AQUARIUM CARE SHEETS

Without using over-technical terms, these Care Sheets give basic advice on such subjects as

Filtration
Water Chemistry
Heating & Lighting
Setting up the Aquarium
Exhibiting and
Transporting Fish
Problems
Feeding
Health Care
Breeding
Routine Maintenance
Aquarium Plants
Snails
The Tank

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AQUARIUM MANAGEMENT CARE SHEET No: 1 Filtration 01/01/98

As water is the fish's natural environment, it follows that its quality should be maintained at the highest level at all times.
This is best achieved by using filtration equipment in association with regular partial water changes.

Water can be cleaned by filtration in three methods -

Mechanical, Chemical and Biological

MECHANICAL FILTRATION

Mechanical Filtration removes of solids and physical impurities from the pond or aquarium water by means of sedimentation, settling, or the use of some method of physical straining through a sponge-type medium (in aquariums) or brushes (in ponds). This removal of the visible water pollution will not on its own necessarily provide the best environmental condition for fish.

CHEMICAL FILTRATION

A material such as activated carbon will adsorb pollutants from the water, removing any yellow colouration in the process. Other reagents may be used to change the water's properties: for instance, zeeolite can be used to reduce hardness
Zeolites, Activated Charcoal, pH Buffers and other commercially available chemicals all have a use in practical fishkeeping but you are advised to 'complete the basics' prior to adding these sophistications to your filter circuit.

Filter media such as sponges, activated carbon, zeeolite etc can easily be contained in chambers within the filter unit itself.

BIOLOGICAL FILTRATION

Biological Filtration is not, in fact, filtration but purification and makes use of naturally-occurring bacteria to remove toxic waste products (generally ammonia-based) and other chemical impurities from pond or aquarium water.
The general principle is to encourage bacteria to colonise as large a surface area as possible, usually within the gravel itself (undergravel filtration) or in a special filter unit containing fine silica sand (fluidised bed filters).
A constant water flow through these two types of media is vital to maintain bacterial life and care should be taken not to interrupt any power supply to these types of filter.

Most filtration media have one main function (Mechanical or Biological) but there is usually a degree of both in any filter once it matures. A biological system may take several weeks before it becomes mature, and should never be overloaded by adding too many fish at any one time.

Always clean filter media in aquarium or pond water;
using tap water will kill off any beneficial bacteria.

Where a filter has several layers of media, it is good practice to change only a part of this media at any one time in order to maintain the filter's bacterial efficiency.

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TYPES OF FILTER

Aquarium filters, now generally operated by an electrically-powered impeller than by air from an air-pump, can be for either internal (submerged in the aquarium water) or external (sited outside the aquarium and connected to it by hoses) use.
The latter method is slightly more easy to maintain and disturbs the aquarium less when servicing is required. Most filters are 'dedicated' to certain standard aquarium sizes, so make sure you get the correct size for your aquarium.

Pond filters are usually hidden in the rockery beside the pond and can incorporate not just sedimentation and biological filtration chambers but also ultra-violet lamps too.
Large Koi pond filters (usually at least one-third the size of the pond) are fitted in the ground and connected to the pond by drainage pipes installed during the pond's initial construction; they can be 'gravity-fed' with a pumped return to the main pond after cleansing has occurred.
It is good pond management practice to fit all external filters with 'back-flushing' facilities in order to periodically remove accumulated sludge from the filter.

PROTEIN SKIMMING

Used in marine aquariums, this is another method of removing organic material from the water. This is achieved by using fiercely aerated water within the filtration unit: organic matter is attracted to the water/air bubble interfaces and the resultant pollutant-laden foam is collected in a chamber from where it can be regularly emptied.

ULTRA-VIOLET UNITS

Ultra Violet Units, used correctly are sterilisers and are capable of 99.9% sterilisation of water.
Used in conjunction with a filtration system, they will indirectly clear algal growth (Green Water) in pond or aquarium and have a place in practical fishkeeping if used correctly.

UV Light can be dangerous and such units should be used with care and discretion.
Similar, but not so generally known, are Ozone generators. These utilise high voltage discharges to generate ozone which, unless properly controlled and dissipated, can be just as effective in killing off your fish as well as all the potential nasties at which you aim it!

MISCELLANEOUS EQUIPMENT

Marine aquariums can also use very sophisticated units in order to keep water conditions perfect. Kalkwasser units can automatically add calcium as and when required. External Trickle Filters and de-nitrifying units are also used. Much of this extra equipment can be housed in the cabinet below the main aquarium.

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AQUARIUM MANAGEMENT CARE SHEET No: 2 Water Chemistry 01/01/98

Water is not the same the world over. Whilst we attempt to keep 'community collections' of fish in one type of water we should also appreciate that not all fish require the same water conditions as these may vary from locality to locality.

WATER QUALITIES : These are usually centred around a few major component values, although it is possible to test water for the most minor components if so desired. Those of most importance (or concern!) to aquarists are the following:

pH: Degree of acidity or alkalinity. Measured from 0pH (extreme acid) to 14pH (extreme alkaline)
Tapwater - between 7.2 - 8 (hard water areas) and 7 (soft water areas)
Rainwater – generally 7 or below (depending on prevailing air pollution at the time)
Saltwater (natural seawater or synthetic mixed) 8.3

HARDNESS ($DH^{o)}$**:** 0 - 3^{o} (soft water) 8-10^{o} (medium hard) 16^{o} plus (very hard)
Often hardness is expressed as 'parts per million' (ppm).

0 - 75 ppm is approx 0 to 4 deg DH 75 - 150 ppm is approx 4 - 8 deg DH
150 - 300 ppm is 8 to 16 deg DH 300 plus is More than 16 deg DH.

Sometimes, fish from soft waters need to be 'changed over' to harder water for convenience of keeping. This can achieved quite naturally with little stress to the fish.

Simply set up an aquarium with ordinary gravel substrate and fill with soft water, as required by the fish. Over the next few weeks, the water in the tank will gradually harden due to the effect of the (probably) calcareous substrate. In the meantime, make sure that partial water changes are made using the hard water to which you wish to acclimatise the fish.

