



WONDER MOLLUSCS AND THEIR UTILITIES

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Accepted on: 09-10-2010; Finalized on: 10-02-2011.

ABSTRACT

Molluscs are amongst ancient of animals on earth today. It has been exploited by humans for millennia. Uses range from food to adornments (dyes, shells, pearls) to even money (cowrie shells) and materials for tools. In addition, Molluscs are an important source of protein and its shell, living flesh and by products are being studied and used in modern medical applications. Many of our beautiful and fascinating molluscs are listed among the threatened animals. Like other marine creatures, it is vulnerable to habitat loss due to reclamation or human activities along the coast that pollute the water. They are also vulnerable to trampling by careless visitors and over-collection for food and for their shells. India has a great diversity of molluscs and they play many important roles in sustaining marine ecosystem. Mollusc resources are very much useful to coastal communities and others socio economic status and livelihood in the different ways and forms. Efforts have to be made to conserve and protect these resources for the sustainable development of coastal ecosystem and the dependent population.

Keywords: Mollusc, bivalves, gastropods, Food, Medicine.

INTRODUCTION

It is man's inborn nature to collect, whether they are rocks, shells, coins, stamps, cars, or baseball cards. We all collect. We always do. It's part of being human. We find procuring, sorting, identifying, cataloguing, and trading of items dear to us and quite satisfying. There are almost as many reasons for collecting shells as there are people collecting them: many people simply admire the endless beauty and variety of shells (a large collection can have up to 30,000 species!)¹, while others collect more for scientific reasons - there is still a great deal to learn from and about the shells of the world, and well-documented collections are of great value to science, even today. The collection and study of shells, whether by amateurs or professionals, is called conchology. Shells have had an indirect influence in advancing other industrial and world concerns in areas such as exploration voyages – both on land and sea. Scuba diving and snorkeling ventures and companies partly spurred on by collectors looking for deep-water shells. Development of marine reserves and parks – to protect the endangered (by pollution and destructive fishing techniques mostly and not by shell collectors) species of molluscs and other sea lives, such as corals. Shellfish have been traditionally used for such various purposes as currency (e.g., the gold-ring cowry *Cypraea annulus*), magical and religious symbols (in India, the sacred chank *Turbinella pyrum* and especially its rare sinistral form is regarded as a divine symbol of success, peace, and prosperity), horns, containers (large gastropod shells of the genus *Melo* are used as scoops for salt or flour in markets of South East Asia and the Pacific, and to bail out the boats of the native fishermen), or even as tools in some isolated oceanic islands².

1. FOOD

Along the world's miles of coastline, man has always had a readily available food source - high in protein and trace minerals, because of the many kinds of molluscs to be found there. Mussel and oyster beds, clam-flats and other abundant shellfish have always provided an easy source of food for human beings. Tastes in molluscan food vary tremendously from one person to the other and from culture to culture. However, when it comes to a question of survival, most molluscs are edible. Some are considered delicacies such as oysters and escargot, while others such as the clams and mussels of fresh water ponds and streams are less likely to be consumed due to taste but, nonetheless, are very edible. Terrestrial molluscs are also eaten. Only a few molluscs are actually poisonous².

- ❖ **Clams:** Family Myidae and Veneridae.
- ❖ **Scallops:** (Family Pectinidae): There are many different species of scallops eaten in many parts of the world.
- ❖ **Oysters:** (Family Ostreidae): When eaten raw, they are often thought to be an aphrodisiac. Oysters can get expensive, which is probably why there is a recipe known as Oysters Rockefeller.
- ❖ **Mussels:** (Family Mytilidae): These are especially prone to poison people with "Paralytic Shellfish Poisoning", which is caused by a tiny, one-celled animal called a dinoflagellate which infects mussels and other bivalves from time to time. During these times, they produce a strong neuro-toxin (i.e., it affects the nervous system) called "demoic acid", which has killed many and made millions of people sick.



