Study of Shells
conchology & shell collecting

Topics

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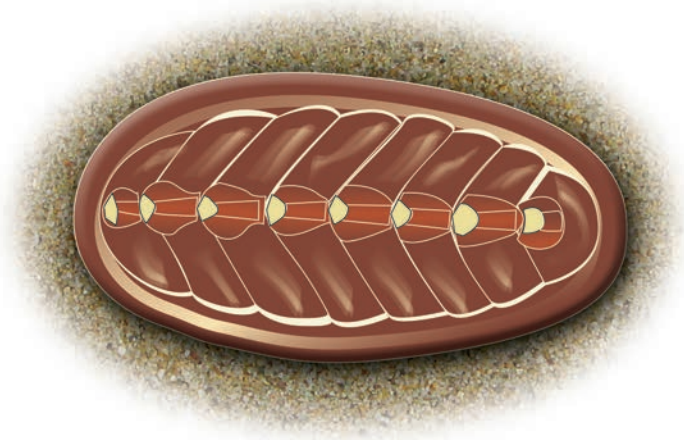
Description & History

Conchology (from Ancient Greek: κόγχος konkhos, "cockle") is the study of mollusc shells. If the mollus as a whole is studied including it's internal soft parts, it is called malacology. The focus of this brochure is the study of mollusc shells from a collector's point of view. Conchology is sometimes seen as an archaic study, due to the fact that only one aspect of the mollusc is being studied. However, a shell often gives at least some insight into molluscan taxonomy, and historically the shell was often the only part of an exotic species that was available for study. Even in current museum collections it is common for the dry material (shells) to greatly exceed the amount of material that is preserved whole in alcohol. There are currently an estimated 100,000 species of mollusks worldwide.

Conchologists mainly deal with four molluscan orders: the gastropods (snails), bivalves (clams), Polyplacophora (chitons) and Scaphopoda (tusk shells). Cephalopods only have small internal shells, with the exception of the Nautiloidea. Due to loss of genetic information, some groups, such as the sea slug nudibranchs, have either lost their shells altogether, or have been left with only a protein support structure.

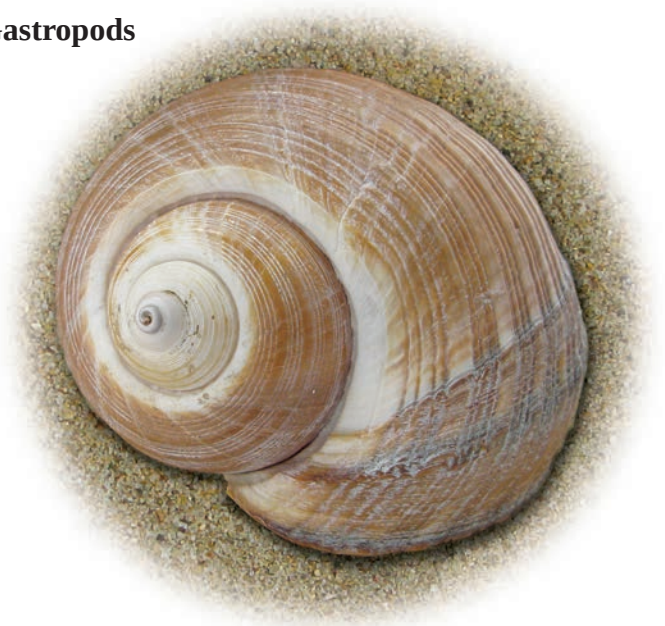
Here are some examples of the 4 main groups.

