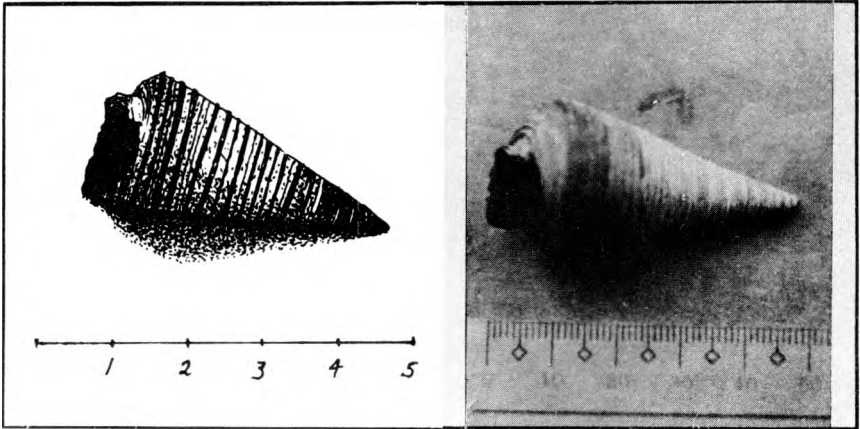
English name: Small Conch

Philippine name: Sikad-sikad

These small conches live in sandy-rocky intertidal areas throughout the Visayas and SE Asia and move in a manner unique among gastropods. Using their muscular foot and operculum (which is formed into a large claw) they kick ("sikad") forward by rapid contraction of the columella

muscle. Hence the local name sikad-sikad.

They are collected by women and children at low tide and are used extensively as a protein supplement in barrio family diets. They are usually cooked in vegetable dishes as eam-hay. The shell is cooked whole with vegetables such as kamote, gabi and kalabasa. When eating, the meat is simply sucked out of the shell, a process called "sup-sup" (which is the sound made by the eater).



Family Potamididae

Scientific name: *Telescopium telescopium* Linne

English name: Telescope shell

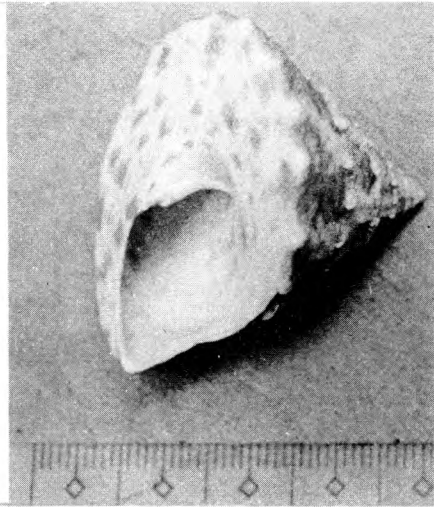
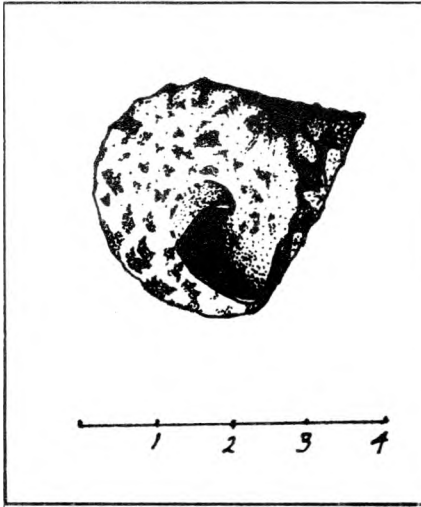
Philippine name: Bagongon (Visayan)

These common brackishwater snails live near the surface of intertidal mangrove mudflats throughout the Philippines. They are usually found in the shady upper parts of the mudflats near the trees. They forage in the algae-rich mud and feed mainly at night or during rainy periods.

Bagongon are brown and black in color and have an average length of 5 cm.

Barrio inhabitants collect these snails from fishpond areas and sell them in the marketplace, or more commonly, use them to supplement their diets. In the market, they sell for P1.00/two-liter sack.

Bagongon is usually prepared in the pinayukan or ginatan (cooked in coconut milk) manner.