- ❖ **Whelks:** (Family Buccinidae): Very big in Japan, and the French pickle them for winter eating.
- ❖ **Cockles:** (Family Cardiidae): Shellfish are one of the few kinds of food that are kept alive right up to the moment of cooking. This is because they go bad very quickly, once dead.
- ❖ **Conchs:** (Family Strombidae): Produce a large amount of meat. The giant Pink (or Queen) Conch (*Strombus gigas* Linne) is farmed extensively. *Strombus gigas* is heavily exploited for food, and along with two species of *Cassis* (Helmet shells), are often cultivated in aquaculture farms.
- ❖ **Squid & Octopus:** Particularly popular in Japan but they are catching on in some parts of the Western World. They are used by the ton as bait for several kinds of fish. Cephalopods - a totally different Class of molluscs from the gastropods or bivalves. They are the most developed molluscs, and some are regarded as the most intelligent invertebrates (animals without a backbone) in the world.
- ❖ **Pen Shells:** (Family Pinnidae): Used in Japan and the Mediterranean and occasionally in the USA. They reportedly taste similar to scallops.
- ❖ **Top Shells:** (Family Trochidae): Caribbean especially, where the West Indian Top Shell (*Cittarium pica* Linne, 1758) is considered a delicacy by some of the locals.
- ❖ **Abalone:** (*Haliotis* spp): A well-known tasty morsel in many parts of the world.
- ❖ **Periwinkles:** (Family Littorinidae): These, once again, are much loved by the French, who like their seafood, even when it is very small.
- ❖ **Coquinas:** (*Donax* spp): Tiny clams, for chowder.
- ❖ **Limpets:** (Families Patellidae, Fissurellidae, and Acmaeidae).
- ❖ **Chitons:** (Class Polyplacophora): Several families used for food. Pacific Northwest Native Americans ate the Giant Pacific Chiton (*Cryptochiton stellari* (Middendorf)), which gets up to 300mm (12") long.
- ❖ **Turban Shells:** (Family Turbinidae): Entire Indo-Pacific, but especially Japan, where, most of the time, if it comes from the sea, they will eat it.
- ❖ **Helmet Shells:** (Family Cassidae): These can grow very large indeed, a 300 - 350mm (12-14") Horned helmet (*Cassis cornuta* Linne, 1758) could feed a whole family.
- ❖ **Giant Clams:** (Family Tridacnidae): Although they are rare and protected today, just imagine the amount of meat a fat, 1300mm (nearly 4 feet) Giant Clam (*Tridacna gigas* (Linne)) could produce. The Bear Paw clam (*Hippopus hippopus* Linne) is still popular today in kitchens in the Philippines.

2. MEDICINAL USES

Shell amulets were once thought to ward off ill health, infertility or bad luck. Shells have also been ground up for use in potions and for various medicinal uses throughout history. Today the shell, its living flesh and by products are being studied and used in many areas of medicine.³

- ❖ The deadly venoms of some Cone Shells (Conidae) are today being used to help victims of strokes and heart disease, and to produce a revolutionary new drug for chronic pain control (Ziconotide).
- ❖ An extract from the hard clam or "Quahog" (*Mercenaria mercenaria* L.) is a strong growth inhibitor of cancers in mice. It is called mercenine, after the clam's scientific name.
- ❖ Ground and processed oyster shells are used as a calcium supplements both for humans and animals.
- ❖ Paolin, a drug made of abalone juice, is an effective inhibitor of penicillin- resistant strains of bacteria, such as *Staphylococcus aureus*, *Streptococcus pyogenes*, *Salmonella typhus* and paratyphoid A & B bacteria.
- ❖ Oyster juice has been found to have anti-viral properties, and may be made into a drug eventually.
- ❖ The threads that some mussels (Mytilidae) use to attach themselves to rocks, piers, and other hard surfaces are being tested as possible glue in surgery.
- ❖ The cement of the Carrier Shells (Xenophoridae) is being studied for use as possible cement for bone fractures. Powdered mother of pearl is sold in the markets of the Peruvian Andes to promote healing of wounds.

3. TRADE GOODS

Shell currency has been around for over 4,000 years and was, in its glory days, the most widely used currency in the world. Even today, there still exist minor currencies based on certain shells³.

- ❖ Cowrie shells (*Cypraea annulus* L., and *C. moneta* L.), collected loose in bags or strung into strands, were the earliest forms of currency used in many countries. The Chinese, so far as we know, were the first people to use cowries as currency. Hard clamshells and whelks were the shells used to make the North American Indian wampum. Eastern Indians also used the tusk shell *Dentalium pretiosum* Sowerby.
- ❖ Beads and other ornaments made of "Spiny Oyster" shells (*Spondylus princeps* (Broderip) and the Panamanian Pearly oyster *Pinctada mazatlantica* (Hanley) were traded all over the Andean region. Coins from many countries display a mollusc on one side.
- ❖ Sacred chank (*Turbinella pyrum* Linne), on the chertum coin of Bhutan.



- ❖ Imperial Volute (*Cymbiola imperialis* Linne) on the 1 sentimo Philippine coin.
- ❖ Stamps from many countries feature various species of molluscs. Today there are over 5,000 stamps depicting seashells.

4. TOOLS

From prehistoric times, man has used shells for tools. Household dishes, cooking pots and utensils: cutlery, scoops, spatulas, etc. were often made from bivalves and larger gastropods such as the bailer (*Melo* (a Volute), whelk, *Nautilus* and turban (*Turbinidae*) shells⁴.

- ❖ Food pounders were made from the crystalline stomach style (which the animal uses to help digest its food) "giant clam" (*Tridachna gigas* L.), in the South Pacific.
- ❖ Storage containers for such things as perfumes, ointments and medicines were made from some of the larger bivalves and univalves such as the *Nautilus*.
- ❖ Oil lamps made from shells are a frequent find throughout the Middle East. There are examples of these made from bear paw shells (*Hippopus hippopus* Linne) and the spider conch (*Lambis* spp). They work by holding oil while the wick floats on the surface.

5. ART AND ARCHITECTURE

Man has long been inspired by the graceful symmetry and beauty of shells. Archaeological diggings at many ancient sites have produced shells and artifacts in the design of shells. Phoenicians, Greeks, and Romans used the shell's shape as part of their building design and decor.