Chitons



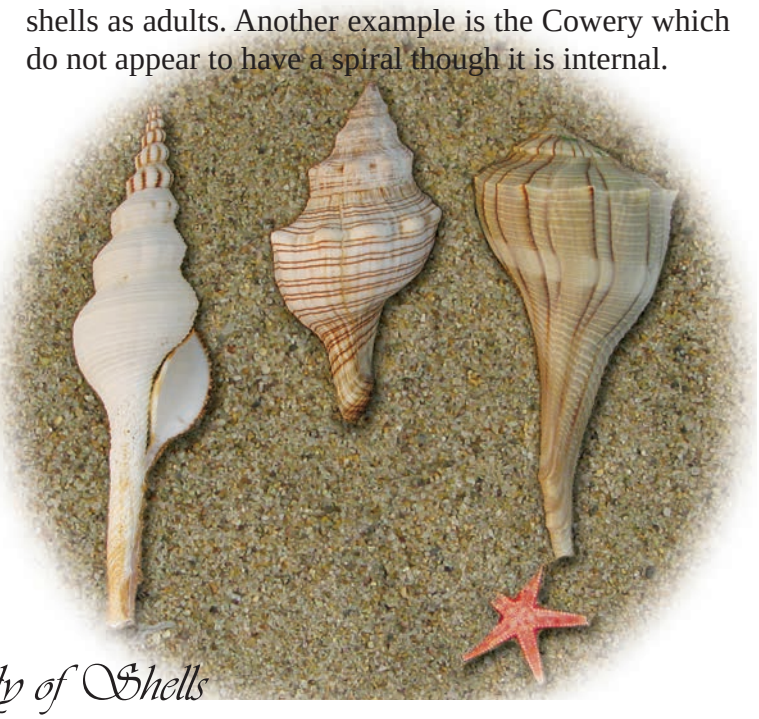
Known as sea cradles or "coat-of-mail" shells, they have a dorsal shell which is composed of eight separate shell plates or valves. These plates overlap somewhat at the front and back edges, and yet articulate well with one another. Because of this, although the plates provide good protection for impacts from above, they nonetheless permit the chiton to flex upward when needed for locomotion over uneven surfaces, and also allow the animal to slowly curl up into a ball when it is dislodged from the underlying surface. The shell plates are surrounded by a structure known as a girdle.

Gastropods



The gastropod shell is an external skeleton or exoskeleton, which serves not only for muscle attachment, but also for protection from predators and from mechanical damage. In land snails, in some freshwater snails and in intertidal marine snails, the shell is also an essential protection against the sun, and against drying out.

Most gastropod shells are spirally coiled. The coiling is usually right-handed, but in some taxa the coiling is left-handed and in a very few species there can be both right-handed and left-handed individuals. The majority of gastropods do have a shell. In almost every case the shell consists of one piece, and is typically spirally coiled, although some groups, such as the various families and genera of limpets, have simple cone-shaped shells as adults. Another example is the Cowery which do not appear to have a spiral though it is internal.



Cephalopods

Nautiluses and the extinct Ammonites and Orthoceras are the only extant cephalopods which have an external shell.

Bivalves

The shell of the Bivalvia is composed of two parts, two valves which are hinged together and joined by a ligament. Example of this is a clam or oyster.

Scaphopods

The shell of many of the scaphopods ("tusk shells") resembles a miniature elephant's tusk in overall shape, except that it is hollow, and is open at both ends.

Interesting fact about identifying shells is the smoother they are the more rougher the seas where they came from.

History of Seashell Collecting

Molluscs have probably been used by humans as a food source for many thousands of years. Shell collecting, the precursor of conchology, probably goes back as far as there have been humans living near beaches.