Eventually, the fish will find themselves living quite happily in much harder water as will any offspring from spawnings who will be used to hard water immediately - without any re-acclimatisation being necessary.

SPECIFIC GRAVITY (marines only)**:** This is a comparison of density between sea water and pure water. Some public aquariums run at lower than normal 1.024 value so as to control parasitic attacks. Usual marine aquarium range - 1.020 - 1.024 at 24^{o}C.

AMMONIA and **NITRITE:** These compounds are toxic to fish and are formed as a result of decaying or decomposing materials (faecal waste, uneaten food, dead plants etc) and are responsible for 'New Tank Syndrome' fish losses. Can be reduced by nitrifying bacteria in biological filters. Once biological filter has matured, readings should be 'zero'.

NITRATE: Less toxic to fish and often utilised by plants as food. Test readings will gradually rise due to production by nitrifying bacteria. Keep in check by regular partial water changes.

PHOSPHATE: Another 'ingredient' of tapwater which, with nitrate, encourages algae growth. Can be removed with RowaPhos$^{(tm)}$

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CHLORINE/CHLORAMINE: These are added to the domestic water supplies to safeguard human health – not fishes'! Chlorine is usually dissipated by vigorous aeration or even simply the process of filling the tank. Chloramine is best reduced or eradicated by means of proprietary additives.

R O Water: Of specific interest to marine fishkeepers, R O Water is water that has been passed through a Reverse Osmosis unit to remove all heavy metals and contaminants before being used to mix with synthetic sea salt.

Similar to distilled water, R O Water is 'lifeless' although when purchased from an aquatic dealer the option is usually offered to add some trace elements at the point of sale.
In freshwater aquariums it is usual to mix some ordinary water with R O Water.

WATER CARE

Attention to water quality is the secret of success in fishkeeping. Good water management can only be obtained by using filtration coupled with regular partial water changes.

Do not subject your fish to any sudden change in water quality or temperature: this will induce stress which, in turn may affect the fish's immune system and so render it open to attack from disease.

It is vital that when moving fish to another location (moving house or even to Fish Shows) you take as much of their normal aquarium water with you so as to make the transfer as stress-free as possible.
See **Transporting and Exhibiting Fish, Aquarium Management Care Sheet No: 9**

Remember that anything (and everything) that is put into the aquarium will affect the water condition to some degree. Keep soluble rocks and those containing metallic ores out of the aquarium; similarly, innocent-looking aquarium ornaments can also have an effect on the water condition.

When mixing salt water for marine fishes, use 'food quality' plastic containers – and make sure their use is conscientiously restricted for aquarium purposes.

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AQUARIUM MANAGEMENT CARE SHEET No: 3 Heating & Lighting 01/01/98

HEATING: Modern submersible heater/thermostat units are extremely reliable, it's usually only a power cut that stops these units from performing rather than a fault on their part. Whilst various forms of heating devices have been tried (under tank heating mats etc) it is the fully submersible combined heater/thermostat units that are most widely used although some large external power filters may have built in heating units.

It is good practice to tailor the size of the heater to the size of the aquarium. As a rough guide, allow 10 watts per 5 litres of water when choosing a heater. One 150 watt heater will suffice for the average 60cm tank: larger tanks can have their heating requirements split into two separate units placed at opposite ends of the tank for better (and faster) heat spread.

ALWAYS SWITCH OFF THE HEATER AND ONLY REMOVE IT FROM THE WATER AFTER A 'COOLING DOWN' PERIOD HAS ELAPSED

For guidance on installing heaters see **Aquarium Management Care Sheet 4**

LIGHTING: This can be adapted according to requirements. For instance, 'fish only' situations (for example, bare tanks for fry raising) won't need as much light as would a fully-planted aquarium. Another increase, not only in light levels but also in colour-spectrum too, would be needed for a marine tank with coral and other invertebrate growth.

Aquariums generally need to be lit for around 12-14 hours a day. The light fittings found in standard hoods are adequate for general fish viewing but for more luxuriant plant or coral growth you will need to double this amount at least. Where hood space is restricted you may need to change the type of light if light levels are still not enough.

Types of Lighting: The norm these days is to use **fluorescent lighting**. If the tubes can be accommodated in a sealed hood – but still have easy access for maintenance - so much the better. A recent introduction has been the 'luminaire' type of fixture where the light sits on top of the open aquarium.

Safety is also another factor that is being built-into aquarium lighting, with the use of low voltage equipment, especially in aquariums aimed at the children's market.

Fluorescent tubes come in various 'colour temperatures' based on the Kelvin (^{o}K) scale. The higher the temperature, the whiter (colder) the light is. Normal daylight (sunshine) is around 6,500^{o}K but some fluorescent tubes for marine aquariums now approach 20,000^{o}K. Actinic 'blue' tubes are advantageous for invertebrate growth.

Hanging pendant type of light fittings use much more powerful **metal halide lamps** and are used over open top aquariums. These lamps must be hung at least 30cms above the water surface to prevent both water splash damage to the lamps and also scorch damage to the aquarium inmates.

Control of Lighting: Using both timers and (if so desired) dimmers. It is possible to simulate dawn, mid-day, dusk and night-time lighting situations.

For Care of Lights, see Routine Maintenance, **Aquarium Management Care Sheet No 8**

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AQUARIUM MANAGEMENT CARE SHEET No: 4 Setting up the Aquarium 01/01/98

SITING THE AQUARIUM : Modern aquariums (all-glass or acrylic) are fragile so it is important that they are sited correctly. Their base must be both firm and level; any unevenness will cause stresses in the construction resulting in a flood! A filled aquarium is heavy so make sure that adequate floor support exists.
Do not site an aquarium in direct sunlight (it'll overheat in summer and grow too much algae!), opposite doorways or near radiators. A quiet recess, where you can control its lighting, is preferable and, of course, there should be a power socket nearby!

SUBSTRATE & DECORATION : Wash all substrates thoroughly. Rinse about half a bucketful at a time. Spread over the tank base to about a depth of an inch or two: you can bank up the substrate towards the rear of the tank for a better visual effect – hold this banking in position by putting rocks in to act as terracing.

