Resembling small legless woodlice they can be perceived to be a primitive limpet whose shell is obviously segmented. Counting the segments will reveal that there are eight separate overlapping plates. Sometimes these plates are obscured to a greater or lesser extent by the mantle. There are around 800 known species of chiton ranging in size from less than 5mm to 40cm in length but the majority encountered in reef aquaria are around 10mm.

The Radula
Despite being primitive molluscs the chitons possess a feeding organ that has been retained and specialised in much more highly evolved members of the Phylum. The radula (Fig 3) in chitons is like a toothed tongue which rasps microalgae and...
small encrusting animals from the surface of rocks. The structure of the radula is used in classification of certain molluscs as can be seen later in this article but this basic form has been kept by several members of the phylum. The radula is not visible to the casual observer being located internally.

Chitons can be regarded as interesting freebies in the reef aquarium. They may feed on encrusting sponges or bryozoans but are unlikely to harm specimen invertebrate species. They are of benefit in their consumption of microalgae in much the same way as turbo snails.

**Class Gastropoda**

This is a massive group of molluscs consisting of over 30,000 species and probably the most successful having colonised marine, freshwater and land habitats. In the gastropods the plated shell has been developed from the ancient chiton shield into a more sophisticated retreat into which the animal can withdraw. Sometimes, even the entrance to this retreat (the aperture) can be blocked with a hard covering called the operculum making entry to most predators impossible. The gastropods are what we refer to as snails and slugs. This group includes the humble garden snail and magnificent nudibranchs as well as many beneficial and harmful marine species.

One good thing about the shelled gastropods is that they are easy to remove in most cases. A pair of fine tweezers is useful for the removal of some of the smaller species.

The gastropods also represent the most commonly found hitch - hiking animals in reef aquaria so it can be necessary to separate the good from the bad. Some of the descriptions in this section will refer to the shell shape of the animal. **Fig 4** shows a generalised gastropod shell with annotations indicating the correct terminology for each part.

**Order : Archaeogastropoda**

**Superfamily : Patellacea**

**Common name : Limpets**

Limpets are very common inhabitants of reef aquaria, often forming large colonies of over 100 individuals in even modestly sized aquaria. There appears to be a few species that regularly occur although in my experience the commonest seems to be a small, white variety that remains in the darker areas of the tank, seldomly growing much over 5mm in diameter (**Fig 5**). They appear to be algal grazers and not to bother any other reef inhabitants. Most people will be familiar with the shell shape of limpets - the conical shell gives them away although limpets are not always what they appear to be.

There is one species of limpet that has caused aquarists some cause for concern but this is due to its resemblance to a nudibranch rather than any harm it may cause. *Jordanella floridana* is a true limpet but the mantle is black and extends over the shell. As the Latin name suggests this was an infrequent import with Florida and Caribbean live rock but as the import of this was restricted some years ago the occurrence of *J. floridana* has not been reported for some time although similar Indo-Pacific species may occur.

Larger species of limpet with the same shell shape as their smaller cousins do occasionally occur and some of these are believed to be harmful to soft corals, particularly when supplies of microalgae are exhausted. I have no experience of this but recognise the need for careful observation of any suspicious specimens.

**Order : Archaeogastropoda**

**Superfamily : Fissurellacea**

**Common name : Keyhole limpet**

Keyhole limpets resemble a slightly flattened common limpet but the main identifying feature is the hole in the shell at its apex where the animal’s siphon tube is accommodated. They are infrequent additions with live rock. As with the true limpets there are reports of hard and soft corals being attacked but they are usually herbivorous, feeding on microalgae.

**Order : Archaeogastropoda**

**Superfamily : Trochacea**

**Common name : Turbo snails and their allies**

Most reef aquarists will be familiar with members of this superfamily as it includes...
the Astrea snails that are commonly sold as Turbo snails in retail outlets (Fig 6). The true Turbo snail, that is, the one with the Latin prefix *Turbo* is more commonly known as the super or spiral turbo (Fig 7). These are very common imports with Fijian live rock and specimen pieces from the Indo-Pacific region. They often appear under about 5mm long and rapidly grow to the maximum size of 4-5cm.

Other members of this Superfamily occur too. These include members of the genus *Trochus* (Fig 8).

Some Astrea snails have quite spectacular shell shapes (Fig 9) and all members of the Trochacea are superb grazers of algae. All regularly found “turbo” snails are beneficial in reef aquaria. Their grazing ability is unsurpassed in other invertebrates given that they promote the growth of coralline algae and reduce undesirable forms. Larger species may knock corals over but they are such good grazers that I am prepared to forgive them for this.

There is another species very closely related to the turbo snails called *Stomatella varia* (Figs 10 & 11). This is the commonest gastropod imported with live rock and will thrive as long as it remains unmolested. Due to the mantle of the snail completely covering the shell in most instances this snail is often mistaken for a nudibranch (sea slug). Hopefully you will be able to positively identify this snail from the photographs because handling it will reveal its adaptation to deter predators – it loses its tail! Much like several species of lizard that shed their tails this little creature has evolved the ability to break-off the hind part of its body which occupies a would-be assailant by twitching attractively whilst the animal itself makes a hasty getaway.