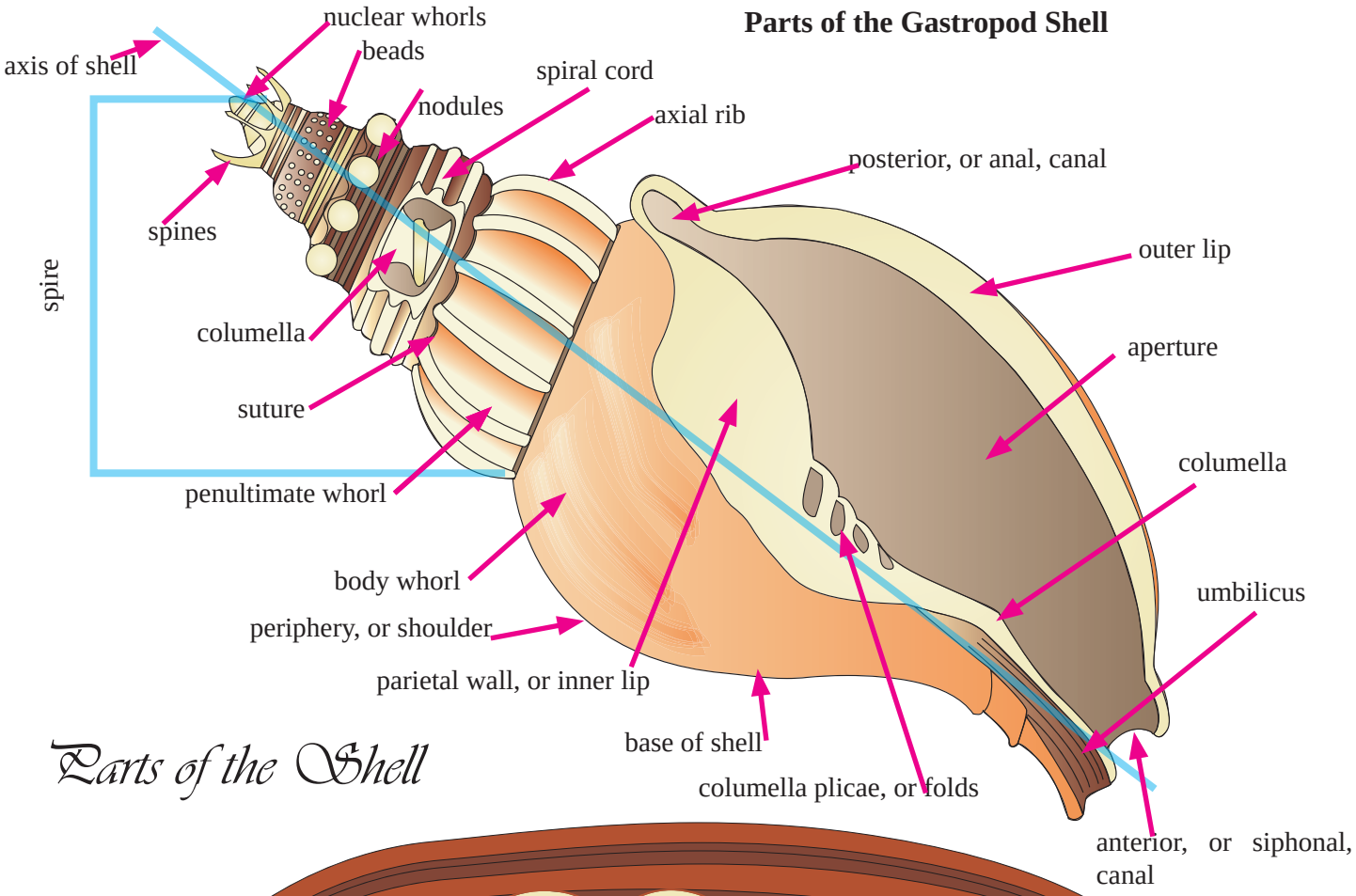
Ancient seashell necklaces have been found, sometimes in areas far from the ocean, indicating that they were traded. Shell jewelery is found at almost all archaeological sites, including at ancient Aztec ruins, digs in ancient China, and the Indus Valley.

During the Renaissance people began taking interest in natural objects of beauty to put in cabinets of curiosities. Because of their attractiveness, variety, durability and ubiquity, shells became a large part of these collections. Towards the end of the 17th century, people began looking at shells with scientific interest. Martin Lister in 1685-1692 published Historia Conchyliorum, which was the first comprehensive conchological text, having over 1000 engraved plates.