Pieces of bogwood look fine but make sure it is completely dead. You should soak it in several changes of water before use to get rid of most of the tannins in the wood, otherwise it will stain the water.
Screw a flat plate on the bottom and bury this in the substrate to prevent the wood from floating.

Only use 'safe' decorations. Rocks should be non-soluble and contain no metallic ores.
Sunken ruins, treasure chests and galleons must not be made of porous materials such as plaster; replica logs made from inert resins are fine.

HARDWARE : Visible hardware is not exactly ideal, so hide heaters, filters and pipework behind rocks or plants but without hindering water flow around the tank.

Heaters must be mounted clear of the substrate and have unrestricted water flow around them if they are not to overheat.
Fit isolating hose-taps to external filters (one in the flow and one in the return) for ease of maintenance.
Airpumps should be situated above the tank if possible or an 'anti-siphon' loop formed in the airline to the aquarium. Alternatively, fit a non-return 'anti-siphon' valve in the airline to prevent water entering the pump if a power failure occurs.
Airlines are best connected to any diffusers in the tank via a controlling air valve.
Similarly, power to the heaters, lights and filters is best connected via a 'Cable Tidy' switching facility mounted in the side of the aquarium.

DO NOT SWITCH ON ANY HARDWARE UNTIL THE TANK IS FILLED WITH WATER

The cover glass and the hood are obviously placed in position after the tank has been furnished and filled with water. Add a thermometer once the tank is filled.

WATER PREPARATION & FILLING : As this is the first time you will fill the aquarium you can treat the water with a dechlorinator when it is filled. Remember to calculate how much water you have used so that you can add the correct dosage to the tank when full. For subsequent water changes, adding dechlorinators and salt mixing will take place using separate containers as required.

Similarly, if this is to be a marine aquarium, you can fill it with water (after placing rocks and hardware in position) and then add the correct amount of salt mix to the water to arrive at the correct Specific Gravity, although this 'salting up' should ideally be done once the water temperature is at the correct value.

Place a small saucer or a jug on the substrate and pour the water into this first. As it gently overflows, the rising water level will not then disturb any of your careful aquascaping nor **dislodge any plants which have yet to establish their roots.**

PLANTING : Bushy type plants are used to fill out spaces, especially corners to disguise the fact that the aquarium is a glass box! Tall grassy plants can also hide the sides and back.

Plants should be rooted in the substrate in species groups rather than singly.
Single, larger specimen plants can make focal points in the tank but never position such a plant smack bang in the middle of the tank. Low, slow-growing plants will form a 'lawn' over the substrate.

Plastic plants do have a place in the aquarium, especially where herbivorous fish make the keeping of live plants an impossibility. Remember that such plants will do nothing to keep water quality high – you will have to rely on filtration and your own good aquarium management for that.

Before planting, inspect each plant carefully for snail eggs (they're usually on the underside of leaves). Taking this precaution now will save a lot of trouble later on should you then have a snail-infested tank.

Some people plant the aquarium 'dry' whilst others fill up the aquarium with water about three-quarters full first. This allows the plants to take up their natural positions immediately and you can easily check on how your aquascaping and planting skills are progressing as you continue to furnish the tank. There's a good reason for only partially filling the tank at this stage – it won't overflow when you put your arms and hands in to plant it!

RUNNING IN : After planting, the tank completely filled and hood and cover glass installed, the power can be switched on.
Filters may need to be 'primed' before they flow continuously. Keep an eye on the thermometer so that you can verify that the heater is working correctly.
Operate the lights as normal, even though there are no fish in the aquarium.

You may wish to check the ammonia, nitrite and nitrate levels during this running in period (it may take a few weeks). Test kits are easy to use and you should see initial peak readings of ammonia and nitrite before these fall to zero.

At this time, the tank is said to be mature and now ready for fish. The nitrate level will be low to start with but gradually increase over the coming months.

STOCKING : Never add the complete tank holding capacity of fish at once.
This will overload the filter system and cause a massive wipe-out of stock. Add fish in few numbers at a time and remember that they will grow!

Once the original batch of fish have settled in, it might be prudent to set up a smaller tank as a quarantine area for any further fish that you wish to add to your collection. This will lessen the risk of introducing disease into the tank.

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AQUARIUM MANAGEMENT CARE SHEET No: 5 Feeding 01/01/98

After water conditions, the next most important factor of fishkeeping is feeding.
Not every fish has the same dietary needs and not every fish feeds in the same way.

By taking note of the fish's mouth position, the fishkeeper can evaluate how the fish feeds. An upturned mouth indicates a fish that takes food from the water surface. A centrally positioned mouth usually shows that the fish takes food as it descends through the water. An underslung mouth is found on species inhabiting the bottom levels of the tank.

TYPES OF FOOD : There is no reason at all for not providing your fish with the correct diet, such is the research and production undertaken by manufacturers.

Manufactured food compositions include floating 'sticks', flakes, fast sinking granules, 'stick on the glass' tablets, extruded paste like foods and 'wafers'.
There are high protein content foods for fry to easy to digest coldwater foods for when Summer turns to Winter and Winter returns to Spring.
Herbivore and carnivore mixes are available in multi-sized flakes for differing sizes of fishes, and those specially-formulated foods for difficult marine fish.

There are also 'live' foods that can be fed. Water Fleas (*Daphnia*), *Tubifex* worms, Bloodworm and Mosquito larvae are favourite waterborne foods. Make sure that these come from fish-free (or certainly disease-free) waters.
In addition, a number of live foods can be cultured. Primarily of use for young fish these include Brine Shrimp eggs (hatch in saltwater for the tiniest, disease-free, live food), Micro-worm, Grindal Worm and White Worm which can all be cultured using cereal based food on a compost base.

HOW TO FEED : The golden rule for feeding is **NEVER OVERFEED**

Firstly, the fish don't require anywhere near the amount of food we think they do and, secondly, any uneaten (or undigested) food will simply pollute the aquarium water.

Feed just the amount of food that the fish will eat in a matter of minutes.

In ponds, where you may not be able to see the food once it falls through the water, using floating sticks or pellet foods will enable you to gauge the right amount more easily.