Family Trochacea

Scientific name: *Trochus niloticus*
Linne

English name: Commercial Top Shell

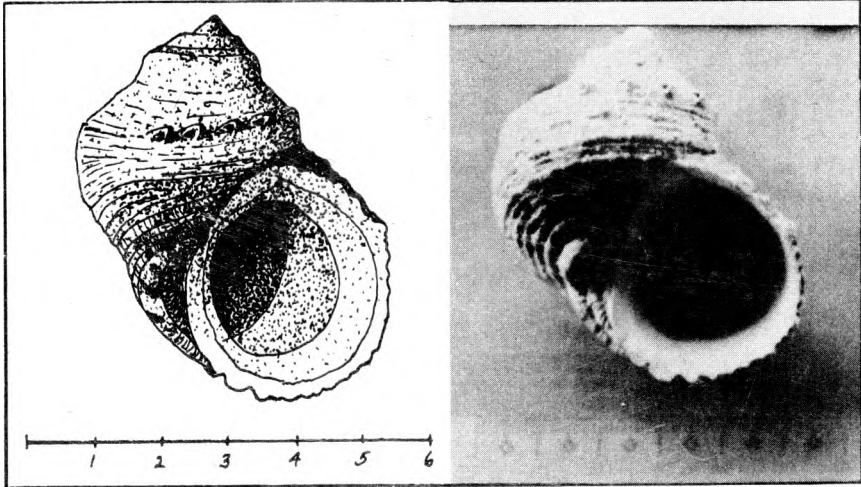
Philippine name: Alin-susu (Aklanon),
Alipulos (Buruanganon)

Members of this family of gastropods live on algae-strewn ocean bottoms and on coral reefs throughout SE Asia and the Pacific at depths of 3 to 7 fathoms. The flesh is succulent and the nacreous shell is made into pearly buttons, supporting cottage industries in some areas.

In northwestern Panay, they are a

common protein supplement and are collected from coral reefs by local divers at high tide.

Researchers at the Micronesian Mariculture Demonstration Center in Palau, Caroline Is., and the University of Hawaii have found that these molluscs are quite easy to spawn and raise (naturally occurring algae in outdoor rearing tanks precludes any necessity for supplemental feeding) for reseeding coral reefs with overfished natural stocks. This technology could be adapted to Philippine conditions to the benefit of local inhabitants.



Family Trochaceæ

Scientific name: *Turbo chrysostoma*
Linne

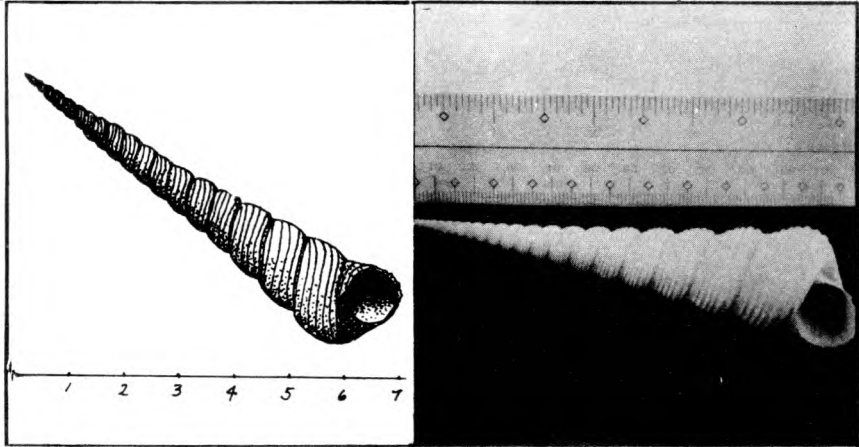
English name: Turban Shell

Philippine name: Bulalu (Kinaray-a),
Bugtungan (Buruanganon)

This common turban shell has a yellow-gold aperture deepening to bright orange within. Its average length is 4.5 cm.

They are collected from the rocky intertidal areas of northern and western Panay and are sold in the wet markets of the region. *Turbo chrysostoma* is common throughout the Philippines.

Bulalu is boiled and served as an appetizer or viand.



Family Turritellidae

Scientific name: *Turritella terebra*
Linne

English name: Turritella Snail

Philippine name: Libud-libud
(Aklanon)

The long, thin Turritella snails (average length is 10 cm) are mud or sand-dwelling and inhabit the intertidal areas of most coastal provinces

in the Philippines.

Like many other gastropods, they are utilized as a free, easily obtainable protein source for barrio families. They are usually prepared in the pinayukan and eam-hay manner. When cooked, the pointed end of the shell is broken off and the meat is sucked out sup-sup style.