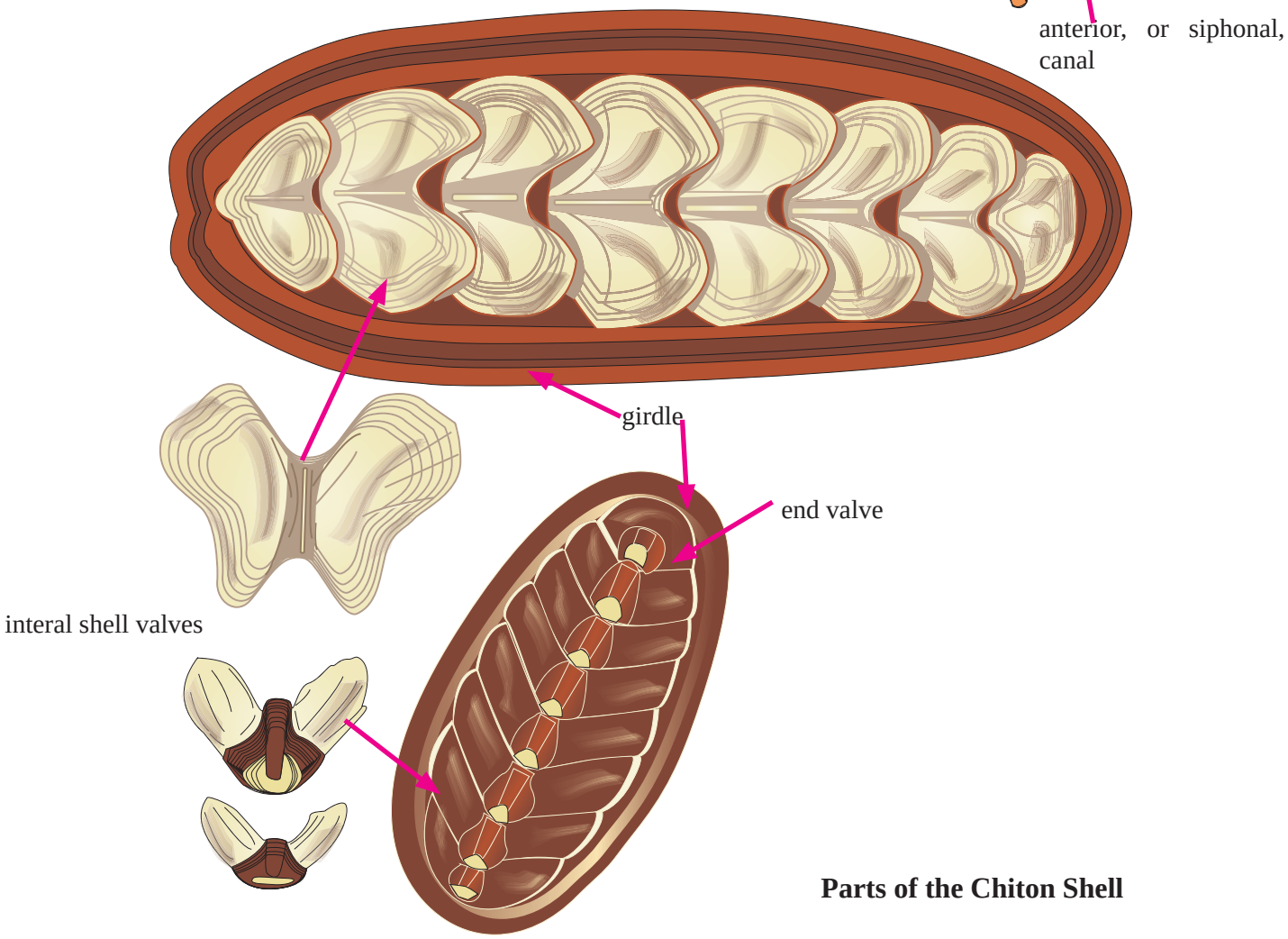
George Rumpf, or Rumphius, (1627–1702) published the first mollusc taxonomy. He suggested "single shelled ones" (Polyplacophora, limpets, and abalone), "snails or whelks" (Gastropoda), and "two-shelled ones" (Bivalvia). Many of Rumpf's terms were adopted by Carolus Linnaeus. Rumpf continued to do important scientific work after he went blind, working by touch.