In the aquarium, siphon out any excess food rather than let it lay on the substrate gradually rotting away. Don't neglect nocturnal fishes' needs. Add some fast-sinking foods just after 'lights out' for their benefit. When feeding marine, turn off filters (but leave any water-circulating pumps working) so that food is brought to sedentary filter-feeding invertebrates.

HOLIDAY CARE :.Many people worry unduly about leaving their fish whilst they go on holiday.

In most cases, providing that the fish have been well fed and are in a well-stablished aquarium or pond, the fish can be left quite safely for up to two weeks without any further care being needed. This is better than relying on a non-fish-experienced neighbour who may well decide to use the whole tub of food over the time you're away! If you want to rely on a neighbour, then make up small meal-sized packets of food with strict instructions to only use one a day at most!

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AQUARIUM MANAGEMENT CARE SHEET No: 6 Health Care 01/01/98

Sadly, despite having set up and maintained a healthy aquarium, filled it with well-fed fishes, things do go wrong and disease will strike at some time or another.

Fortunately, most of the commonly encountered fish diseases can be diagnosed and treated fairly easily. Access to a good reference book is recommended.

DIAGNOSIS : There is no substitute for good old observation. Most fishkeepers become very familiar with their fishes' behaviour and should be able to spot anything out of the ordinary. Things to look out for are loss of colour, out of character swimming actions, lumps, spots, pimples, fraying fins, trailing faeces, swellings, eye protrusion etc.

The key to curing fish disease is early diagnosis. Unfortunately, symptoms of many internal diseases do not show on the outside of the fish (or affect its behaviour adversely) until the disease is too far established for any remedy to be effective.

COMMON AILMENTS:

White Spot – The fish is covered in tiny white spots and may scratch against rocks.

Marine Ich – The marine equivalent of White Spot.

Velvet – Similar in appearance to White Spot but the spots are much tinier giving the fish an appearance of being dust covered.

Fin Rot – Not exactly a disease in itself but more of a secondary infection to, say, a split fin and the infection site is aggravated by poor water conditions. Treat the cause not the effect.

Fungus – Cotton-wool like growth on the fish's skin.

Mouth Fungus – this fungus like growth around the mouth is not s fungus but a slime bacterium requiring different treatment to that for fungus.

Dropsy – The body swells up and the scales stick out at an angle.

Carp Pox – Waxy growth on the body on coldwater fish.

Lymphocystis – Cauliflower like growth on coldwater fish. This seasonal ailment often self heals.

Swim Bladder Problem - Fish cannot maintain a chosen position in the water; may bob up or down or tumble head over heels. A common ailment in Fancy Goldfish.

TREATMENT : If in any doubt about a fish's condition then isolate it immediately into a separate treatment tank. Use as much of the original aquarium water as you can if you have to set one up in a hurry, otherwise set one up as closely to the main aquarium's water conditions as possible.

Treatments range from adding medication to the whole aquarium, giving individual fish a medicated 'bath' in a separate treatment tank, using medicated foods, to injection and perhaps surgery on the fish whilst out of water under anaesthetic.

Whilst many common ailments are cured by 'off the shelf' remedies, sometimes antibiotics are required and these must be obtained through your veterinary surgeon.

Basic treatments such as medicating the aquarium or giving the fish a separate 'salt' bath are well within the capabilities of the average fishkeeper.

If you decide to treat the fish in the main aquarium bear in mind the following:

Extra aeration should be used, as medication often consumes more oxygen.

Remove any carbon from filters as this will remove the medication from the water before it has a chance to do its job.

Treatment for disease in marine tanks is difficult as usual copper-based remedies cannot be used as these will kill any invertebrates present.

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AQUARIUM MANAGEMENT CARE SHEET No: 7 Breeding 01/01/98

One of the more rewarding aspects of fishkeeping is seeing your fish multiply in numbers. Most fishkeepers see this as justification in their methods of fishkeeping, although we all know that many of our fish breed despite of our treatment of them, such is the urge to maintain the species.

METHODS OF REPRODUCTION: All fish breed from eggs, but it is the development of the fertilised eggs that gives us the diversity in reproduction methods.

The majority of fish are egg-layers where the fertilised egg develops outside of the fish's body. The unfertilised eggs are first expelled from the female under stimulus from the attention of the male. Eggs may be simply released amongst plants or scattered in open water to be fertilised by the free-swimming male; they may be deliberately laid on a pre-selected spawning site or placed in a floating bubblenest; they can be laid out of water on an overhanging terrestrial plant leaf (or on the tank's cover glass); they can be buried in the substrate; they can be incubated in the parent's mouth.

Several of these methods have evolved to give better protection for the development of the egg and subsequent fry.

Alternatively, with the livebearing fishes, the fertilised eggs remain in the female's body to develop and later emerge as free-swimming fry. A variation in this method allows females to store sperm from the male so that further batches of young can be produced without any further 'mating' being required. An even more sophistication allows developing fry to obtain nutrients from the female via a primitive 'placenta'.

Such are the diverse methods awaiting fishkeepers wanting to breed their fish.

SEXING : The first practical barrier to overcome is sexing the fish and making sure you have a male and a female to breed with.

Livebearing species are easy to sex: the male has the anal fin transformed into a rod-like structure, the gonopodium, through which he injects sperm into the female. Females have the traditional fan-shaped anal fin.

It is important to strictly control which fish breeds with which: livebearers are notoriously promiscuous and will interbreed indiscriminately. Only put together fish of the same strain unless you really want a thankful of 'mongrels' as a result!

Egglaying species need to be observed a bit more carefully. Males are generally more colourful and have longer finnage. Females usually are plumper in the body (due to the build up of eggs) when viewed from above. Egglayers generally breed true without too many surprise packages amongst the offspring.

Sexing Goldfish: When in breeding condition, males develop small white breeding 'tubercles' on the gill-covers and on the first thick rays of the pectoral fins.

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CONDITIONING

THE PARENTS : The fish need to be brought into breeding condition. This entails feeding with high quality foods (especially live foods) for a couple of weeks before the fish are put together to spawn. Ideally, the sexes should be separated during this process to ensure both partners are at optimum 'ripeness' when re-united in the spawning tank.