SHELL RECIPES

EAMHAY is a basic ingredient in a vegetable dish and is often referred to as fish, meat, chicken, shrimps, or molluscs. When shells are used as "eamhay" for squash and other vegetables the shells must be cooked with the vegetables to enhance the flavor (besides the seasonings).

GINAMUS nga abahong is prepared by shelling the mollusc then salting the meat or flesh. It takes from seven to ten days after salting to serve the full ripened ginamus. Proportion: use 4 measures of abahong to one of salt. Any mollusc may be used.

PINAYUKAN is a general term for dishes prepared with coconut milk, be it with vegetables, fish, chicken, or shells or in combination. How to prepare coconut milk or pinayukan:

1. Use fully matured coconut.
2. Grate the nut meat very fine.
3. To every nut grated add about $\frac{1}{2}$ cup water; work with the hands to facilitate extraction of the thick or rich milk. Strain through wire strainer to separate the meat from the milk; set aside.
4. Repeat the process of extraction by adding about one cup water to the coconut; strain. This is known as the second extraction or thin extraction. It is used to cook the vegetables with the seasonings and the shells.
5. In the last few minutes of cooking time the rich milk or first extraction is added; set to boil a few minutes. Seasoning is the last addition, to improve the taste

and palatability of the dish.

Tahong Soup

Ingredients:

- 1 piece of ginger sliced thin
- 3 cloves of garlic, pounded
- 1 onion, chopped
- 2 pieces tomatoes, chopped
- 1 liter unshelled Tahong (green mussel)
- dash of pepper and salt

Preparation:

1. Clean Tahong shells with a brush, set aside.
2. Saute garlic, onion, tomatoes and ginger.
3. Add a cup of water, bring to a boil;
4. Add Tahong and season.
5. Remove from fire when the shells open. Overcooked shells make tough meat.
6. Serve Tahong as soup.

Cold Rice Salad with Seafood and Vegetables

Ingredients:

- cold poached Tahong, abahong, etc.
- shrimp
- marinated mushrooms
- leeks
- pimientos
- tiny peas with rice
- celery and parsley, plus dill, thyme or oregano for seasoning
- Vinaigrette salad dressing

Preparation:

Simply combine ingredients in a large salad bowl and add dressing. Serve chilled.

(From: Woman's Home Companion, April 1, 1981 9:32-33.)

Stuffed Tahong (Green Mussel)

Ingredients:

30-35 pieces Tahong in the shells (large)
3 T. pork adobo or fresh, chopped fine
2 T. onions, chopped fine
2 cloves garlic, (large) pounded
4 T. bread crumbs
1 large egg, well beaten
Fat for cooking, salt, powdered pepper

Preparation:

1. Steam or boil Tahong only until shells open.
2. Remove flesh from shell; cut into very small pieces; set aside; save some good sized shells.
3. Saute garlic and onions in 2 T. fat.
4. Add pork and cook if fresh meat is used, stir until done.
5. Add Tahong; season with salt and pepper stirring often to avoid scorching.
6. Remove from fire; add bread crumbs, and beaten eggs to moisten mixture.
7. Refill shells with the cooked Tahong.
8. Dust with bread crumbs; spread beaten egg to cover the top.
9. Fry or bake.

LIST OF SCIENTIFIC NAMES

Phylum Mollusca

Class Bivalvia

Amusium pleuronectes Linne
Anadara granosa Linne
Anadara sp.
Arca antiquata Linne
Brachidontes sp.
Cardium subrugosum
Circe gibba Lamarck
Crassostrea iredalei
Donax sp.
Geloina striata Linne
Isognomon sp.
Mactra maculata Linne
Mactra mera Deshayes
Modiolus metcalfei Hanley
Paphia exavata
Perna viridis Linne
Pharella acutidens Broderip and
 Sowerby
Placuna placenta Linne
Saccostrea sp.
Sotellina elongata Lamarck
Teredo sp.

