The Book Of Coldwater Aquariums

By Alan J Hartley

The Author.

Alan Hartley left school with a good general education and had a wide range of jobs before settling down to work at the family garden centre. For a while he was a bank clerk, lifegaurd and then sales representative , but it was fish keeping that was to fire his imagination. He started his hobby by keeping fish in the reservoir at the garden centre and soon started selling them from a small outdoor display area. After a couple of years he erected a purpose built greenhouse to house the new department and trade developed rapidly with little opposition. As the department grew he installed an aquarium room and started selling tropical fish but soon found he had more interest in fancy goldfish and other unusual coldwater fish.

Eventually his parents retired and sold the garden centre so he studied for the City And Guilds Certificate In Pet Store Management which enabled him to get a license in his own name to run an aquatic shop. He soon found a small garden centre that wanted a fish department and set up shop there.

As part of his advertising and in an effort to promote his fish department he started to write articles for the local free newspaper. Many of these were published in the pets column and caused much local interest. The enthusiastic way in which they were received encouraged him to edit them and compile them into this, The Book Of Coldwater Aquariums.

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Introduction

Children are often introduced into the hobby of fish keeping with the gift of a bowl or a goldfish won at the fair. If the fish survive for a short while the childôs parents are often pestered for a bigger tank and more fish. Sometimes the interest stems from keeping tadpoles indoors to watch them grow and develop. Or it may be that you yourself have a pond and you want some fish in the house for an interest in the winter. You may decide to buy a large aquarium with lights and cabinet to house it making it part of the house furnishings.

Whatever your reason for buying a tank this book contains invaluable information on every aspect of keeping a coldwater tank from making the initial choice and place to position it, to setting it up correctly and installing a filter. The book goes on to briefly describe how a filter works and what happens if it isnôt running properly.

Common diseases and their treatment are dealt with, along with general fish care. There is also a useful section describing some of the most popular aquarium plants that will survive in a coldwater tank at room temperature. All the popular coldwater fish are reviewed in detail along with information on their breeding habits. Some of the less common fish are included also in an easily readable text. Towards the end of the book is a light hearted look at some of the less well known facts about goldfish and their habits.

The last chapter rounds off with 12 common problems which face newcomers to fish keeping along with simple remedies.

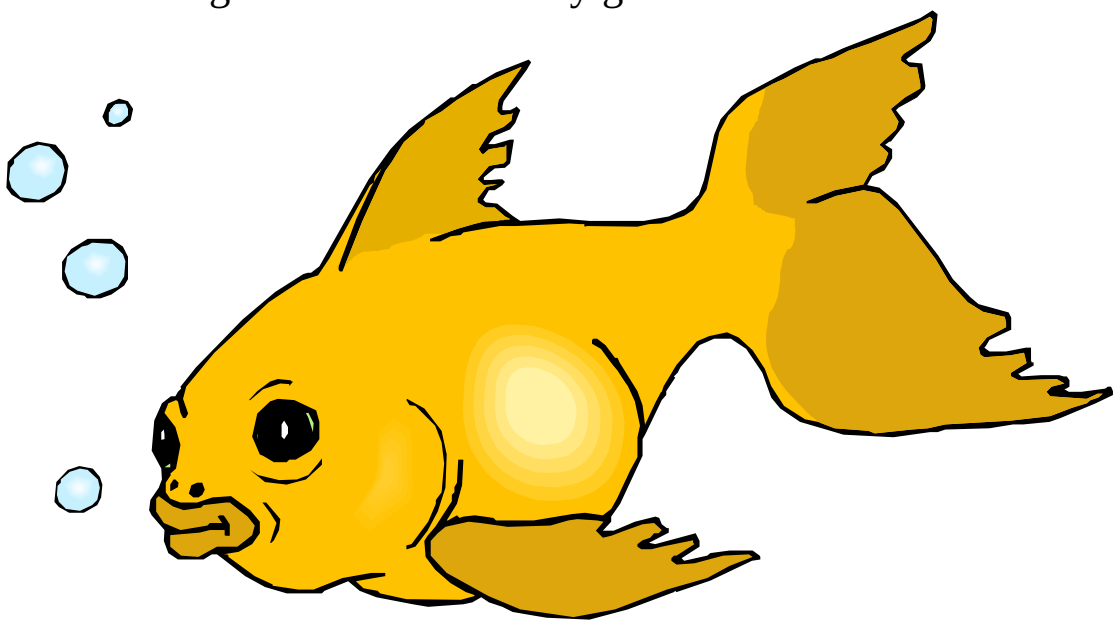
The book is written from the fish keeperôs point of view in a clear simple style which is informative without being over technical. The text is clearly illustrated with dozens of photographs and diagrams throughout.

Alan Hartley draws on 15 years of experience in the aquatic trade and from dealing with the many and diverse problems that customers have presented him with, to produce this book.

A Brief History Of The Goldfish And Fishkeeping

The goldfish originates from a small crucian carp species which was bred for food in China. Early records indicate that by around 500 AD an orange strain of this carp was starting to develop. With a little help from the fish farmers in the form of selective breeding it was developed further. Keeping it as a pet in pottery bowls or artificial pools became more and more popular over the next 1000 years. Further breeding resulted in some colour variations and different shapes.

Later it was introduced into Japan where more specialized breeding occurred resulting in some of the fancy goldfish forms that we see today.



By 1700 trade became more widespread by the developing nations and travelers carried the goldfish far and wide throughout Europe and into Britain. It is a wonder that the fish survived because journeys would take many months overland and by ship and they had none of the benefits that electricity brings with air pumps and filters. Even when the fish arrived

there was no clean tap water to change the water in the bowls. They had to rely on wells or river water which may have contained diseases and contamination. Also they had none of the modern medicines or chemicals to treat them with.

By this time stately homes were being built throughout Europe with their ornamental gardens and pools designed by the likes of the forbearers of Capeability Brown. There were several ways that the early pools were constructed. Some were lined with clay which was puddled the same as in the construction of the canals.

To do this the wet clay was kneaded and this process made it waterproof. The second method was to dig a pool out where the water table was very high. This meant the pool filled up naturally and would always remain at the same depth as the water table. The third method was to simply dig a hole and divert a flow of water from a nearby source such as a river or stream. This was done with many of the big houses because water pumps did not exist as they do today and this was the only way of having a fountain. The water would be piped from a higher source to give it pressure and allowed to run downhill to give it some force to operate the fountains. These fountains would then feed into the ornamental pools and keep them topped up. The water source might be several miles away but no expense was spared to create these gardens.

The construction of these pools continued the spread of the goldfish and by 1800 it had reached all the far flung parts of the British Empire and the world including Australia and even America.

The 1900s saw the introduction of some of the more exotic varieties of fancy goldfish into Britain which at first were kept in large pottery or glass bowls until the advent of the home aquarium. By the 1960s the hobby of fish keeping outdoors had really started to take off with the development of fibreglass pools which was an easy and cheap alternative to concrete or puddled clay pools.

The next development came with silicone sealant which made aqauriums cheaper to mass produce and less likely to leak. The 1970s and 1980s saw a gradual switch from fibreglass pools to vacuum formed plastic ones. These were cheaper to produce and brought fish keeping within the range of many more people.

As plastics developed a new high density plastic was invented which has resulted in a whole new range of shapes for tanks which are virtually indestructible with no visible seams. During the last 20 years fish keeping has expanded phenomenally and many more varieties of fancy goldfish have been introduced from Japan and China who are still the leading fish breeders of the world.

A lot of coldwater fish are also now bred in America and Israel. The trade has grown so much that it is now worth countless millions of pounds to pet shops and specialist aquatic outlets such as are found at garden centres.

Keeping Goldfish In A Bowl

In this country many fish enthusiasts frown on keeping goldfish in bowls even though that it is where fish keeping all started. For hundreds of years the Chinese have kept goldfish in bowls, long before the advent of electricity and power filters. The secret is in not having too many fish in too small a bowl an also in having clean healthy water. 1 small fish per bowl or perhaps 2 in a very large bowl is the limit.

It is possible to buy small filters for goldfish bowls but for what you get the expense is quite high so most people simply clean it out regularly instead. At least once a week is essential twice would be far better.

Children should be supervised when feeding fish in a bowl until they become more responsible as a very tiny amount of food is needed on a regular basis perhaps 2 or even 3 times a day. Overfeeding will result in polluted water very quickly. A good quality flake food should be used as this makes less mess in the bowl.

A piece of oxygenating plant added to the bowl occasionally will help to keep the fish healthy, because the goldfish will eat it and gain valuable minerals from it.

When actually cleaning the bowl the chill should be taken off the water before replacing the dirty water. A dechlorinater can be added to remove harmful chlorine. If it is a plastic bowl it should be given a light wipe around with a soft sponge, never scrubbed, as it will scratch. Glass bowls wont scratch so easily but are not so popular because of the safety aspect.

Sometimes Chinese porcelain ones can be bought which can be quite large and will accommodate more fish but obviously you can only see them from above. A lot of young people are introduced to the hobby with the gift of a small bowl. As the fish grows, a larger tank is bought and more fish added. Then as the child grows and the fish get too big for the tank a pond is the next step, installed in the garden.

The years go by and the child develops into an adult and another fish enthusiast is added to the ever growing ranks of the hobby. So those who sneer at keeping a goldfish in a bowl should think again, perhaps it is how they started in the hobby.

Positioning The Tank

The tank or bowl should be positioned out of direct sunlight so a windowsill is not the best place. This is because the sunlight will warm the water and may literally cook the fish. Also the tank should not be put anywhere close to a heat source such as a radiator for the same reason. The top of a television is the last place to put a tank for many reasons. Perhaps the most dangerous is the fact that if any water is spilt from it it may go into the television and lead to someone being electrocuted. For this reason all tanks should be situated away from electrical appliances.