It is possible to 'flock' or 'shoal' spawn fish rather than just a single male and female. In this case all the males would be separated from all the females prior to spawning.

SPAWNING : One of the problems with the more indiscriminate egglaying species is that the egg-scatterers also have a very healthy appetite for their own eggs. Some precautions must be taken to prevent this.

Using a layer of marbles on the base of the spawning tank allows the eggs to fall between the crevices out of reach of the hungry adult fish. Dense bushy plants or spawning mops can also trap (and hide) eggs during spawning. Such plants also offer refuge to newly born livebearer fry.

Site spawners such as cichlids, gouramies and mouthbrooding species effectively protect both their spawning sites and developing fry from other fish. It is possible with cichlids to remove any spawning receptacle and hatch the eggs artificially away from the parents, but then you miss out on witnessing the amazing parental care exercised by these fish.

Killifish eggs, once collected from spawning mops, may need a period of semi-dehydration before being re-immersed in water to hatch.

In some cases, the spawning couple need not even meet each other! Goldfish females can be hand-stripped of their eggs and then the male's milt can be milked into their container to fertilise them.

It is advisable to supervise spawning if at all possible. Many male fish drive the females very hard during the spawning chase and often continue to harass them after spawning is complete.

The spawning tank should be furnished with plenty of bushy plants in which the female can hide if necessary, but in most cases it is best to remove her from the spawning tank as soon as possible after spawning has been completed.

FRY CARE : Once the fry hatch and are free-swimming they must be provided with plenty of correctly-sized food. Infusions, green water, liquid fry foods and newly-hatched Brine Shrimp are all good starting foods.

After a few days, the food size can be increased to include Grindal Worm, White Worm, sifted *Daphnia* and so on up to crumbled flake food, after which the more normal diet can be provided. Tank space will also become important too, so extra tank space should be available not just for growth but also to segregate the young fry for quality or sexes.

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AQUARIUM MANAGEMENT CARE SHEET No: 8 Routine Maintenance 01/01/98

Whilst the aquarium is nothing like a well-oiled machine, the comparison to necessary maintenance of both for ensured well running does stand examination.

Everything that goes into the aquarium (of whatever type) will have an influence for good or bad. Close attention to regular maintenance is most important. But this need not be a monotonous chore, as only a few minutes each week need to be put aside for maintenance – a small period when compared to the many hours you're likely to spend gazing into the aquarium's depths.

DAILY TASKS : Check number of fishes – investigate any absentees immediately, may be trapped behind rocks etc..
Check Ammonia, Nitrite levels (during running in period only).
Check temperature (until you get used to the 'feel' of the front glass).

WEEKLY TASKS : Prune plants if necessary, remove dead leaves.
Clean cover glass and any fluorescent tube reflectors..
Empty Protein Skimmer (marine aquarium)

MONTHLY TASKS : Remix new synthetic sea water for water change ahead of actual task.
Partial water change (siphon out detritus from substrate in process).

NOTE: When the water level falls in the aquarium due to evaporation it is pointless to merely top up the tank with new water. No dissolved minerals in the water will have 'evaporated' so the water in the tank will just get more and more overloaded. Remove a percentage of the aquarium water and then top up with fresh.

It is permissible to top up the marine aquarium with fresh (NOT salt) water to replace evaporation losses, as simply topping up with more salt water will only increase the Specific Gravity beyond the correct value.

Remove algae from front glass (leave algae on side and back glasses for the benefit of herbivorous fish).
Clean filter media, using aquarium water not tap water.

PERIODIC TASKS : Check air-pump filters; renew fluorescent tube when required.
Rotate live food cultures as necessary.
Set up spawning tank, condition intended breeder fish.
Begin Brine Shrimp hatching as fish spawn.
Remove dead marginal plants (ponds)
Remove excess silt from pond.
Use a 'Gravel Washer' to remove silt from aquarium substrate; rake over substrate to prevent compaction..
Clean Show tanks.

ODD FISH BEHAVIOUR: Check pH, Ammonia, Nitrite and Nitrate levels..
Check and clean filter media.
Check air-pump.
Check for bullying, disease, overcrowding.

FEDERATION OF BRITISH AQUATIC SOCIETIES

AQUARIUM MANAGEMENT CARE SHEET No: 9 Transporting & Exhibiting Fish 01/01/98

Welcome to these information Sheets that will not only help you make the best fish choices for your aquarium but also provides details on their best care.

Preparation: It is a good plan not to feed any show fish two days before the Show. This will help to prevent large amounts of faecal matter in the tank.
When preparing the fish for the Show, carefully check that it is free from damage and disease – particularly 'White Spot' and fungus. If there is any doubt, withdraw the entry.
All disqualified exhibits will be removed from the Show bench.

Show Container: Ensure that the Show tank sufficiently larger than your exhibit and that it meets the Federation's Show Tank requirements. See that it is clean and partly filled with clean water taken from the aquarium where the fish to be exhibited is normally is kept.
Once the fish has been placed in the Show tank, cover the top with clingfilm and put the lid on the Show tank secured with elastic bands or sticky tape. Place the Show tank into a 'poly box' for transport to the Show. It is much better to use a larger tank than one that is barely sufficient.

Netting: Always ensure that any nets used are suitable for the size of fish you are catching. If in doubt, use a larger rather than smaller net.

Transportation: Ensure that the poly box is transported safely in the car and in such a way that it does not move during the journey. Take a sufficient quantity of aquarium water with you to the Show just in case you need to do a water change or to top up the Show tank.
If you are taking the fish in a polythene bag, first check that the bag does not leak. It may seem obvious but a surprising number of fish bags leak. Always use two polythene bags, one inside the other. Do not fill the bag more than one third full of water. This will allow for sufficient air space. Again, transport it in a 'poly box' and take spare plastic bags and at least one spare Show tank with you in case of accidents. Also it could be useful to have some small pieces of expanded polystyrene sheeting available to use as packing pieces in the poly box.

Auxilliary Air: If possible take a battery-powerd emergency air pump with you and spare batteries.