Class Cephalopoda

Nautilus pompilius Linne

Class Gastropoda

Angaria delphinus Linne
Conus leopardus (Roding)
Conus omaria Hwass
Conus striata
Conus spp.
Cymbiola vesperilio Linne
Cypraea moneta Linne
Cypraea tigris Linne
Lambis lambis Linne
Ocenebra sp.
Oliva annulata
Potamides sp.
Strombus aurisdianae Linne
Strombus bulla Roding
Strombus lentiginosus Linne
Strombus luhuanus Linne
Strombus spp.
Telescopium telescopium Linne
Trochus niloticus Linne
Turbo chrystostoma Linne
Turritella terebra Linne

LIST OF PHILIPPINE NAMES

Abahong	Kidoeday	Bulalu	Sarap-sarapan
Agihis	Kilaput	Bugaton	Sigay
Alin-su-su	Lagang	Bugtangan	Sisi
Alipulos	Lak-lak	Bulak-lak	Sikad-sikad
Apugan	Lampirong	Bayuyan	Silutan
Apugan	Libud-libud	Capiz	Sobra-sobra
Bagongon	Litob	Capiz-capiz	Tahong
Baka-baka	Litob-litob	Dalu-dalu	Talaba
Baka-baka	Lusob-lusob	Halaan	Tamilok
Balinday	Lusob	Hale-hale	Tik-han
Banag	Ma-ma	Ilokon it bakhaw	Tuway
Barko-barko	Pasyak	Kagaykay	
Batotoy	Pi-us	Kamot-pusa	
Bibi-bibi	Punaw	Kanding-kanding	

GLOSSARY

Adductor muscle scars: scars on the interior of the shell left by the muscles which close the bivalve shell; normally one or two are present.

Anterior: refers to the end which is in front when the mollusc is crawling. c.f. posterior.

Aperture: in gastropods only, it is the space at the end of the body whorl into which the mollusc can withdraw itself.

Body whorl: the last and largest whorl or turn which terminates at the aperture of the shell.

Byssus or byssal threads: A bundle of chitinous threads laid down by the bivalves' foot and used by some species for attachment.

Cardinal hinge teeth: projections located about the middle of the hinge which fit into complementary depressions in the opposite valve.

Chomata: small depressions lining the inner shell margin of *Saccostrea* spp. which distinguish it from *Crassostrea* spp.

Columella: the thickened axis of the shell about which the whorls are developed.

Dorsal: refers to the upper portion of a bivalve shell on the hinge side.

Hinge: the dorsal region of the shell along which the valves meet and where they may be held together by interlocking teeth.

Intertidal zone: coastal areas that are periodically inundated and exposed by the cyclical movements of the tides. They are usually rich in marine life and may be rocky, sandy, or both.

Ligament: a band of fibers in the hinge which react against the pull of the adductor muscles and open the shell by forcing the valves apart.

Lip: the edge of the body whorl which borders the aperture. The outer lip is that part of the lip which is away from the center of the shell.

Mantle: the fleshy cape of the live mollusc which secretes its hard, calcium carbonate shell.

Pallial line: the mark on the inside of the shell left at the position of attachment of the mantle lobes.

Pallial sinus: an indentation in the pallial line, sometimes pronounced, always with its opening in the posterior half of the shell and sometimes with its lower margin confluent with part of the pallial line.

Periostracum: a horny covering which

overlays the exterior of the shell in many species and, like the shell, is secreted and shaped by the fleshy mantle of the animal.

Posterior: refers in bivalves to the half of the shell containing the hinge; in gastropods it is the area where the apex or spire is located.

Spire: in gastropods, the pointed end

which is also the point of origin of growth.

Umbo: the apex or point from which growth of the valves commences, hence it is the oldest part of the shell.

Ventral: in bivalves, the side of the shell opposite the hinge. c.f. dorsal.

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About the Author

Richard L. Edwards is currently working as a U.S. Peace Corps Volunteer in Batan, Aklan, Panay Island, where he serves as a technical advisor for fishpond and mussel farm projects. His term of service will be completed in August of 1981.

Prior to his Peace Corps assignment, he received a B.S. in Biology (emphasizing marine biology and ecology) from the University of Oregon in Eugene, Oregon. He spent one term at the Oregon Institute of Marine Biology in Charleston, Oregon studying invertebrate zoology and worked for nine months researching the culture of *Tilapia spp.* in a solar greenhouse. He also worked for a short time as a biological aide in a large salmon hatchery in Springfield, Oregon.

Mr. Edwards' interest in edible molluscs arose from his work with mussel farmers and from his experience living in an impoverished coastal barrio in Batan where he found that live molluscs collected from the beaches, rocky intertidal zones and fishponds near his home were utilized extensively as a protein source for the families in the area. His travels throughout the coastal areas of Panay as well as extensive dialogues with other mariculture workers confirmed for him that molluscs are an important protein source in the Philippines and that a field guide to these animals would be of interest to mariculture scientists looking for new species to raise in captivity, students, shell collectors, and others with a general curiosity about molluscs and how they are utilized by the Filipino people.