The study of zoology, including conchology, was revolutionized by Swedish naturalist Carolus Linnaeus and his system of binomial nomenclature. 683 of the 4000 or so animal species he described are now considered to be molluscs, although Linnaeus placed them in several phyla at the time. He later went on to classify many plants including cacti.

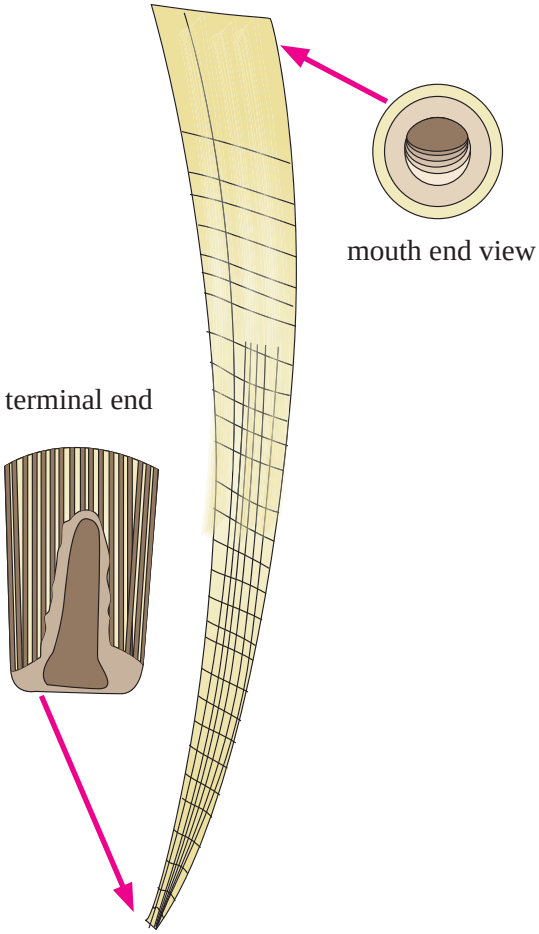
There have been many prominent conchologists in the past two centuries. The Sowerby family were famous collectors, dealers, and illustrators. John Mawe (1764–1829) produced arguably the first conchology guidebook, *The Voyager's Companion or Shell-Collector's Pilot* as well as *The Linnæan System of Conchology*. Hugh Cuming (1791–1865) is famous for his huge collection and numerous discoveries of new species. Thomas Say wrote the fundamental work *American Conchology, or Descriptions of the Shells of North America, Illustrated From Coloured Figures From Original Drawings, Executed from Nature in six volumes (1830–1834)*.



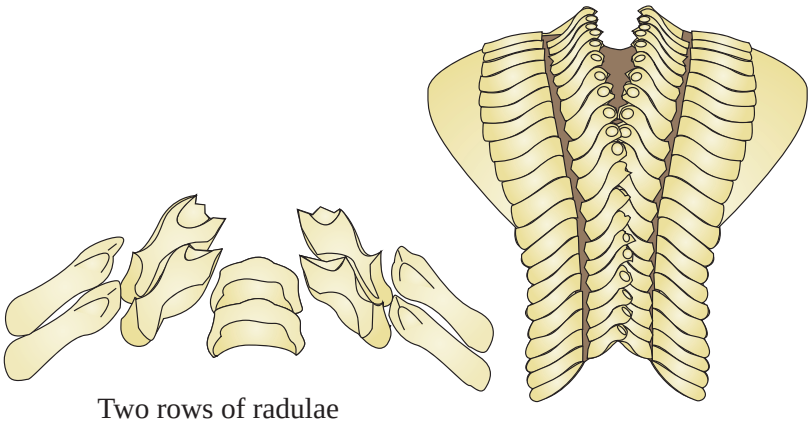
Parts of the Shell



Parts of the Scaphopoda (Tusk Shell)