Tanks do break very occasionally so you must think about where the water will go if it does. All glass aquariums should be placed on a very strong even support, Remember that a gallon of water weighs 10 lbs so a 20 gallon tank weighs 200 lbs or the same as a very heavy man. The tank should also be placed on a thick layer of polystyrene or some other suitable material such as rubber to support it more evenly.

If electricity is to be used in the running of the tank for filtration or for lights then a power source will be necessary. This should be close by but not directly underneath the tank. Any centrally heated house will provide more than enough background warmth to maintain a high steady temperature for fancy coldwater fish. Indeed it may be found by the use of a thermometer that the temperature is too high for some varieties in which case a cold spot in the house will have to be found. In an unheated room such as a garage it may be necessary to add a heater to the tank especially if fancy goldfish varieties are to be kept as they like a minimum temperature of about 55 F. Some aquarium heaters are more adjustable than others, so it may be possible to find one that can be set to between 65 and 70 degrees Fahrenheit . This would be ideal for delicate fish and would also suit most of the tropical plants listed later in this book. Another advantage to having such a heater would come when the tank is cleaned and refilled with icy tapwater. It would quickly raise the temperature to a suitable level before the fish are replaced .

Ordinary goldfish and most other coldwater fish, however, will be alright down to freezing as long as ice does not form in the tank and break it.

Choosing A Tank

The range of aquariums now available is quite bewildering from small goldfish bowls holding one or two little fish to custom made tanks taking up one whole side of a room. Small plastic bowls are sold in huge numbers but the less popular glass versions are far superior. This is mainly because the plastic discolors and scratches so easily. The danger of glass and the reason it is not so popular is because they are easily broken and therefore not a good idea with little children around.

The bowl should be shaped so that the top is the widest part allowing the largest water surface area to be exposed to the air. The same applies to tanks so a tall tank is not so good for large numbers of fish as a low oblong one. Having said that tall hexagonal tanks are now all the rage as it is possible to have a very large tank in a small area of floor space. These need particularly good filtration and oxygenation.

They are made out of acrylic plastic which is very hard and strong making it a very good substance to make fish tanks out of. Apart from the tall hexagonal tanks most tanks are still made out of glass which is held together by silicone sealant which bonds the glass together making a very tough water proof join. Gone are the days of metal framed tanks with glass held in place by putty which often leaked especially if the tank was moved.

Small tanks often come with a plastic hood included and are meant as a starter tank because fitting a light is difficult. They will only hold one or two small goldfish whereas the larger tanks which are usually sold separately to the hoods will hold many more fish and it is possible to do a

lot more with them. Large tanks can have wooden or metal hoods fitted on them and stands and cabinets can be bought to support them. Metal stands come in a wide range of sizes and designs and are very practical as they will easily hold the immense weight of a full tank.

The fishkeeper may however decide that they are not very elegant and may choose a wooden cabinet. These are made to a standard range of sizes by numerous manufacturers and come in many colours and designs. It is possible to buy complete systems made by some manufacturers but these are expensive and it is often better to gradually build up a system starting with a tank. However cabinets can be used to hide all the electrical connections which have to be made for lights, powerfilters, air pumps etc.

When buying a tank always get some sort of top for it even if it is only a plastic condensation tray costing a pound or two because fish are prone to jumping and can easily jump out of a tank onto the floor where they will quickly die if not replaced.

Before choosing a tank you must also decide what sort of fish you are going to buy and how many. A big tank will always hold more than a small one however good the filtration is. The maximum number of coldwater fish for stocking density is 1 inch of fish per gallon of water. Tanks which are very narrow from front to back are now becoming available which can best be described as picture tanks. They fasten onto the wall by the use of small brackets. Due to the size of these tanks they are only really suitable for very small fish such as minnows or Japanese Rice Fish.

Custom Made Aquariums.

Custom made Fibre Glass fish ponds have been around for some time with an ever growing number of small firms making them on site for the customer. However , more recently the same practice has been applied to aquariums , specially in the big cities where interior designers are popular with the wealthy. Standard mass produced fish tanks come in a range of sizes between 12 inches and 4 feet in length. Occasionally you may find that large specialist outlets stock 6 foot tanks but these are rare.

Some stockists actually make the aquariums on site and can construct one more or less any shape and size, but over 6 feet in length they become extremely heavy and difficult to move so it may be necessary to construct it en situ. Very large tanks may cost thousands, or even tens of thousands of pounds to have made.

One famous pop star has just had his apartment redesigned and he had a wall constructed between his hallway and living room. The difference was that the wall was a fish tank 15 feet long and weighing some 3 1/2 tons. Some of the countries big businesses are also installing these extra large aquariums.

Specialist firms exist who actually rent out fish tanks and employ staff to go on a weekly basis to maintain them, feeding the fish and when necessary cleaning out the aquarium. Their services dont come cheap and are only to be recommended in cases where you really have not got time to do it yourself.

Filtration

A small bowl needs to be cleaned out regularly to keep the water fresh but because of its size this is not a great problem. As the tank size increases cleaning becomes more of a problem thus necessitating the installation of a filter of some sort. Filters can be bought for bowls but they are not very successful. Filters for tanks can be very complicated affairs and they come in many shapes and sizes. Filters can be categorized as follows;

Firstly there are two types; 1) Chemical.
2) Biological.

Chemical filters use activated carbon in some form and start working straight away but are unpopular because of the constant expense of replacing the carbon. Generally this type of filter consists of a small plastic box through which the water in the tank is circulated by the use of an air pump.

The second main category is a Biological filter although some very large power filters have different compartments into which carbon can be packed as well as biological media. Biological filters can be sub divided into 2 main types and they are ; 1) Undergravel.
2) Powerfilters.

Undergravel filters used to be the most popular and consist of a plastic plate which fits into the bottom of the tank which is then covered by a couple of inches of gravel.

The plate allows a free flow of water and the gravel acts as the filter media. It physically filters the larger particulate matter out of the passing water and provides a large surface area for bacteria to live which are the biological part of the filter.

Undergravel filters can be operated by either an air pump or a powerhead. The air pump blows bubbles down a tube which then rise and draw the water with them thus circulating the water through the filter. Air pumps are simple mechanical devices that vibrate and by the use of a non return valve pump air. Most of them are not in fact pumps at all except piston pumps. These are very expensive but very quiet and look like a miniature steam engine.

Powerheads are often quieter than an ordinary air pump and are immersed in the water attached to the uplift tube of the filter. This draws the water directly through the filter. Some powerheads have a reverse flow switch which can be used to backwash the filter. Basically the powerhead is a small water pump designed to be submerged and run continuously.

Powerheads, Air Pumps and Undergravel Filters come in a variety of sizes to suit all tanks. The bigger the tank the more powerful the filter system has to be. It is no good buying a small air pump to run the filter on a large tank because it is a false economy as it just wont do it.

Powerfilters mainly consist of a small foam filter housed in a plastic container attached to a small water pump. The pump circulates the water through the foam which filters it physically and biologically. The foam needs cleaning every few days whereas undergravel filters can go months before they need cleaning but when they do the whole tank has to be emptied and it is a major job.

Larger powerfilters are available which consist of a water tight cannister with several compartments for filter media and a water pump is enclosed. This type of filter sits outside the tank and can be difficult to install but is much more suitable for very large tanks. It may be necessary with a large tank full of different varieties of goldfish to employ more than one type of filter for best results.

Ultra violet steralizing systems as used extensively in fish ponds have now been adapted for use in fish tanks. These consist of a small container through which the aquarium water is pumped. The container houses an Ultra Violet light source which shines on the water steralizing it . As with all U.V. systems the light source is shielded because U.V. light is harmful to all living tissues and could cause cataracts or skin cancer if you were exposed to it.

Another steralizing system is also available. This utilizes a gas called ozone. Ozone is simply a free molecule consisting of 3 oxygen atoms instead of the usual 2 that we breathe in the air around us. High in the atmosphere ozone exists and due to our pollution there is now a trace of it at lower levels. This is leading to additional problems for asthma sufferers and people with breathing difficulties because it is highly corrosive and affects the lungs. That is to say ozone is extremely unstable and will react chemically with most living tissue, burning it badly. Because it burns living tissue it can be bubbled into fish tanks under controlled circumstances where the fish cant swim and be used to kill any bacteria or other pathogens present.

Ozone is produced in the atmosphere in the breakdown of flourocarbons and other pollutants by the action of sunlight but is also produced by passing a high energy discharge such as a spark through oxygen. In nature lightening does this very efficiently but in the fish tank the spark is created by a small electrical box of tricks to simulate the effect. The system works

well and produces a small but constant flow of ozone through the water of the aquarium thus steralizing it. Ozonisers are not cheap and are mainly used in conjunction with protein skimmers for difficult expensive set ups such as marine tanks when sterility of the water is paramount.

The main problem with U.V.s And Ozonisers is that they are not selective in what they destroy. They steralize the water killing not only pathogens but also beneficial organisms such as filter bacteria.

Biological Filtration.

No matter what a filter is made from, or what type it is whether for an aquarium or pond ,it will be a number of weeks before it becomes biological in its actions. It will instantly act as a physical filter removing large particulate matter from the water as it passes through it. The reason for this is that bacteria take time to grow and multiply before they exist in sufficient numbers to digest the chemical composition of the water effectively. The addition of bacteria in solution or even freeze dried bacteria will speed the process up and get the colony of bacteria off to a good start.