**Order :** Mesogastropoda  
**Superfamily :** Columbellidea  
**Common name :** Dove snails

Typified by the genus *Euplica* (Fig 12), dove snails are very common imports from the Indo-Pacific region. They appear to be totally harmless and many established aquaria have several specimens spending a large amount of time on the aquarium glass apparently feeding on algae. The shell resembles that of *Strombus* – the conch and relatives, but the animal can be distinguished from these distant cousins by the fact it prefers rocks and glass rather than sand, and less prominent eye stalks. Most aquarium specimens attain a length of about 1cm and have a slender foot region.
and prominent proboscis.

Gastropods such as these should be left in the aquarium. They appear to be very hardy and long-lived. Their inclusion in the ecology of the aquarium is difficult to quantify but half a dozen of these in a forty gallon aquarium will consume a lot of algae in a year and their shells, being more slender than those of the turbo snail family, enable them to get into more nooks and crannies.

Order: Mesogastropoda
Family: Common name: Scavenging snails

There are two species that I would like to focus on under the heading "scavenging" snails. These are common imports and must be left in the aquarium only with great caution.

Species 1
This species (Fig 13a) is a relatively common import along with live rock and to date I have been unable to identify it but presume it is a mesogastropod. It shows a distinct liking for meaty food such as mysis, mussel and brine shrimp but this carnivorous diet seems to be limited to dead material rather than the snail being an active predator. However, look at Fig 13a again and compare it with Fig 13b which is also a carnivorous snail responsible for the deaths of four fish in a hobbyist’s aquarium. Although differences can be seen it is obvious that confusion can arise. If you are unsure about the intentions of such a snail then remove it. The harmless species is a great addition to sump tanks where it will seek out uneaten food intended for fish.

Species 2
This species (Fig 14) has a very distinctive spotted shell that has a similar shell shape to Species 1. Although the latter’s shell is much rougher in texture. Although I may be completely wrong I am going to recommend that this snail is removed when first sighted. I base this on my experience that this snail only arrives on specimen pieces of invertebrate rather than live rock. This could be due to the fact that they are feeding on the specimen and so it is better to err on the side of caution and remove it.

Order: Mesogastropoda
Superfamily: Cerithiacea
Families: Vermetidae and Turritellidae
Common name: Worm snails

Worm snails are a fascinating group of snails that many people mistake for worms due to their occupancy of tube-like shells. When the snails are young they have a typical gastropod shell but as they grow this elongates and the whorls separate resembling the tube of a filter-feeding worm. The shell is attached to rocks, other shells or any suitably hard surface where it remains. The shell can then be overgrown by calcareous algae and any other organism that likes the conditions, almost totally obscuring the shell. The animal itself can further protect itself with an operculum. The flesh of these snails can be brown, orange, red or green – the brighter individuals generally being the most obvious.

Perhaps the most interesting feature of these snails is their method of feeding. Obviously if you cannot move towards your food you must rely on it to come to you. This is a tactic used by filter feeders and ambush predators but the vermetid snail has no specialised body parts to act as a filter and certainly isn’t an ambush predator. Instead it uses the stuff that molluscs have in profusion – mucus. The snail secretes a “net” of mucus threads around the entrance
Friend or Foe

Figure 16 shows a vermetid snail that has been overgrown by Porites hard coral much like the tubeworms normally found in plume rock (Fig 15). The snail is located in the hole at the bottom of the picture, the red area emanating from the hole appears to be as a result of the feeding behaviour of this cryptic animal.

These snails are harmless and actually do the beneficial job of cleaning up uneaten food and detritus.

Ovulid snails
Common name: Egg cowries

Ovulid or egg cowries have a shell shape that is superficially similar to ordinary cowries but are generally far more harmful than their cousins. Closer scrutiny of the opening of the shell reveals obvious whorls leading to a definite apex at the posterior end and a more curved opening to the shell (Fig 18).

One particular problem with these animals is their incredible camouflage, particularly that demonstrated by the species found on Dendonephthyea soft corals (Fig 19). Primovula sp. (Fig 20) is an excellent example of this. It can remain undiscovered in the aquaria of even the most eagle-eyed aquarist, that is, unless you know what you are looking for! The mantle in these snails has evolved to resemble the shape and colouration of a cluster of polyps confounding predators and aquarists alike! Fortunately pieces of Dendronephthyea are only host to one or two of these snails at a time and once you have spotted one you should have no trouble in finding others.

Other species of coral and gorgonian are attacked by ovulid snails and it is only the vigilance of the aquarist that can prevent them from doing severe damage to their host. Some species that predate gorgonians are very elongated and taper to a point at either end – an obvious adaptation to remaining concealed on the branching “arms” of gorgonians.

As you can already recognise, even in the more primitive gastropod groupings there are already several species of interest to aquarists whether they are predatory or beneficial in reef aquaria. Most of the species I have concentrated on so far are beneficial in reef aquaria. Unfortunately, in the second part of this focus on the molluscs, all of the gastropods listed are harmful if left unchecked. After highlighting these species I will then go on to look at the other molluscan hitch-hikers we regularly encounter – the Bivalvia, the clams, scallops and cockles.