Presentation: Ensure that the Class Labels you are given are correctly fixed to your Show tank. Siphon off any detritus from the tank and top up with water you brought with you; adequately fill the Show tank. Clean the tank sides with a cloth or paper towel so that the exhibit looks well cared for. Just prior to judging, check that your exhibits are all OK – that there are no signs of disease, and that the fish is not stressed. If you consider there to be a problem, consult the Senior Steward / Show Manager. If they have a doubt, they will request that you remove the exhibit. If during the judging, the exhibit appears to be stressed, the organisers are at liberty to add a supply of air. If this does not assist the fish, then they may decide to remove it from the Show bench. The Show organisers will whenever possible do that with your assistance.

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At the Show: The organisers must ensure that the hall is sufficiently heated for the comfort of the exhibits. They should also try to ensure that during benching, the fish are not subjected to undue cold draughts.

Care Area: The show organisers will provide a suitable 'care' area for the use of exhibitors. With hot water, and an air supply on hand; also with some basic remedies on hand such as Stress Coat, White Spot Cure and Salt. These should be available for exhibitors to use. However the onus is entirely on the owner to organise and administer any treatment should this be required for their exhibit. A Senior Steward is always on hand in the care area to advise and help.

Show End: At the time of de-benching, exhibits should be carefully repacked for the journey home.

At Home: When you arrive home, carefully check all of your exhibits. If they have cooled down slightly during the journey, allow them to get back up to the aquarium temperature gradually by floating them in a plastic bag in the aquarium, turn off the aquarium lights whilst doing this. After releasing the fish back into the aquarium feed all the fish it will enable them to settle down.

The Next Day: Carefully check all exhibits for signs of damage or disease, and treat accordingly.

ADDENDUM

Further information on the Federation's Rules governing the exhibiting of Fish, Breeders Teams of Fish, Furnished Aquaria, and Aquascapes, together with judging procedures employed, can be found in the Federation's Constitution (Book 5).

Also available is the National Show Fish Size Sheets (Book 6), this lists the Classes fish should be entered into at a Show as well as a recommended maximum size for individual species of fish.

Both these are available from the Merchandising Officer (see this site for the address). Any one exhibiting fish for the first time are advised to obtain a copy before considering entering any Show.

However do not be put off from exhibiting your fish. Show organisers and other fishkeepers showing their fish are only too willing to help first-timers. As there are no money prizes involved much of the cut-throat competitive showing that is apart of other animal Shows does not occur at Fish Shows. It's more a fun day out meeting other fish people and exchanging ideas and information.

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AQUARIUM MANAGEMENT CARE SHEET No: 10 Aquarium Plants 01/05/03

Aquarium plants are not just for decoration, they perform vital services too.
Primarily, they help maintain optimum water conditions by absorbing carbon dioxide and, to some degree, remove nitrates from the water. In addition, they provide fish with shelter, spawning sites and, in some cases, food!

In the aquarium, you have the choice of using real living plants or equally realistic plastic replicas; either will beautify the aquarium and whilst the plastic ones won't contribute any water-cleansing functions they still make the aquarium look nice if you like to keep fish that have strong vegetarian-diet tendencies!

Live aquatic plants are usually classified by hobbyists into three groups:

Rooted, Floating and **'Cuttings'**

Rooted : these plants generally feed through their leaves but have roots for merely anchorage purposes. Another way of anchoring themselves in position is by clinging on to rocks or logs with thin creeping stems.

Most rooted plants send out vegetative runners on which young plants grow; alternatively, some such as Amazon Swordplants (*Echinodorus* spp) have 'daughter plants' growing on leaf surfaces.

Members of the *Aponogeton* genus have rhizomes and bear aerial flowers which can be pollinated to produce seeds from which extra plants can be grown.

Single, large specimens of rooted plants are best used as 'feature plants' in aquascaping designs, whilst the tall, grassy species provide natural 'curtains' which hide the back and side walls of the tank.

Floating : As the name suggests, these plants are happy to float around untethered. Some have nutrient-collecting, trailing roots dangling down into the water and these make excellent refuges for young fish.
Surface floating plants often become rampant and should be netted of as required.

Floating plants offer shade, shelter and, sometimes, bubblenest building material for fishes.

'Cuttings' : Fast growing, bushy plants can be propagated by taking cuttings and using these to make more plants by re-anchoring them in the substrate. Fine-leaved species such as *Cabomba* and *Myriophyllum* are examples of such plants.

These plants provide an excellent and natural way to fill up corners and spaces when aquascaping the aquarium. Dense bunches of such plants also make excellent spawning materials for egg-scattering fish.

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AQUARIUM MANAGEMENT CARE SHEET No: 10 Aquarium Plants 01/05/03

PLANT CARE

Before planting, rinse off each plant; remove any dead or dying leaves and inspect the undersides of leaves for jelly-blobs - these are snails' eggs and should be removed - unless you want a plague of snails in the very near future.

Always plant in groups of the same species - it looks more natural.

Plants which dislike strong light can be planted under the shade of those stronger-growing, taller species or under a cover of floating plants.

Do not bury the plant too deeply; the 'crown' (the junction of leaf/stem and root) should be level, or just above the surface of the substrate.

Don't expect all plants to get on together; settle for those that you can grow well.

Most of the growing problems associated with aquarium plants are usually connected with the amount of light available.

Increasing the light makes for better plant growth and you can either install more fluorescent tubes or, for a start, fit light-enhancing reflectors to make full use of all the light generated.

If you have too much light then, unless you stock extra plants to make use of the light's energy, you will get excessive algae growth - particularly if you over-feed, which puts more algae-nutrient into the water! Cutting down the light period, or installing less powerful lamps, may cut down excessive algae but remember that most plants like a twelve hour light period.

Be careful of adding extra nourishment to the aquarium in the form of specialised substrate materials or plant fertilisers.

Never attempt to use horticultural fertilisers (even in diluted form) to encourage more plant growth.

Too much extra nourishment without careful handling will only lead to water pollution and more algae.

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AQUARIUM MANAGEMENT CARE SHEET No 11 Apple Snails (1)

Whilst many fishkeepers regard Snails as a pest to be eradicated (or controlled at least) due to their appetite for aquatic plants, there can be some good reasons for having Snails. In the marine aquarium aquarium, for instance, gangs of Snails do much to clean up any uneaten food, algae and debris.