The bacteria that exist in filters are mostly nitrifying in their actions and are aerobic. This means that they need oxygen to survive so the filter must be kept highly charged with oxygen. This can be done by keeping a good flow of water circulating through the filter. The bacteria actually feed off the nitrogen compounds in the water which are poisonous to fish. The compounds exist in the water because they are in the fish waste products. They are also to be found in canals and rivers , sometimes in high concentrations because farmers have been careless with their fertilizers or farmyard slurry and they have washed into the water.

Their toxicity can be seen quite clearly when one of these accidents happens because it results in many fish dying. Ammonia is more toxic than nitrite and nitrate which it breaks down into;

Ammonia-----Nitrite-----Nitate-----Nitrogen Gas
NH3 N02 N03 N2

When a filter is not working properly it is immediately apparent because the ammonia present in the water will oxidise causing scummy white bubbles to appear on the surface of the water where it bubbles in the tank. If this happens a partial water change should be carried out straight away. To enable the levels of nitrite and nitrate to be monitored there are test kits available from all good aquatic departments.

The PH levels may also vary wildly and can be checked easily as well with a reading of between 7-8 being good. 7 is the PH of neutral tapwater.

Because the filter is a living entity the food source, ie water flow must be constant and if it is turned off for any length of time , such as a power cut, the bacteria will die and anaerobic bacteria will flourish. Two problems result from this.

Firstly the anaerobic bacteria produce a toxic waste product and secondly it takes time for the aerobic bacteria to replace them. This means that the filter should be washed thoroughly and treated as a new one. The load that waste matter exerts on the system, can be reduced by keeping feeding down to a minimum.

Looking After Air Pumps.

If the air pump fails to pump any air but is buzzing normally then there could be one of two things wrong with it. Extra noisy air pumps usually mean that the diaphragm is worn or damaged. If this is the case the simple cure is to buy a repair kit for the air pump making sure that is the correct size diaphragm. It is a fiddly job but not very difficult and as they regularly become faulty it is cheaper than replacing the air pump every time.

If the pump is quiet but not working then it could be the tiny rubber valves need replacing on the pump. The above mentioned repair kit also contains new valves. Replacing them often makes the pump work like new again. Another possibility is that the filter on the inlet is dusty and simply needs a clean.

Sometimes water syphons back into the air pump when it is turned off. This must be prevented at all costs as it is an electrical appliance and water and electricity donôt mix. It is due partly to capillary action in the air line as it is a fine pipe and partly due to the difference in air pressure between the top of the tank and where the air pump is on the floor. A non return valve in the air line is the simple cure for this problem as it will let the air through but not permit water to return through it in the event of a power cut. Alternately place the air pump above the tank so that water cant run down into it.

If an air pump is placed on a hard surface such as wood then it will be found that it will walk on its rubber feet. This is due to the constant vibration and is easily cured by placing the air pump on a thick piece of old cloth or carpet.

Air pumps that are allowed to vibrate against a hard surface such as the side of a cupboard make a tremendous row and the way to stop this is to stop them walking. Sometimes even the noise of the bubbles breaking on the surface of the water is too much noise to tolerate as may be the case in a bedroom. To prevent this fit small air stones on the end of the air line going into the aquarium. These break the bubbles into very tiny ones which are much quieter. However they do become blocked with dirt and algae and have to be replaced regularly but as they cost less than a pound a pair this is not a great problem.

Decorating The Tank

After the desired method of filtration has been chosen any decorations to be added should be so done before filling the tank and adding the fish.

Bogwood makes a good feature in the tank but it should be soaked in water for a couple of weeks to make sure all the tannin is leached out of it. If this is not done correctly it will turn the water brown when placed in the tank.

If there is a layer of gravel in the bottom of the aquarium then plants can be rooted directly into it and should be allowed to establish their roots before the addition of fish as some may get uprooted by foraging. Dont forget that live plants will need light so an aquarium light must be installed and left on for at least 8 hours a day or more.(See section on lights) There are many aquarium plants to choose from but some grow more easily than others and some grow best at different temperatures. (See chapter on plants.) If you are going to keep goldfish species in the tank then real plants are not a very good choice because they love to eat them but of course plastic plants will be safe. They are a lot more expensive but of course work out cheaper in the long term. Plastic plants come in a wide range of colours and designs some of which look more realistic than others but it is all a matter of personal choice and taste.

The next thing which can be added to your tank is a clay or plastic ornament. Bridges, skulls, castles and all sorts of things are available from most aquatic retailers. Some bubbling ornaments, such as divers are also available, which are operated by small air pumps.

Background pictures which stick on the back of the fish tank can be bought by the foot. Some of them have pictures of a rocky stream and others feature plants but all give an added depth to the tank. Even painting the back of the tank has a magical effect on a bare tank. This can be done as follows;

First of all the surface of the tank has to be cleaned to remove all the grease. As it is the outside of the aquarium that you paint it does not matter about using detergent on it as the water inside the tank does not come into contact with it. Wash the outside surface to be painted, whether it is the back or back and sides carefully and dry it thoroughly. Any paint can be used either emulsion or oil based and a nice bright sky blue gives the best effect. For best results apply 2 coats evenly allowing them to dry between coats.

When your tank is set up and you have added the fish feed them very sparingly to start with so that the filter does not become overloaded with ammonia before it is properly established. Any proprietary aquarium fish food can be used for coldwater fish although there are some special foods for fish such as catfish. Remember that it is not like keeping fish in a pond where they can feed off the naturally occurring snails and insects. Give them live food occasionally.

Bloodworms, daphnia and brine shrimps are readily available either live, which will cause great excitement in your tank or in dried form. Various fishy treats such as cubes of dried insects which stick on the side of the tank can also be bought. These all give variety to the diet of the fish. If in any doubt as to how to set up your tank always ask as mistakes can result in heavy fish losses especially from new tank syndrome. Most aquatic retailers are quite experienced and only too happy to give free advice.

Installing And Looking After Lights.

When lighting a fish tank a full spectrum light sources should be used to allow the plants to grow properly. An ordinary fluorescent tube will not do, nor will a household spot light. Special tubes can be bought which emit light at the blue end of the spectrum or red to show off the colours of the fish better. The fluorescent tube should be positioned above and at the front of the tank for best effect. This may not be possible with some hoods so you may wish to add a spot light to shine on the front of the tank as well. Dont forget that plants will grow towards the light so donât just shine one on the front of the tank. For really good lighting it is a good idea to use two or three fluorescent tubes at once to encourage plant growth.

If you are going to use spot lights above the tank there are several types available such as mercury, sodium and metal halide but always choose one that gives a broad spectrum of light. Spot lights are very expensive and as you will need two or three to light the tank may not be the best option. Also they generate a lot of heat and can raise the temperature of the fish tank considerably.

Always turn off the light when adding new fish for an hour or two as a bright light will stress them. If after using the fluorescent light for some time it starts to flicker it is almost certainly due to a faulty starter motor. This is a small round piece of plastic with two pins on that fits into the control box. They are easily replaced and only cost about a pound each.

When the light does not come on at all it may be the starter or it may be that the tube needs replacing. This is a simple matter to decide because if the tube is at fault the two ends of the glass part will be black. If you replace a tube make sure that it is the same width as the fittings and the correct length for that particular controller. All controllers have a little label on them specifying the tube size. This is most important because it is potentially dangerous to fit the wrong tube.

When fitting a fluorescent tube or indeed any light over an aquarium you must ensure that no water can get at it or at the fittings. This means that the tank must have a condensation cover over it. Of course the light must also be fitted securely with the clips provided. Do remember that the controller has a transformer inside it which generates a lot of heat .If this is put in an enclosed surround it could easily start a fire so always secure it in a well ventilated spot. If in any doubt about electrical fittings then consult a qualified electrician because water and electricity are a potentially dangerous combination.

Green Tanks.

A green tank is caused by a combination of faults.

Firstly there are too many minerals in the tank allowing the algae which cause green water to proliferate. This problem can be reduced and even eliminated by the use of a good or better filtration system.

Secondly sun light can contribute to the algae growth so try placing the tank in a shadier spot. Plant life in the tank will need some light but a careful balance has to be struck between to much and to little. The addition of plants may themselves also help in improving the water clarity but fish love to eat them so in such an enclosed environment as a tank it may prove difficult to get a luxuriant growth of plants.

In certain conditions a red algae may grow and this again may be deterred by changing the filtration system. It is possible to buy algicides for fish tanks but they are not a good idea because a green tank is natures way of balancing the water quality and making it fit for fish life. Simply poisoning the water with an algicide to kill the algae will alter the PH and Nitrate levels dangerously until they become toxic to the fish. Remove the problem properly with a good filter.

Green glass often occurs with too much sunlight when the water itself may be clear. In this case simply place the tank in a darker spot and use a glass cleaner to remove the algae. These come in the form of a sponge on a long plastic stick or as an algae magnet. The magnet comes in 2 halves, one of which is placed on the inside of the tank and the other on the outside.

Then a slow wiping action will scour the algae off the glass. The fish will follow the magnet and clean up the tasty morsels. Very rarely a long filamentous form of algae called blanketweed may find its way into the tank on plants or in a bag of fish. If this happens there is nothing to be done other than a thorough clean to remove it or resort to the use of algaecides.

Cleaning The Tank.

If a power filter is used to keep the tank clean then the filter should be dismantled weekly and cleaned out thoroughly. This will keep the system operating and maintain a fairly clean tank. Over a period of time very fine particles of dirt which pass through the filter will give the water a brownish appearance and reduce clarity. The water is said to have lost its polish. To prevent this happening too quickly regular partial water changes should be carried out. This is done by simply syphoning off a couple of inches of water on a weekly basis and replacing it with fresh tap water. If only a small amount is replaced like this the temperature and chemistry of the water should not be affected much. However an appropriate amount of water conditioner can be added.