Artists: Botticelli's Birth of Venus has Venus rising from the foam in a scallop shell. In the ancient world of the Mediterranean, this theme of Aphrodite's (Venus's) arising birth from the shell repeats itself in figurines and wall paintings⁴.

Sculptors: Bernini made the famous Triton (designed after the *Charonia* or trumpet shell) fountain in Rome.

Architecture: Leonardo da Vinci drafted the first spiral staircase plans from studying the simple snail shell with its interior whorls. The spiral tops of Grecian Columns were designed after a nautilus shell cut in half.

Crafts: Sailor's valentines and Shell floral arrangements. Sea shell figurines and toys: Made in Taiwan, the Philippines, India and other places with inexpensive labor and plenty of shells.

6. RELIGION

Shells have played a central role in religion from prehistoric times on. Dominating early religious practices, cowry shells (*Cypraea*) had powerful symbolism (basically sexual, for they were first and foremost a female symbol) Shells in some cultures even today are used as amulets, good luck charms, and as symbols for love, fertility and life eternal⁵.

- ❖ **Africa:** Shells fetishes were often used in worship.
- ❖ **North American Indians:** also made fetishes of shells.
- ❖ **India:** Hindus: The god Vishnu holds his staff crowned with a very rare left-handed *Turbinella* ("Chank") shell. The Hindu, when praying, often clasps a sacred chank or other venerated object in his hands, believing that it will help his or her petitions be heard. Priests also use it for holding sacred oils.
- ❖ **Asia:** In Buddhists the Chank or *Turbinella* also plays a significant role in their ritual music and ceremonies, and figures into Buddhist iconography.
- ❖ **Spain:** The home of the shrine of Santiago (St. James). St. James's badge is the Giant European scallop shell (*Pecten jacobaeus* Linne).
- ❖ **Egypt & China:** Used the cowry in connection with their burials and other religious ceremonies.
- ❖ **Christianity:** Many churches had or still have baptismal fonts made of *Tridachna gigas* Linne) (the famous "Giant Clam") or are designed in their likeness. They are thought to be a symbol of birth[5].

7. MUSIC AND COMMUNICATION

Long before our modern day communication systems, man found that trumpets made from shells produced a sound that carried for many miles. By using a series of trumpet blasts, messengers were able to communicate fairly detailed messages from village to village, tribe to tribe⁷.

- ❖ As a daily call to prayers. Shinto priests in Japan still use the Triton Trumpet shell (*Charonia tritonis* L.) for this today.
- ❖ As a summons to call warriors to battle and to ring out triumphs in battle.
- ❖ As an announcement to herald the entrance of kings, emperors, heroes, or important persons.

8. INDUSTRY

Today, molluscan research is taking place in the areas of parasitology, biochemistry, mathematics, archaeology, paleobiography, palaeontology, taxonomy, ecology and zoology. Also, many of the categories of use discussed above have significant economic impact, mostly in many small businesses, so the total economic activity involved in man's varied uses of molluscs is quite major⁶.

- ❖ Aquaculture (farming of abalone, oysters, scallops, mussels, etc.)
- ❖ Import & export companies of shellfish as food.
- ❖ Sea shell and shell artifact importers, exporters and distributors: shell collectors, tourist shells, shell crafts.
- ❖ Jewelry designers and manufacturers.



- ❖ "Pearl button industry: although not as important as it was in the early 1900s, it still remains as an industry in many countries today.
- ❖ Construction industry: Shells along with gravel are used for building roads in some areas, and lime from shells is a vital component in the production of concrete and plaster.
- ❖ Fertilizer manufacturing.
- ❖ The Purple Dye Murex (*Murex brandaris* L. (Mediterranean) belongs to the Family Muricidae - the Murex Family and used to produce a bluish-reddish-purplish type of dye.

CONCLUSION

India has a great diversity of molluscs and they play many important roles in sustaining marine ecosystem. Mollusc resources are very much useful to coastal communities and others in the different ways and forms. Due to the range of utilities offered by molluscs, they improve the socio economic status and livelihood of the coastal communities. Efforts have to be made to conserve and protect this resources for the sustainable development of coastal ecosystem and the dependent population. Marine and coastal ecosystems provide a wide range of important products and services. Fish, crustaceans and mollusks are major food. Marine organisms provide about 84 million tones of human food and live stock supplements in 1993. Mollusc accounts for about 16% of the average individual intake of protein at global level and the proportion is much higher in many developing countries. Gastropods and bivalve fisheries are of sustenance nature and are used for edible purpose, source of lime, as decorative shells or for industrial purpose. Though the molluscs sustain regular and very productive fisheries in our waters, only a few of the mussels, clams and oysters are now generally eaten and even these are more poor man's food. Commercial

exploitation accounts for the greater reduction of molluscan population in nature, pollution and environment hazards also cause death of molluscs and to a lesser magnitude, the professional shell collection from wild. Indiscriminate fishing from natural bed may lead to depletion of stock of most of the molluscan resources. Though our country is bestowed with rich molluscan resources, in some areas these resources are indiscriminately exploited which is leading to depletion of stock.

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