Although Snails might not be so desirable in freshwater aquariums or ponds, a group of Snails does have a very practical use, especially when breeding fish

The 'Apple Snail' has a voracious appetite and, as a consequence, produces copious amounts of waste. However, this waste does help to produce infusoria-rich water which can be used as a first food for the tiniest of fry. Hence their inclusion in this series of Care Sheets

Genera : *Pomacea canaliculata*

Family: Ampullariidae

Geographic Origin : native to central/south America but introduced to Far East

Common Names : Apple Snail Channelled Apple Snail

Compatibility : Community – only with peaceful inhabitants. No aggressive fish, eg: Cichlids, Goldfish. No Loaches, Pufferfish or other snail-eating fish.

Minimum Aquarium size: 4 gallons per adult

Temperature : 18-28^{o}C

Habitat : Prefers lentic waters to turbulent. Coverglass a necessity as snails can survive for a long time out of water and escape the aquarium.
Air space above water levels essential for egglaying as eggs are laid out of water, otherwise babies will drown. Mainly active at night.

Water Parameters : pH 7.5-8.5, zero ammonia, nitrite. Freshwater. No salt.
No trace metals especially copper.

Health : The addition of calcium, and carbonate salts may be needed for shell health in some soft water areas.

Diet : Shrimp, flake foods, algae tablets, fresh fruits, spinach, cucumber, courgette (cooked), green beans (cooked), broccoli (cooked), most soft green vegetables. Will devour most vegetation

Plants : See **Diet**!

Availability : Readily available at aquatics shops

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AQUARIUM MANAGEMENT SHEET No 11 **Apple Snail (2)**

Genera : *Pomacea bridgesii*

Family : Ampullariidae

Geographic Origin : native to central/south America but introduced to Far East

Common Names : Apple Snail; Golden Mystery Snail; Brazilian Apple Snail

Compatibility : Community – only with peaceful inhabitants. No aggressive fish, eg: Cichlids, Goldfish. No Loaches, Pufferfish or other snail-eating fish.

Minimum Aquarium size : 2 gallons per adult

Temperature : 18^{o}-28^{o}C

Habitat : Prefers lentic waters to turbulent. Coverglass a necessity as snails can survive for a long time out of water and escape the aquarium.
Air space above water levels essential for egg laying as eggs are laid out of water, otherwise babies will drown. Mainly active at night.

Water Parameters : pH 7.5-8.5, zero ammonia, nitrite. Freshwater. No salt.
No trace metals especially copper.

Health : The addition of calcium, and carbonate salts may be needed for shell health in some soft water areas.

Diet : Shrimp, flake foods, algae tablets, fresh fruits, spinach, cucumber, courgette (cooked), green beans (cooked), broccoli (cooked), most soft green vegetables

Plants : *P. bridgesii* – will not eat

Availability : Common colours readily available from aquatics shops, rarer colours available from private breeders.

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AQUARIUM MANAGEMENT CARE SHEET No: 12 PROBLEMS 01/02/2002

It is impossible, given all the variables involved, to either foresee or to solve every problem that is likely to befall the fishkeeper. Even if it were possible, then limitations of space would prevent all the answers being presented here on these pages.

We will try to deal with some of the more worrying practical problems here; for fish-related problems, please refer to our 'Ask Us' pages elsewhere on this site.

POWER FAILURE

The first thing to do, in the event of a power supply failure is ….don't panic!

The tropical aquarium, even one of modest proportions, can be regarded as a heat store and won't suddenly freeze solid in a matter of minutes. In the average setting of a normally furnished (and probably centrally heated) room the heater in the aquarium won't have been over-worked anyway, once the water had reached its selected temperature. It would take several hours for the water temperature to fall to lethal limits for the fish. Now to sensible actions.

Further heat loss should be prevented at all costs – even before seeking to restore the power supply failure. (This presumes that the power failure is likely to be ongoing and not just a blown fuse).
Wrap the aquarium is some form of heat-insulating material – bubble-wrap, blankets or even several layers of newspapers. Now you can turn your attention to providing alternative heating (again, presuming a lengthy power shortage).

If you have an alternative means of heating – gas, for instance – then the best thing to do is fill several containers with hot water and stand or float them in the aquarium to maintain the temperature.

NOTE : You should drain out some of the tank water to allow for water displacement by the containers, otherwise the tank will overflow.
You may have to repeat this operation at regular intervals to maintain the temperature.

Do not simply drain off some water and replace with heated water as this will alter the water conditions in the tank; the fish may be stressed by sudden exposure to 'raw' water being introduced.
In marine tanks, adding water will certainly upset the Specific Gravity reading.

The opposite situation

Should the aquarium overheat, then you can reduce the temperature by floating ice cubes (contained in a sealed bag) in the water.
Alternatively (or additionally), open the hood, turn up the aeration (or add some) and direct a fan to blow air across the water surface to add more cooling.

LEAKING TANK

More serious for the house occupiers, is a leaking tank – a small amount of water goes a long way across a carpet! Reasons for a leaking tank can usually be traced to incorrect installation, particularly where the tank is standing on an uneven foundation that sets up stresses in the glass panels, leading to eventual cracking. Always make sure the tank is on a firm and level foundation.

Turn off the power to the aquarium, to safeguard the heater from burning out.

If the leak is serious – through a split glass, for instance – then the fish and plants should be transferred to another temporary tank or suitable container as soon as possible. Use as much of the remaining water as possible to avoid stressing the fish too much. Once the tank is emptied, the leak can be repaired.

Sometimes, is the leak is just a slow 'weep' then it will eventually seal itself as silt from the aquarium works into the gap.

It will be necessary to strip the furnishing from the tank, dry out the tank and re-seal any obvious leakage point. You may even have to remove the damaged pane of glass and replace it with a new piece.

Give the repaired tank at least 24 hours for the sealant to 'cure' and then, if possible, test for leaks before re-setting up again.

FILTER NOT WORKING

A sudden stop in water flowing from the filter return can mean a burned out motor or it may have benn getting slower without you noticing it over a period of time.

In the first instance, the remedy is obvious – a new replacement. But, only too often, all that is wrong is that the filter needs cleaning.