Eventually the water deteriorates to the point where a complete water change has to be done. The water temperature of the new water should be no more than 5 degrees different to the old water in the tank to prevent shock to the fish.

If an undergravel filter is used on the tank the filter can be cleaned on a weekly basis by using a special plastic cleaning device which works on a siphon principle. Firstly the gravel is agitated to disturb the debris and then the siphon draws off the dirty water which can then be replaced with fresh. Eventually however the tank will have to be stripped down and cleaned out thoroughly.

When stripping an undergravel filter first remove some of the water and catch the fish placing them in large clean plastic bags containing the water from the tank.

Then using either a siphon or pump empty the tank carefully into a large bucket and dispose of the dirty water down the drain. Dont put it down the sink because you are likely to suck up some gravel in the siphon and this may well block it. Swirling the gravel around while emptying the waste out will help to clean it. When most of the water is out scoop out the gravel and place it in a clean plastic bucket. The bucket should be one that is only used for fishy purposes and must never have had soap or any other chemicals in.

Finally sponge the remaining muck and water out again using a sponge that is kept solely for the purpose of cleaning the tank. All the time that the tank is being emptied no attempt should be made to move it however tempting it might be to carry it to the sink or outside. Even with 3 inches of water and some gravel in it will be very heavy and movement would be dangerous and might well crack it especially with a large tank.

When empty sponge it around thoroughly to remove every little speck of dirt and gravel. If you dont the odd specks of gravel may be trapped under the filter and rattle against the glass. When the tank is clean the ornaments have to be washed with a sponge or toothbrush in clean water.

Next the gravel has to be washed. This is easiest done by placing a few inches depth of dirty gravel in a clean bucket and topping it up with tap water. Swirl the gravel around with your hand and then tip the water away being careful not to lose the gravel. Carry out this procedure with all the gravel and then replace the filter plates. Tip the gravel on top and level it out. Next replace the ornaments and plants and fill with tap water.
If a plate is placed on the bottom of the tank and the water is poured onto this the gravel may not be disturbed but if it is it can be easily leveled out again afterwards. When the tank is full carefully add the correct amount of water conditioner or dechlorinator and then turn on the filter. For tropical fish the heater will have to be turned on for a few hours to get it back up to temperature and this can be done for coldwater fish as well. Dont be tempted to put hot water in out of the tap as this will have poisonous

copper dissolved in it. You can boil some cold water in the kettle and use this to take the chill off the water.

When the fish are put back into the tank don't just tip them in but float the bags that they have been in to equalize the temperature. About ½ an hour should be fine however cold the water. The fish will probably just sink to the bottom at first if it is cold but they will soon be back to normal as it warms up to room temperature.

Such drastic cleaning measures as this should only need to be done every few months even with a goldfish tank and if it has to be done more often then you are probably feeding your fish too much, or, you have too many fish in the tank for the filter to cope with.

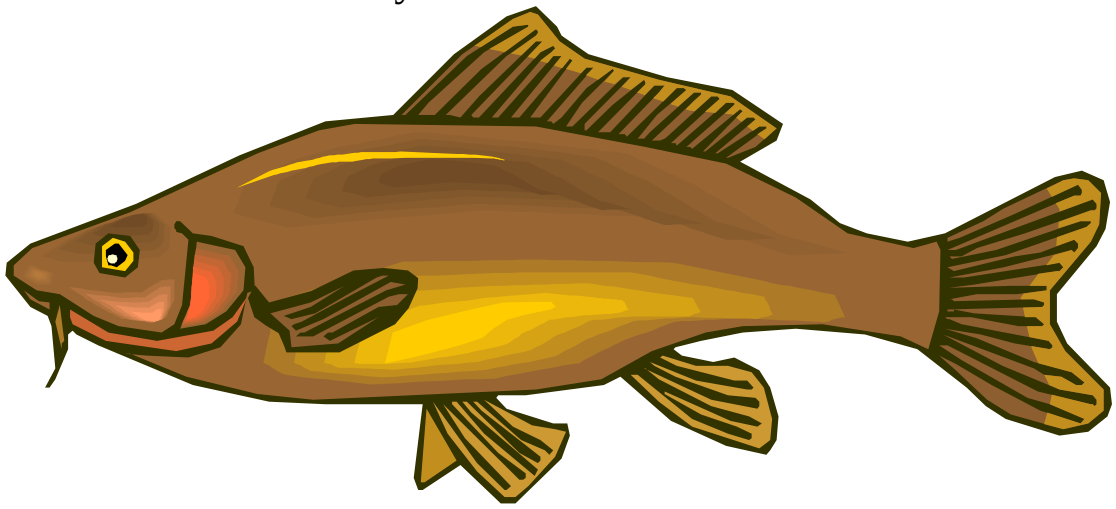
Problems With Limescale.

In hard water areas limescale can be a problem. You will know if you have hard water because it will cause your kettle to fur up. Limescale in the fish tank will form as deposits just the same. With marine fish any water added to the tank will have to be treated with a water softening treatment system which is not cheap but in a coldwater aquarium it is not really necessary. However scale deposits will form wherever the water is moving and especially where the water is being oxygenated such as uplift tubes in under gravel filters. To remove such deposits special long handle brushes can be bought to clean the insides of them.

If the scale forms on the inside glass of the tank then it can be scoured off with a stout nylon cleaning pad. Limescale can especially become a problem with power filters making cleaning more difficult.

The Goldfish Family.

The common goldfish has been around many centuries after originally being bred in China from the common carp which were kept by the monks for food in monastery pools. It is a fairly chubby but streamlined fish growing up to about one foot or 30 cm in length under ideal conditions and maturing at about four or five inches. Goldfish may live 20 to 25 years if no ill fate befalls them but 10 to 15 years is considered good in a fish tank because of the intensely stressful conditions.



Goldfish are usually plain orange but are sometimes available in white or yellow. Often they have black blotches on them but these usually disappear as they get older A long tailed variety of goldfish is often seen and this is called a comet. This is not to be confused with a veiltail which is a type of fancy goldfish like a fantail which is short bodied and not at all streamlined.

Another type of comet which is bred in America is called a Sarasa Comet. This is exactly like a goldfish comet with a long tail except a good specimen is evenly marked red and white. A lot of poorly coloured fish

are sold so do be careful when choosing one. This fish does not grow quite as large as the ordinary goldfish but in all other respects is the same.

Shubunkins are related to goldfish but are a completely different colour and come in several varieties. Bristol and London Shubunkins have a similar colour which is a combination of red, yellow, blue and black colour variations. They come in an infinite number of patterns and so usually every fish can be identified.

Cambridge Blue Shubunkins are mostly blue as the name suggests with very little black on them. A good specimen is plain blue but the breed has not been perfected so many multicoloured fish are sold. Again Shubunkins live like goldfish and will interbreed with them but dont grow quite as large only reaching about 10 inches or 25 cm in length.

Breeding Goldfish.

Breeding goldfish is quite simple, after all it is perfectly natural for them to do this and with a little encouragement you can easily rear many fry to maturity. The first thing to do is to select the breeding parents. Only fish with a good shape and no deformities should be used for breeding. This is especially important if you are attempting to breed fancy goldfish. Also the fish should be of the same type as it is difficult enough to obtain good offspring without further complicating the procedure.

Choose a male and female well before it is time for them to spawn and keep them separate so that they are both ripe with eggs and sperm. Deciding which is a male and which a female can be difficult but there are several methods to determine this. One is to examine the pectoral fins because a mature male will develop little white nodules on the leading edges at the breeding time. Females on the other hand become much broader across the beam as they become laden with eggs. Another method to distinguish the sexes is to again look at the pectoral fins. In a male the fins are more pointed and in a female they are rounded. Failing all other methods the males will chase the females around the tank when in season and a deft scoop with a net might separate them.

Commercially the fish are brought into breeding condition by the method of injecting them with hormones and then they are stripped of eggs and milt by hand into a bowl. This maximizes the number of eggs produced because as soon as the fish have spawned naturally they start eating the eggs.

If you are spawning the fish in a tank place lots of bunches of fresh oxygenating plant in with the breeding fish onto which they will lay their eggs. Lowering the temperature of the tank with ice cubes will induce

spawning which usually occurs early in the morning and can last for hours. The eggs can be easily hatched in a warm aquarium and only take a few days to do so.

When they first hatch they will hang from the sides of the tank and feed off the remains of their egg sack but soon they need food. This is best provided in the form of infusoria. This can be prepared by pouring some boiling water over some lettuce leaves and leaving it to stand for a couple of days . At first it will go cloudy and then will clear, at this point it is ready to feed the fry. A fresh preparation should be made every three days until the fry are big enough to take a proprietary food of crushed flake. Sieved hard boiled egg makes a good if somewhat messy substitute. Sometimes baby foods are available for fish at some retailers. Brine shrimp are also an excellent food for developing fish.