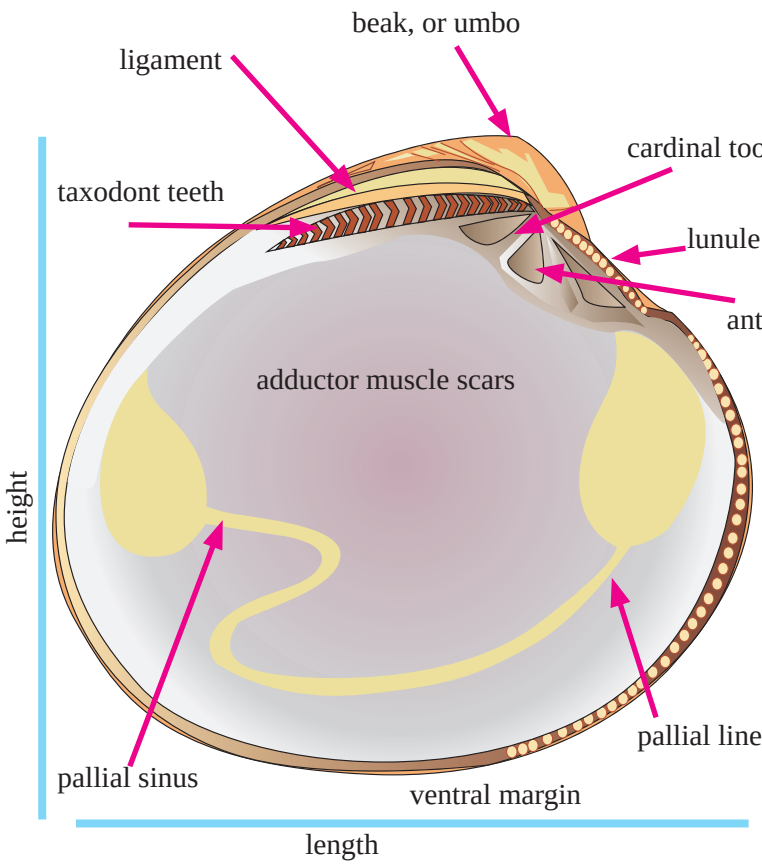


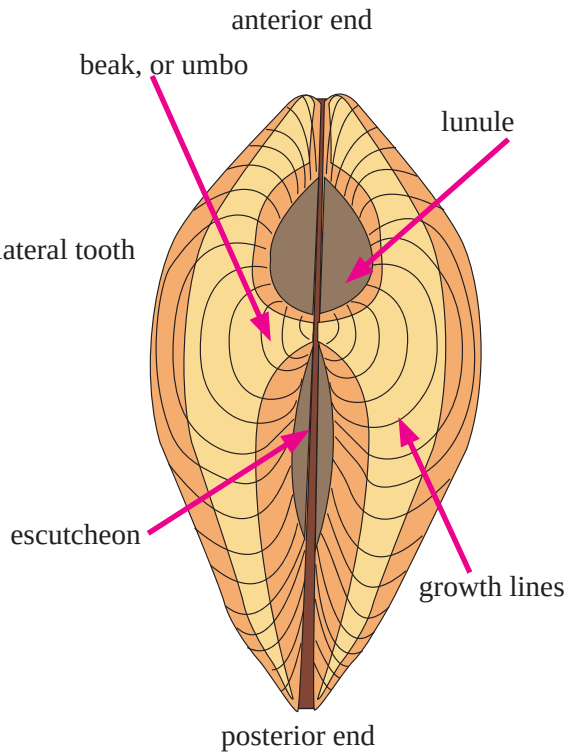
radula ribbon (teeth like griders in mouth end)