Apart from rinsing out the filter medium (**ALWAYS USE AQUARIUM WATER FOR THIS**), take out the impeller and clean off any slime that has built up. Don't forget to clean out the impeller chamber too.

Occasionally, a filter may stop due to an air-lock developing inside. Give it a shake or even invert it (over a bucket, just in case) to dislodge the air.

AIR PUMP NOT WORKING

An obvious change in sound coupled with no air output indicates a split diaphragm in the pump. Replacement is straightforward but always **disconnect from the electricity supply** before opening up the pump.

A reduced air flow from the pump points towards two things: firstly, there are two tiny rubber 'flap valves' in the pumps output chamber that may need cleaning.

Secondly, the air pump has to draw its air in from somewhere; usually its through a hole in the base which is protected by a felt filter pad. Over time, this pad gets clogged up and reduces the air supply to the pump. Don't neglect to clean this forgotten component.

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ALGAE

The main causes of unwanted algae growth are too much light and/or an excess of 'plant nutrients' in the water, usually nitrates and phosphates.

Make sure you have enough plants to make use of all the light available. Try cutting down on the intensity of the light (shade the cover glass) rather than cutting down on the light duration – most tropical plants need twelve hours or so a day.

Cut down nitrates by regular partial water changes and use a phosphate remover in your filtration system.

If the algae is the 'soft' green variety, use a natural way of reducing it – import a few vegetarian minded fishes.

OILY FILM ON WATER

Sometimes, an oily film develops on the water surface. This usually comes, initially, from food added to the aquarium.

This film not only cuts down important gaseous exchanges to and from the aquarium, but also reduces the amount of light entering the water for the benefit of aquatic plants.

To remove it, drag a piece of absorbent paper across the water surface.

SNAILS

Snails do damage to aquarium plants and will also eat fish eggs. Once established they can be difficult to eradicate, especially the livebearing conical-shelled species that live in the substrate.
One way to control them is by using the following method:

BELL BATTERY: Strip 150mm of insulation from 1m Bell Wire.
Connect to the positive end of a 9v battery.
Place the stripped wire at one end of the tank. Do the same with the negative.
Leave working for 1 hour. Repeat 3 times at 2 week intervals.
Following each treatment, change 25% of the water.

Please Note: This treatment will affect the plants burning off any brown or dead parts.
All snail treatments must be repeated at least three times at fortnightly intervals as snail eggs are not affected and one must wait for them to hatch.

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AQUARIUM MANAGEMENT CARE SHEET No: 13 The Tank 14/06/04

THE RIGHT TANK

Success or not in fishkeeping depends on your ability to provide the fishes with a correct and stable environment in which to live.

Basically, fish require space, light, food, correct water conditions and compatible tank-mates.

In order to start off correctly, you should choose the right tank for the type of fish you intend keeping. There are three main areas of interest in fishkeeping – tropical, coldwater and marine – but unfortunately you can't switch between them as your interests change because they each demand different conditions.

A tank of any given size can, obviously, only support a certain number of fishes but it is not often appreciated that this number is not the same for all types of fish. You can keep many more tropicals in a tank that would otherwise only support a few coldwater fish, and even less marines.

To put it into more practical terms, a collection of tropicals would be happy with a tank 600mm long, coldwater fish would prefer a 900mm long tank whilst marines could need a tank 1200mm long.

Small acrylic tanks with built-on mini-fluorescent lighting are undeniably attractive (especially to children!) but maintaining optimum water conditions in these tanks is much more difficult.

Tank design

Modern tanks are of all-glass or extruded acrylic construction. Look out for optical distortion in the curved shapes and rounded corners of acrylic tanks. Bear in mind too that each type of aquarium requires different maintenance care, special dedicated cleaning pads are available to suit each type.

Deep tanks are very visually attractive but come with a couple of drawbacks. If the depth is longer than your arms then you'll have problems planting and maintaining it. Also, extra powerful lamps will be needed to get the light right down to the substrate level.

Obviously, given the ability to construct tanks easily using silicone sealant and glass, a tank of virtually any design and shape could be made especially, say, to fit into that awkward corner. Triangular tanks are popular but may be awkward to clean – and just try netting a fish hiding in those acute corners!

Should you decide to make your own tank, bear in mind that attention must be given to the thickness of glass used. As the size of the tank increases, so will the outward pressure from the water and so the thickness of the glass must be increased proportionately. In long tanks (over 900mm) the tendency for the front and rear panels to bow outwards can be restrained by fixing 'front to back' straps across the top of the tank. The aquatic trade operates a quality code to ensure that the correct thickness of glass is used in manufactured tanks.

The overall dimensions of the tank are not exactly critical as long as it is appreciated that a large water surface area as possible is desirable. It is at the water surface that the important gaseous exchanges occur – intake of oxygen and expellation of carbon dioxide. In some 'hang-it-on-the wall' tank designs, the surface area may not be large enough to allow stocking the number of fish that the overall length of the tank implies is possible.

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Installation

As mentioned above, the water pressure in a fully filled tank is considerably and it takes only the slightest stress in a glass panel for a crack to develop.

Even if you could, NEVER lift an aquarium with any appreciably amount of water in it.

Therefore it is vitally important that the tank is sited level in all directions. Apart from this, a sloping water line doesn't look attractive at all. Another stress-causing factor is any unevenness on the surface of what the tank stands on. It is usual to put a slab of polystyrene (styrofoam) under the tank to iron out any unevenness.

A fully-filled and furnished aquarium is also extremely **HEAVY**.

Make sure that not only what the tank stands on is capable of taking its considerable weight but also the floor beneath. Ensure that, with wooden floors, the weight is distributed evenly across the joists.

Do not site an aquarium in direct sunlight (it'll overheat in summer and grow too much algae!), opposite doorways or near radiators. A quiet recess, where you can control its lighting, is preferable and, of course, there should be a power socket nearby!

Should you have an alcove just begging for an aquarium to be installed, remember that whilst you could tailor-make an aquarium to fit exactly, you must leave enough room around it to make maintenance easy.

Please refer to **Aquarium Management Care Sheet No 4** for complete instructions on setting up a complete aquarium.