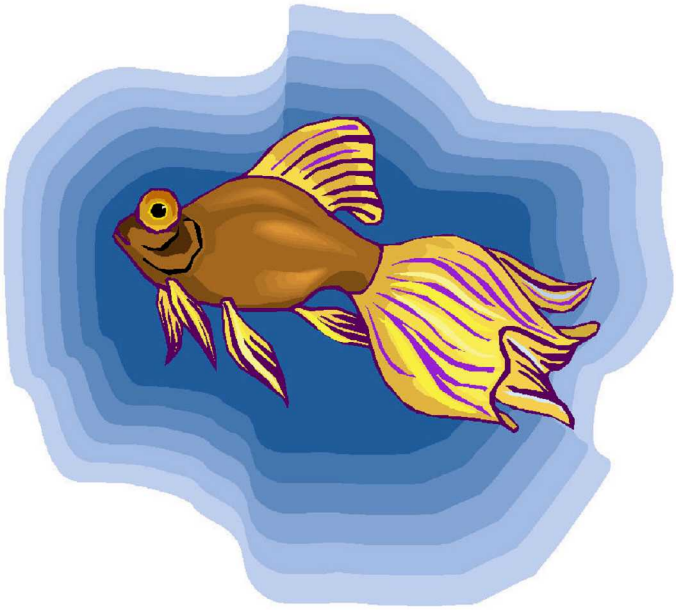
As the fish develop space will become a major problem because a goldfish will lay 1000 or more eggs most of which will hatch. Some eggs will turn milky in colour and these should be removed to keep the others healthy as they are dead .In fact hygiene is very important at all stages of development and feeding should be kept to a minimum at all times. Good oxygenation is also very important.

When the fry are big enough to see clearly you should start culling them to weed out the deformed fish. This is especially important for the fancy goldfish varieties. This will allow more space for the others to develop. It will take a couple of years for the fry to reach maturity from hatching and they should be kept separate from the adult fish until they are big enough not to get eaten.

The fry will rapidly darken to a brown colour which they will stay for about a year until they change colour and turn orange. (see section on colour changes in your fish)

Different Varieties Of Goldfish.

People often set up a coldwater fish tank without giving the varieties of fish to be kept in it much thought. Invariably the first choice is a goldfish, sometimes a red fantail or even a black moor. But nowadays a lot of retailers are importing many new varieties of fancy goldfish giving a lot more choice than you might imagine. The more exotic varieties of goldfish donôt like low temperatures and so are not suitable for pond life. Below about 55 F they start developing fin problems and stomach upsets. 60 -70 F is probably ideal but they will stand it a little higher as people have been known to keep them in tropical tanks although this is not advisable. You must remember that the higher the temperature the more highly oxygenated the water must be. Another problem that the fancy goldfish varieties are susceptible to is swim bladder disorder. (See chapter on diseases).



Every year new varieties of goldfish are being imported from China and the far East. Some of these varieties are real freaks of nature and viewed

with distaste by some people but others see beauty in their unusual form. It is all a matter of personal taste and preference. Perhaps the most popular of these mutations is the black moor which as its name suggests is black in colour. This variety has large bulbous eyes projecting from their sockets. As with all the fancy goldfish varieties it is not streamlined in shape but is more of an egg shape with fins on. This means that a small tank provides relatively more swim space as they swim very slowly.

Closely related to the black moor is the red telescope. These are identical except for the fact that they are red in colour instead of black. Again they are more hardy than most of the fancy goldfish varieties and could be kept out in the fish pond for summer and be brought in for the winter.

Fantails are also fairly hardy and quite popular. These again are egg shaped and come in a variety of colours. The most common are plain red and calico like that of a shubunkin. That is to say they are multicoloured with blue as a base colour. Fantails should not be confused with orandas which have one main difference. When mature orandas develop a fleshy growth on their heads which looks as if their brains are spilling out. This is due to a hormonal change and can be encouraged by the use of special foods. The most popular oranda found in aquatic retailers is probably the red cap. This is a white fish with a red patch over its forehead. Other varieties now available include chocolate, red and blue which are easily mistaken for fan tails when young.

Closely related to the orandas are the lionheads and ranchus. These are very similar in shape with the main difference being that they have no dorsal fin. This makes them particularly awkward swimmers and under no

account should they be kept with ordinary goldfish because they would not get to the food quick enough and would be bullied. There are more exotic varieties such as bubble eyes now becoming available. These come in all the usual colours but underneath their eyes the fish have a large fluid filled sack or bubble which is very small when the fish is young but rapidly develops. If the bubble bursts it will often regrow but will not grow as big as before so extreme care must be taken when handling these fish.

Another difference between these fish and fan tails is that like lionheads they have no dorsal fin. Pearl scales are a very round bodied delicate fish. They are usually calico in their markings except for tiny raised scales evenly spaced around the fish which are pearly white in colour. Good specimens are hard to find and because of their shape are especially prone to swim bladder disorder.

Pom Poms are another unusual looking fish in as much as under their eyes they have tassels of flesh which float about in the water. Like most of the exotic varieties they are available in several colours. The fancy goldfish varieties were principally bred for keeping in bowls and being viewed from above. This is especially apparent from the development of the celestial goldfish. In this fish the eyes are on stalks and forever turned upwards giving the fish a weird appearance. Again they come in several colours but as with most of the fancy varieties they are quite expensive to buy compared to the humble goldfish. Large specimens of any of the exotics can easily cost up to £50 or more but small specimens may be purchased for a more modest few pounds.

Whichever variety you choose be a little more selective than you would be with a goldfish because quality of colour markings and shape are much more important especially if you are thinking of showing them. Most aquatic retailers will stock some of these varieties of goldfish but usually they are to be found in the aquarium display section along with the tropicals instead of the big tanks that pond fish are kept in.

Other Types Of Fish

Sturgeon.

The sturgeon is a very large fish reaching up to 20 feet in length and over 1000 lbs in weight in good conditions. It is a native fish of Europe and was to be found in all the larger rivers up until the 1800s. However with industrialization and a growing population to feed vast numbers were caught throughout Europe and it was nearly fished to extinction. The ever increasing numbers of dams in the river systems also prevented its natural breeding and feeding processes.

Nowadays its value as a natural resource is appreciated more with an intensive breeding program in America underway and attempts are being made to reestablish the sturgeon in the great rivers. In Britain the fish is protected by law and considered the property of the Queen if any are caught.

Apart from its value as food it is highly prized for its eggs or roe which is called caviar and is a worldwide delicacy. Parts of the fish used to be processed to make Isinglass , a substance used to clarify wine but nowadays other chemicals are used.

The sturgeon is obviously too big for most fish ponds but there is now a smaller variety available called a Sterlet. The sterlet only grows to about 3 - 5 feet in length which is still quite big. It has a very striking appearance because it has a long shovel shaped nose which it uses for digging in the mud for its favorite food of insects. The fish is long and thin and covered with boney plates. If the fish stops swimming it sinks to the bottom.

Because of its unusual appearance it makes a very good aquarium fish, while small, where it can be seen to best advantage.

Another unusual feature about this fish is its mouth which is underneath and set well back from the tip of its snout. This makes it difficult for the fish to eat floating foods but it soon learns to feed upside down. The main problems with keeping sterlet in an aquarium is that they grow very fast and need particularly good water coditions if they are to survive successfully. The Sterlet is becoming more widely available at good aquatic retailers but is very expensive to buy even as small specimens. A black and white variety can also sometimes be found which is even more exotic in appearance.

Raising Small Koi.

Fish keeping has taken off in a big way in recent years and by far the biggest single growth sector is that of koi carp. They seem to have an infinite variety of colour patterns making it possible to identify each individual fish and also they become very tame as they get bigger. These two qualities have made them very popular but large specimens are still expensive to buy. Because of this a lot of people have started to buy very small koi for a couple of pounds and rear them in a fish tank in the house.

Normally small koi have a high death rate in a pond outside as they are not suited to our cold winters, but inside it is a different matter. Conditions can be controlled and it is easy to keep an aye on them. A large tank is needed, the bigger the better because they will grow very fast and their large appetite means a good filter is needed but other than that no special conditions need apply. They are not fussy about what they eat and will eat anything that you give them as long as it will fit into their greedy mouths.

Flakes are normally fed to fish in an aquarium but if you do use pellets remember to keep the tank clean as they contain a lot of indigestible matter to bulk them out such as ash. It will prove impossible to keep real plants in an aquarium with small koi as they will eat them as fast as you put them in so for decoration put in plastic ones. Also their foraging may upset undergravel filters so it is best to install a power filter instead.

Always keep a lid on the tank as Koi often jump and would almost certainly jump out of your tank without it.

After about 1 year in a fish tank the young Koi should have reached a good size and will survive outdoors. Transfer them using a plastic bag and install them in their new home in the same way as you would any new fish. Remember that the tank that they have been in is a lot warmer than the pond so float the bag for a good ½ hour to acclimatize them to the lower temperature.

Koi are now bred in Japan, America, Israel, China and even Britain. As every year goes by the standard of colour markings improves although the Japanese fish always command the highest prices.

All aquatic retailers sell some Koi but very tiny ones are not always available so you may have to shop around for them.

Unusual Coldwater Fish.

There are quite a few different species of small coldwater fishes finding their way into the display tanks of most aquatic retailers. One such common fish is the Gudgeon. This small streamlined fish only grows to about 5 or 6 inches in length. It does prefer sinking food as it would normally take worms and insects from rummaging about in the gravel of fast flowing streams and rivers in the wild, but, it will get used to floating foods quite quickly. Being fairly plain in colour it is not seen to its best advantage in a pond but makes a very good candidate for a small coldwater tank. It has a very small mouth so although it is basically an insect eater and therefore a carnivore it is very unlikely to cause problems in a tank.

Loaches are another bottom dwelling insect eater that are becoming available. These look more like eels than fish and can grow quite large, up to 8 or 9 inches in length, but again have very small mouths. The common Weather Loach is most often seen but occasionally you may find a golden variety which is very bright and colourful and somewhat smaller.

Loaches like to hide under stones and submerged branches spending much of their time out of sight. However when food is put in the tank they will rapidly search it out darting from their hide out only to take their prized morsel back into hiding to eat. With this habit and their eel-like swimming action they make a splendid addition to an aquarium. With loaches you never need to worry about the oxygen content of the water because if the oxygen level is low they rise to the surface and take a gulp of air before swimming back to the bottom.