Two rows of radulae

Parts of the Bivalve Shell





Seashell Purists

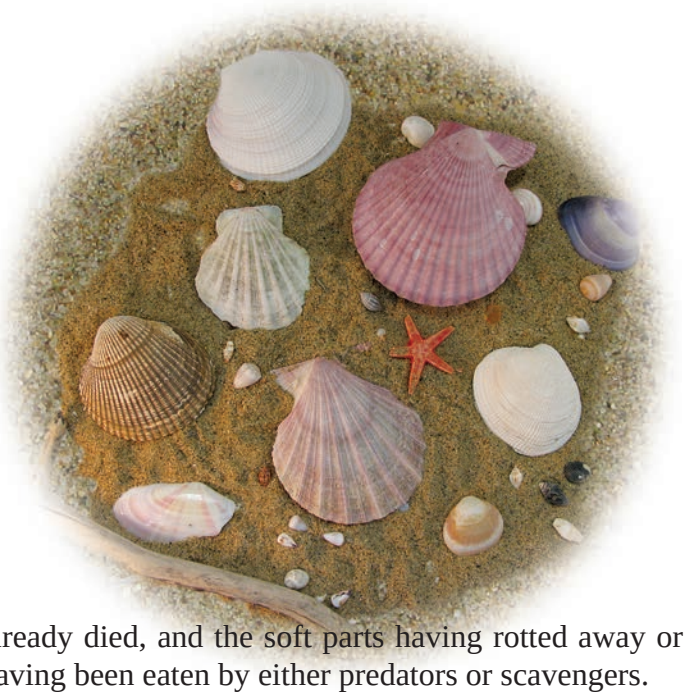
The terms shell collector and conchologist can be regarded as two distinct categories. Not all shell collectors are conchologists; some are primarily concerned with the aesthetic value of shells instead of their scientific study. It is also true that not all conchologists are shell collectors; this type of research only requires access to private or institutional shell collections. There is some debate in the conchological community, with some people regarding all shell collectors (regardless of motivation) as conchologists.

R. Tucker Abbott was the most prominent conchologist of the 20th century. He authored dozens of books and was museum director of the Bailey-Matthews Shell Museum, bringing the world of seashells to the public. His most prominent works are *American Seashells*, *Seashells of the World*, and *The Kingdom of the Seashell.*

Many of the finest collections of seashells are private. John DuPont and Jack Lightbourne are known for their extensive collections. John DuPont donated his shell collection to the Delaware Museum of Natural History in 1984. Emperor Hirohito of Japan also amassed a huge collection, and was a competent and respected amateur conchologist.

Where to Find

Seashells are commonly found in beach drift, which is natural detritus deposited along strandlines on beaches by the waves and the tides. Shells are very often washed up onto a beach empty and clean, the animal having already died, and the soft parts having rotted away or having been eaten by either predators or scavengers.



Empty seashells are often picked up by beachcombers. However, the majority of seashells which are offered for sale commercially have been collected alive (often in bulk) and then killed and cleaned, specifically for the commercial trade. This type of large-scale exploitation can sometimes have a strong negative impact on local ecosystems, and sometimes can significantly reduce the distribution of rare species.

Shells can also be found in freshwater such as lakes, rivers and ponds.

Seashells are usually identified by consulting general or regional shell-collecting field guides, and specific scientific books on different taxa of shell-bearing mollusks (monographs) or “iconographies” (limited text - mainly photographs or other illustrations). However, not all books include freshwater varieties.

Modern Uses of Shells in Art & Fashion

Shells have been featured on over 5,000 postage stamps worldwide.

Shells have also been used as coins and featured on many coins, including the Bahamian dollar (1974), the Cuban peso (1981), the Haitian gourde (1973), the Nepalese rupee (1989) and Philippine peso (1993).

They have been used as Musical Instruments such as the Conch Shell and in some cases have a religious or spiritual meaning.

Even today, shells are used in jewelry for fashion. Some examples include carved shell buttons, necklaces, shell inlay in brooches and bracelets and earrings.

The most common shell used for these creations is abalone or any shell with a thick flat surface.

Technology emf

Shells even have a use in our computer and cellphone industry. It has been discovered that some people are highly sensitive to EMF or EMR Electromagnetic radiation. EMR can effect some people's calcium levels and cause various health problems, including fatigue and muscle cramps. A good solution to muscle cramps is to make sure you're getting enough calcium in your diet. However, in order to protect yourself further, why not create for yourself a barrier against EMR producing devices? Shells are full of Calcium Carbonate.