Various North American species of Bass are sometimes to be found in dealers tanks.

These usually only grow to a few inches in length and like the Sun Bass can be quite colourful especially in the breeding season. However be warned that these fish are best kept with slightly larger fish as they can be aggressive. At breeding times they are very territorial. The Sun Bass may breed at 3 or 4 inches in length. The male will excavate a small depression in the gravel and encourage the female to lay her eggs in it. Then he will fiercely gaurd it against all comers until the eggs are hatched.

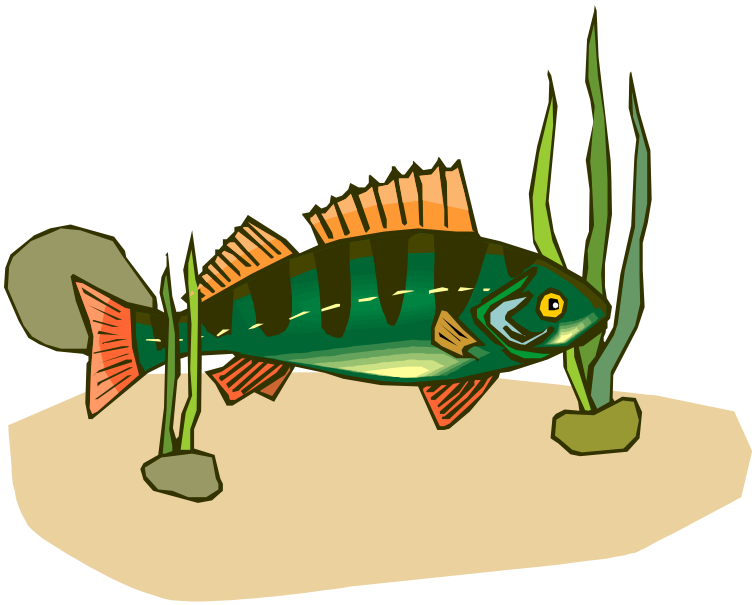
Shiners are another species of small fish that become very colourful in the breeding season. Bitterling are a small native fish of about 3 or 4 inches that are sometimes seen. The Japanese variety called the Tanago may also be found. These fish have an iridescent rainbow hue to their appearance.

Like the Bass and shiners they are more disc shaped than most fish and feed off insects as well. Perhaps their most special feature is their breeding habits (See section on Mussels).

Minnows can be found at some retailers and make a good addition to a small tank but dont be tempted to take them out of the wild because you may introduce diseases. There is a golden orange variety now available which may be bought very cheaply. This Rosy Minnow looks just like a Golden Orfe but donôt be fooled as it is completely different in its size and habits. The Rosy minnow is one of the few fish that does not appear to eat its young. Although they only lay a relatively small number of eggs they are prolific breeders and will readily breed at 3 or 4 inches in length.

An even smaller Minnow is the White Cloud Mountain Minnow. This fish will often be seen in the tropical tanks but it will live longer in slightly cooler water.

Another small native fish that makes a beautiful aquarium specimen is the Stickleback. Unfortunately the only way to obtain this fish is from the



wild, so great care must be taken not to spread diseases. In fact it is probably safest to keep a few on their own and not mix them with other fish. They can be very territorial in the breeding season anyway and can use their sharp spines to damage other fish. The stickleback is ideal for a small tank as it only grows to approximately two inches in length. The breeding season is late spring and early summer during which time the male fish develops a red chest making it very colourful.

When breeding the male makes a small nest out of vegetation and entices the female into it to lay her eggs.

Afterwards he guards it until the eggs hatch and for a short while he looks after the resulting fry. The fry grow quickly on a diet of planktonic food and are rapidly ready for small insects which are the favourite food of the adults.

The Japanese Rice Fish is also very easy to breed in a small tank. This fish only grows to about 1 1/2 inches and is best kept with very small fish or it will get eaten. When the female lays her eggs she carries them around with her under her tail until they hatch.

There is a coldwater fish called a Butterfly Plecostamus which is becoming available. These are very expensive and not recommended for the beginner but are quite exotic in their appearance. They are a flatfish and look just like a miniature manta ray. Opalines are worth keeping a look out for as they are algae eaters and will help keep the glass clean.

They look a little like Gudgeon and donôt grow very big. Tadpoles are not of course fish but they are worth a mention here. In fact for young children just venturing into keeping fish they are offer an excellent introduction. They are very tolerant of bad water conditions and not fussy about what they eat.

Table scraps will do but they will make the water very dirty so live oxygenator plants or a branded fish food are preferred. Tadpoles can be kept with fish, but do remember that fish love to eat them if they are big enough to swallow them and tadpoles are likely to be fin nippers. Bullfrog tadpoles can often be seen for sale which make very interesting specimens because of their size. Ordinary tadpoles can of course be released when they eventually develop into small frogs but bullfrog tadpoles will have to be disposed of some other way. (See section called Mixing Natives With Ornamentals.)

It is of course possible to set up a vivarium to house the developing frogs.

Newt eggs can be collected and allowed to develop the same way as frogs but do remember that most species are protected by law so dont get caught.

Freshwater Mussels.

There are a couple of varieties of freshwater mussel sold in the aquatic trade but the most common is called a swan mussel. This is actually a mis-spelling of the word Schwanne and has nothing to do with swans but is the name of the German who first found them. The swan mussel grows to about 6 or 7 inches in length and is a filter feeder. It is sold as a means of filtering the water in a tank or a pond. However as it only filters about 1 pint of water per hour, even a relatively small tank would need a dozen or more to keep it clean. This is clearly not practical, specially for a pond holding perhaps 100 gallons.

Mussels move about by the use of their single foot or pseudopodia and they use this to bury themselves in the mud at the bottom of the pools where they live. In a fish tank they would bury themselves in the gravel, continuously churning it up rendering the filter useless and making the tank dirty. Mussels lead a very interesting existence because they go through several distinct stages of development. They are expelled from the parent as tiny eggs which soon hatch and become freshwater plankton. Then they start to develop and become parasitic on fish.

They catch a ride on the nearest passing fish and bore a hole into its side and then here they develop further.

In the next stage of development they release themselves from the fish and attach themselves to the side of the pool or tank. At this point they are tiny miniature replicas of the adults. They take several years to mature. The only practical reason for keeping mussels in a fish tank is because they have a special relationship with a small fish called a Bitterling.

During the breeding season in late spring and early summer the female bitterling develops an ovipositor. This is an egg laying tube which she positions over and then inserts into a suitable mussel through its siphon or mouth. About 50 eggs are laid at a time in the host mussel where they are fertilized by the male fish. The eggs stay inside the protective shell of the mussel and develop until the have hatched and the baby fish swim out. In return for this protection the parent fish often unwittingly act as hosts for the parasitic baby mussels. There are two problems with this arrangement and they are firstly that the mussel has got to be the correct variety or else the female bitterling will not come into breeding condition and secondly mature fish will often eat the mussels. Furthermore most other fish seem to like the taste of fresh mussels , so unless you buy them specifically for breeding bitterling they can prove to be very expensive fish food.

Catfish.

There are many varieties of catfish from all over the world, specially the tropics. Here a lot of the different species do not grow very big and are quite suitable for small aquariums. Most of the tropical species are quite harmless scavengers but it is a different story with the cold water varieties. All catfish use their whiskers to search the muddy bottoms of the pools and rivers that they inhabit for any tasty morsel that they can find. The larger varieties will take almost anything that they can get into their mouths. European Wels catfish are said to feed off water voles, rats and even ducks. There are tales in Russia, where they are most common, that they have eaten small children that have been swimming in the rivers. As they can grow to 15 feet in length and weigh up to 700 lbs these stories may not be so far fetched.

Catfish, which have a huge head and mouth in relation to their bodies, are said to be able to swallow a fish their own length because of their expanding stomach. Wels catfish, which are the only European variety, are very scarce in this country because it is illegal to import them and illegal to release them into the wild. However there are some quite large specimens in a lake at Woburn Abbey.

In America there are several native varieties of coldwater catfish which are frequently imported into this country. The Channel catfish is the most popular and in some states it is farmed the same way we farm trout. Catfish Pie is quite a common dish . Channel Catfish can grow up to about 3 or 4 feet in length and weigh 30 or 40 lbs in good conditions.

There are two varieties available, the gold and the blue. The blue Channel catfish is more of a silvery grey but the gold is very definitely bright yellow and much more attractive. This variety is much favoured by little girls who find its appearance cute.

The Black Bullhead catfish is a slightly smaller species that only grows to about 2 feet in length. As its name suggests it is jet black with a very wide head. This species proves very popular with little boys who like its ugliness and many are sold every year to be kept in bowls and small tanks for which they are not really suitable. They grow very fast if kept well fed and will soon outgrow such small confines. As with all non native species it is illegal to release them into the wild so what people do with them when they get too big is unknown.

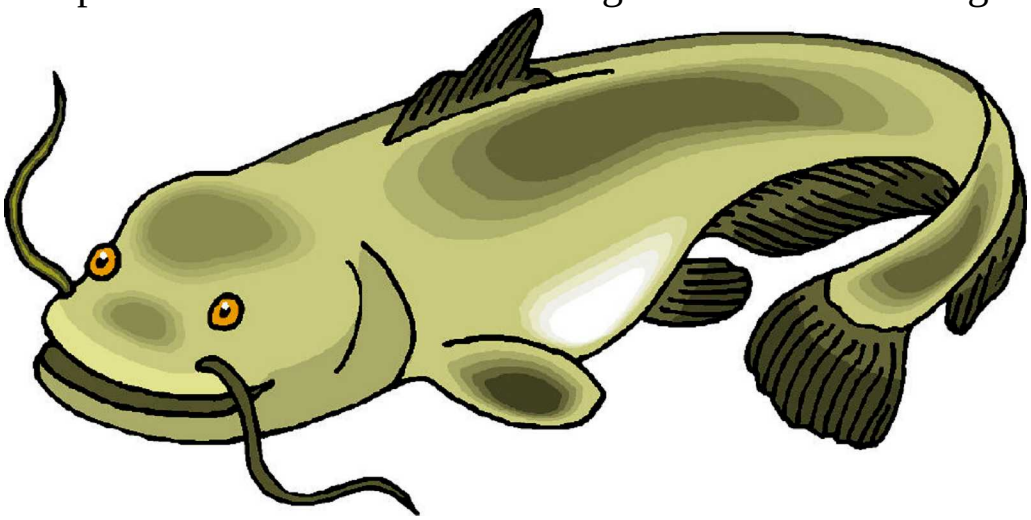
Coldwater catfish are very aggressive by nature and although when small may be kept with other fish they soon grow and there will always come a time when they suddenly become hunters. If kept with goldfish or Koi they will invariably end up attacking them. Do not be fooled into thinking that the other fish are to big for the catfish to swallow because they have a bony lip and can actually bite pieces out of their prey.

Because of this aggressive nature it is best to keep two or three catfish , possibly of different species together and separate from other fish .This is perfectly acceptable as they donôt seem to attack their own kind. Catfish have prodigious appetites and will take a variety of foods. Live foods such

as earthworms and maggots are specially good for them occasionally. Pelleted food is usually quite cheap and will fill their large stomachs up.

Special catfish pellets can be bought but are expensive and unnecessary so long as a mixture of food is offered they will remain healthy. Because of their large size and appetites the fish tank housing the catfish must have a good filtration system and great care must be taken when feeding not to pollute the tank with uneaten food. Another word of caution must be given when keeping catfish and that is they are quite resistant to disease but not very tolerant of chemicals such as lime and chlorine in the water. Catfish are very definitely a fish with attitude and make good specimens as large fish. They wont actually bite you, although it is not recommended to put your finger in their mouths, but they do need carefull handling because when frightened they stick out their their fins at right angles to their bodies and the bones in the fins are like needles.

More and more retailers are stocking catfish in greater numbers and they are usually quite cheap to buy as small specimens. Large specimens are not usually sold but as they grow so fast this is not a problem for those who have a big tank to fill. Just buy several small ones and wait for a few months. Then take the excess fish back to where you bought them from and persuade the retailer to exchange them for something else.



Crustaceans

If you have a coldwater fish tank but fancy having something a bit more exotic in your tank other than just fish then perhaps a coldwater lobster or Crayfish is for you. There are hundreds of varieties of crayfish around the world and some of them are quite large unlike our native variety. They can be grown in large numbers in quite small ponds and taste very much like lobster to eat. In some of the warmer more rural parts of America they form part of a staple diet and are often farmed in large numbers to sell to restaurants.

I would not recommend eating any that have been in your fish tank because any medicines you may have added will have been absorbed by them and could make them poisonous to eat. They make good scavengers and will eat anything although they prefer vegetable matter. The unfortunate thing about them is that compared to fish they are relatively short lived dying after their eggs have been laid and hatched. However, breeding them should be relatively easy so if you have a spare tank you can rear a continuous supply for your display tank.

They have a very low oxygen requirement and can breathe air if they escape which they will do if given half a chance. Fresh water lobsters on the other hand will eat fish quite readily if they can catch them so dont keep them with slow moving fantail varieties. They should live quite happily with goldfish which are faster and which may only have their fins occasionally nipped by those evil looking pincers that they have. In a deep tank you should not have any problems as the fish will swim around quite

happily out of reach of the lobsters which will scavenge around the bottom of the tank looking for any tasty morsel to eat.

Fresh water lobsters are much larger than crayfish and longer lived and really look quite something in an otherwise ordinary goldfish tank. Some aquatic retailers are venturing into stocking more exotic aquatic life such as crayfish and red lobsters which have been seen offered for sale along with unusual fish in their aquarium display section. As with any new product to be sold, however, they are expensive and will probably remain so as they are unlikely to be sold in big enough numbers like goldfish to force the price down.

Useful Insects And Other Aquatic Life.

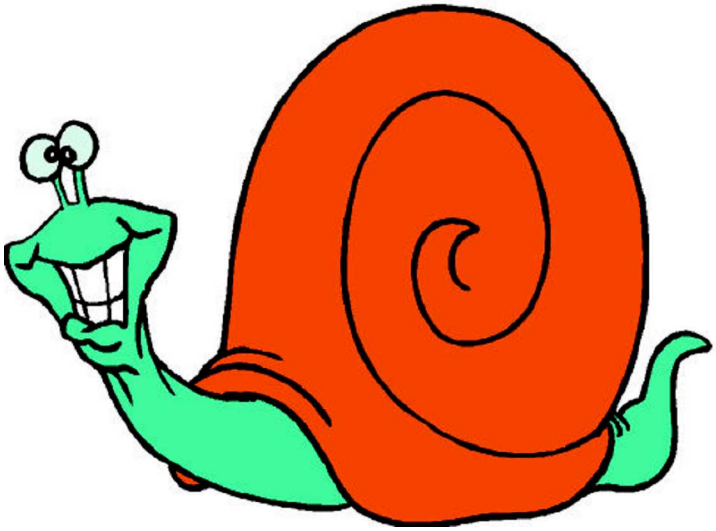
Blood Worms are tiny red worms that continuously wriggle in the water. Most aquatic retailers sell them in small bags as a specialist food for tropical fish as they are a good source of protein ,but goldfish love to eat them as well and will chase after them frantically when they are introduced into the aquarium. They can be bred in a tub of water with some leaves added to it. It should be left outside and as the leaves rot the bloodworms will develop. They can be netted and washed by placing them in a shallow dish under running water before feeding to your fish.

Brine Shrimps can easily be hatched from thir eggs which are readily sold or they can be bought ready hatched from most bigger tropical fish dealers. Newly hatched shrimp are an ideal food for small fry but they can get quite big if left to grow for larger fish. They are actually salt water creatures but this does not matter as they soon get eaten by the fish.

Daphnia or water flea can also be bred in a tub full of water left outside. They feed off the algae in green pondwater so are easy to catch in the spring when ponds are just waking up. They are called water fleas because they look like a flea and have jerky movements through the water just the same as a normal flea. Daphnia are quite small being only a couple of millimeters in length but fish love to eat them. Some aquatic retailers sell them but they are not as popular as blood worms or brine shrimps.

Midge Larvae also make a good live food and can be collected from ponds in the summer. They hang from the surface of the water by their breathing tubes and continously wriggle.

Snails are not of course insects but for convenience will be included here. In ponds they are plentiful but are unlikely to find their way into your aquarium unless the odd one appears on newly introduced plants. If you have a mixture of fish in your aquarium it is probable that any that do appear will get eaten before they can breed. Donôt forget that they are hermaphrodites and as such one can breed on its own. If they do become a nuisance it is possible to buy a chemical to facilitate their removal. Snails can usually be seen for sale at most dealers but there is little point in deliberately adding them to your tank.



Two types are common, the Stagnallis and the Ramshorn. The Stagnallis is conical in shape and is an unselective scavenger which will readily eat fresh green leaves as well as debris, so this one is definitely not to be encouraged. However the Ramshorn which is flatter and shaped like a coiled up hose pipe or curly ramshorn, hence its name, is said to eat only rubbish.

If you have any snails hiding in your tank you will see their eggs, which look like a string of jelly, on the undersides of plants or on the glass.

Oxygenating Plants

During the hours of sunlight all green plants use a process called photosynthesis to produce the building blocks of life. Photosynthesis involves the action of sunlight on photoreceptive cells called chloroplasts which contain chlorophyll, the green chemical which gives plants their colour. The chloroplasts convert the carbon dioxide out of the air which they take in through openings in their leaves called stomata and water which they also absorb, into carbohydrate compounds or in other words sugar.

This process releases oxygen as a by product which in the case of water plants is allowed to bubble up to the surface of the tank permitting some to be absorbed by the water.

The sugar compounds are broken down in the presence of minerals into organic acids by another process which absorbs oxygen. During the hours of sunlight there is so much oxygen produced that this second process is unimportant to the fish keeper but at night it becomes the plants sole activity thus making the plant remove oxygen from the surrounding water. This reverse photosynthesis as it is called means that aquarists should be wary of low oxygen levels in their tank at night if it contains lots of live plants.

Any plant that grows with leaves submerged can be considered an oxygenator. Most of them are weeds in their natural habitats but some have been cultivated and are now sold for fish ponds and aquariums.

Hornwort is sometimes seen on sale as an oxygenating plant. This plant has small, thin, round, needle like leaves tightly packed on a thick stem. The plant is very tough but will grow quite readily and may not be eaten as much as some of the other plants. It looks very like the tropical plant called Cabomba.

The Hottonia Palustris is another coldwater or pond oxygenator. This plant is very attractive with its feathery folliage growing entirely submerged. If allowed to reach the surface it will flower in season.

Myriophyllum or to give it its common name of Parrots Feather is also often sold as a pond marginal plant as well as an oxygenator. Outside it is a little delicate with its whispy folliage but in an aquarium there is no problem.

One Australian plant that is often seen for sale as an oxygenator is called Tillaea Recurva. Like the others it will be available potted in small pots with roots already established. This plant has very fine leaves and grows with its foliage totally submerged.