By placing a decorative dish of shells around your electronic devices, when you are not using them, you are letting the shells absorb the radiation rather than your own body.

Fake Shells

Shell collectors who purchase shells from dealers may sometimes encounter shells which have been altered to represent new species or rare color varieties. It is claimed that in previous centuries, fake examples of Epitonium scalare were created out of rice paste. Today you can find in your local toy store shells that are created out of such materials as rubber or plastic that look

very realistic. While worthless from a collector's point of view they are great for children, because unlike real shells they will not break when dropped.

Shell Facts

Here are some interesting facts about Shells you may not know:

Shells can cost nothing or be worth thousands of dollars depending upon their rarity. At one time the most expensive shell ever sold on record was Conus gloriamaris or Glory of the Sea Cone, thought to be very rare in 1969. However, as Scuba divers went into deeper waters they found more of these shells, bringing the price down to $100. While these shells are still popular today, the are generally found in Tropical waters like the Philippines and in order to protect habitat there can be restrictions on purchasing shells from this country. Another example of a prized shell is the Imperial Volute which also comes from the Philippines.

One of the largest gastropod seashells ever found is the Syrinx aruanus or Australian trumpet; it is 91 cm long and weighing up to 18 kg. Others like the Florida horse conch can reach up to 60 cm.

Another famous shell is the Tridacna gigas or Giant Clam which can weigh more than 200 kilograms (440 lb), measure as much as 120 cm (47 in) across, and have an average lifespan in the wild of 100 years or more. Some people regarded this clam as the killer clam or a man eater and believed that if a diver's foot was caught in it, the shell would instantly close down and trap the diver. While it is certainly capable of gripping a person, the shell's closing action is defensive, not aggressive and the shell valves close too slowly to pose a serious threat. Furthermore, some are not able to close their shells fully due to how the internal structure is arranged.

Protecting your Shells

Seashells are primarily composed of calcium carbonate. Mollusc shells are vulnerable to attack by acidic fumes. This can become a problem when shells are in storage or on display and are in the proximity of non-archival materials. It can appear as a powdery white coating on a shell. It also often looks as if a shell has been "infected" with mold; however, under magnification the mold-like appearance is revealed to be a crystalline growth of salts. To keep your shells free of what is known as Bynesian decay you can do the following:

- Use of only archival-quality materials such as metal cabinets and display cases, archival quality paper labels and card trays.

- Sea shells, after collecting, need to be washed thoroughly in freshwater to remove the salt that is on and in the shell, and then dried thoroughly before they are stored. Salt attracts moisture and makes shells more vulnerable.
- Avoid using materials that contain wood or cellulose. Many varnishes and paints are well known emitters of volatile organic compounds (VOCs), some of which may be acidic. Water-based varnishes and paints are considered less harmful.
- Keep the air around your collection dry and keep the environmental relative humidity under control at about 50%. Copy paper or KOH-impregnated filter paper can also be useful in elimination of moisture.

Links to Museums & Organizations

Many museums worldwide contain very large and scientifically-important mollusc collections. However in most cases these are research collections, behind the scenes of the museum, and thus not readily accessible to the general public in the same way that exhibits are.

The largest assemblage of mollusc shells is housed at the Smithsonian Institution which has millions of lots representing perhaps 50,000 species, versus about 35,000 species for the largest private collections.

Links in British Columbia, Canada:
UBC Beaty Biodiversity Museum Marine Collection

http://www.beatymuseum.ubc.ca/marine-invertebrate-collection

UBC Beaty Biodiversity Museum Fossil Collection

http://www.beatymuseum.ubc.ca/fossil-collection

55-55 Marine Drive - White Rock

http://www.5555marinedrive.com/Index.tsp

Seashells of British Columbia on-line

http://www.petersseashells.com/bcframe.html

BC Gemshow - (Fossils, Inlaid Gem & Shell Jewlery)

http://www.lapidary.bc.ca/gemshow.html

Jennifer Harder's website - The Ink Rag:

http://www.theinkrag.com

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