Elodea Crispa or sometimes Canadensis is sold by all aquatic retailers in small lead weighted bunches and sometimes ready potted. It is by far the most popular of the oxygenators. This plant is so prolific in its growth that it is often termed Pondweed because it can get out of hand in an unmanaged pool. In a fish tank it rarely has time to grow because the fish love to eat it. In fact any plants put in an aquarium will be nibbled by the fish as they are omnivorous and quite partial to a bit of greenery in their diet. In fact it is an important part of it.

Oxygenating plants are not only important as a food supplement but they provide valuable hiding places for fish and so give them a sense of security. When breeding fish they give the fry somewhere to hide from the adults. Also they make an excellent spawning medium.

Because of their fast growth oxygenators are greedy feeders and will in a small way help to keep the water in the fish tank sweet by removing various minerals especially nitrates.

Tropical Plants.

There is a wide range of tropical plants sold for aquariums. Unfortunately some of them are simply tropical plants which will look nice for a few weeks but will not grow underwater. They will eventually die and rot, polluting the tank. So when choosing any plant for your fish tank the best thing to do is get a good book on the subject and look up every one before buying. Having said that there is an ever increasing range of proper aquatic plants available to the aquarist, most of which are tropical in their origins. However, if your aquarium is in a centrally heated room the chances are that the temperature of the tank is over 65 degrees Fahrenheit and probably nearer to 75 degrees. If this is the case a lot of the hardier tropical plants will grow quite happily in your aquarium provided that they have enough light.

Aquarium plants can be grown in the gravel sub strata or filter, or preferably in special, small pots designed for them. These pots can then be buried in the gravel or hidden with an ornament.

A short list follows of the most popular with some brief details about them including required temperatures and their habits.

APONEGETON. There are several varieties of this plant that are suitable for warm aquariums over 65 fahrenheit but the hardiest is the Madagascan variety which will stand the temperature even lower. All of the apogenetons have wide ,long leaves growing from a central clump but the madagascan variety has lacey leaves which are particularly atractive.

BACOPA. There are also several varieties of this plant but the best is the red. Bacopa will grow up to about 12 inches or 30 cm in height in moderately warm water. It has small alternate leaves growing up a central stem.

CABOMBA. This is one of the hardier aquarium plants with standing temperatures down to 55 degrees fahrenheit. It is particularly popular as it grows very well in any water conditions . It is not unlike a miniature conifer with its very fine leaves except that it is columnar in its growth. Cabomba is best planted in bunches and will take easily from cuttings.

CARDAMINE. This is commonly called Japanese Cress and definitely prefers cooler water although it will tolerate it quite warm. The leaves are almost round strung along a thin winding stem.

CERATOPHYLLUM SUBMERSUM. This is a tropical version of the coldwater plant called Hormwort and consequently looks almost alike but is far more delicate. Tropical Hornwort will not produce roots under any circumstances but still grows well under any conditions.

CERATOPTERIS. This plant favours slightly warmer water and is a little more difficult to grow well. It is in fact a true water fern and has the typical fernlike appearance.

CRINUM. This is commonly known as the onion plant because of its appearance. This plant grows from a bulb and is very easy to grow tolerating different water conditions although it likes warmer water with a minimum of 65 degrees.

EGERIA DENSA. Giant Elodea as it is commonly known will stand quite low temperatures and grow well in most conditions. It is a large plant and will need the tips pinching out occasionally. As its name suggests it looks like pond elodea.

HOTTONIA INFLATA. This plant likes slightly warmer water but grows well in most conditions. Its popular name is tropical water violet and grows to about 2 foot in height. The leaves are a little fern like but quite short.

LUDWIGIA has short oval leaves arranged alternately up a thin stem. It will with stand a wide range of temperature and differing water conditions. It is quite suitable for a smaller aquarium as it only grows to about 15 inches or 38 cm in height.

MYRIOPHYLLUM. There are several varieties of this tropical plant all of which will thrive under many conditions. They will tolerate a wide range of temperatures as well. There is of course a pond variety which has already been mentioned called parrots feather.

NUPHAR JAPONICUM. This is another plant with a coldwater cousin, Nuphar Luteum. Japonicum means japanese and this is where it comes from. This plant looks like our native variety but likes the water a little warmer with a minimum temperature of 55 degrees. Nuphars do well in larger aquariums with their arrow shaped leaves growing like a water lily to which they are related.

NYMPHAEA MACULATA. This is a tropical water lily which grows with its leaves totally submerged. It is not fussy about conditions but likes the water a little warmer with a minimum temperature of 65 degrees. The plant grows from a tuber like any other lily. There are other tropical water lilies available for the aquarium but this is the smallest and most suitable.

NYMPHOIDES AQUATICA. This plant is another with a coldwater relative , nymphoides peltata. It is commonly called the banana plant because it develops thick roots

that look like a bunch of bananas otherwise the plant looks a little like an under water lily. Nymphoides aquatica likes the water a bit warmer but is not critical about water conditions.

SAGITTARIA. Several species exist of this easy to grow aquarium plant. The giant and dwarf varieties both tolerate low water temperatures and are not fussy about other factors. Both varieties have long narrow leaves and soon form large clumps. They are easily propagated by runners.

VALLISNERIA. Several species exist of this very popular aquarium plant. Straight and Twisted are the common names of the two most popular. The plants have very long narrow leaves growing from a central clump. Both plants will tolerate temperature down to 60 degrees although the straight variety grows much taller than the twisted. Twisted vallisneria as the name suggests has leaves which spiral upwards and so is quite unusual in its appearance.

It is worth remembering that if you use any of these plants in your aquarium they must not be put back into the tank straight away when it has been cleaned out. You will have to keep them in a bucket of water somewhere light until the tank is back up to temperature because cold tapwater will probably kill most of them.

Fish Food.

Fish are no different to other animals in as much as they need food to live and grow. Where they do differ is that like some reptiles they dont need a continuous supply. Fish can in fact go for long periods without any food at all and just live off body reserves. This is a point worth remembering when going on holiday. (See section on fish tanks and holidays) There is virtually no natural food in a fish tank, other than a little algae growing on the ornaments, so the only food the fish get is what you give them. For this reason it is more important to feed your fish a well balanced healthy food. It is normal practice to feed aquarium fish on flaked food because this is concentrated goodness and if fed correctly gives virtually no waste droppings.

However they are expensive for bigger fish and it is therefore acceptable to feed larger fish on pellets or stick foods. Pellets are available in a wide range of qualities from cheap oily trout pellets (not to be recommended) to high quality Japanese. They are also available in a range of sizes from pellets the size of a grain of course sand to pellets the size of marbles.

Stick foods are the third type of processed food sold for fish. These are usually high quality foods that have been extruded to make them look like rice crispies. Because they are full of air they float longer than a flake and soften more quickly than a pellet in the water thereby aiding digestion. Some foods have added vitamins and minerals and even colour enhancers such as carotene. The purpose of this is to bring out the reds and oranges in the colour of the fish.

Fish in a warm house should be fed 2 to 4 times a day and the rule is little but often. The fish should be given no more than they can eat in five minutes. Any uneaten food should be removed otherwise it will go mouldy and quickly pollute the tank .A hungry fish is a healthy fish!

If you keep your tank in a cold room such as a garage then you must also be aware of the changes that occur to the fishes metabolism in the winter. Below 55 degrees Fahrenheit wheatgerm food should be used and given in smaller amounts. As the temperature drops still further then feeding should be stopped altogether until the temperature warms up again in the spring.

Wheatgerm food is now sold as flakes , pellets and sticks although it is more expensive than the conventional fish meal based foods. 40 Fresh elodea added to the tank is a good source of extra minerals and vitamins as the goldfish love to eat it and it has laxative qualities (See section on swim bladder disorder) as do all live foods.

Live foods are to be recommended to bring fish into peak condition for breeding purposes as well. There are many different live foods that can be given to aquarium fish (See section on insects) but the cheapest to obtain are maggots and earthworms. Make sure that the worms are washed thoroughly and not to big for the fish. Fish love live food and will frantically chase it around the tank when it is introduced .

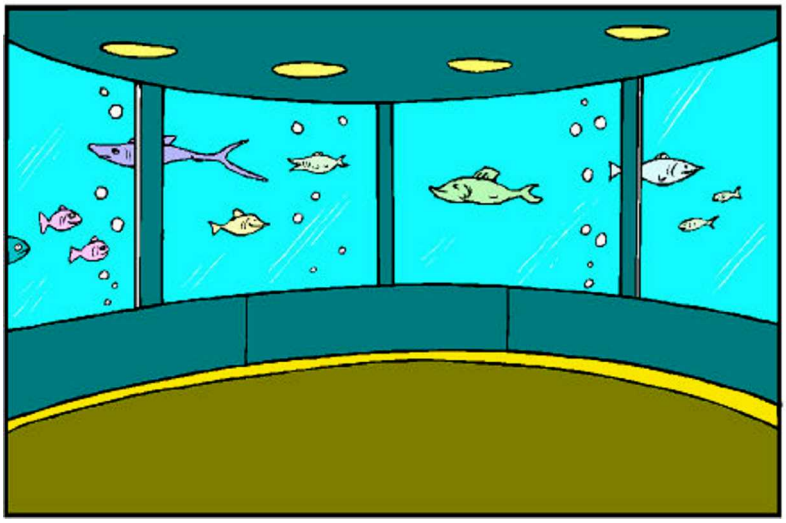
Other fish treats can be bought such as specialist pellets for catfish and cubes of dried tubifex worms which stick on the glass. Indeed all the foods that can be bought live can be bought dried as well as more exotic things such as shrimps. When feeding aquarium fish it is advisable to not only change their food occasionally but vary the diet with treats of live food. This will ensure that they get a healthy balanced diet.

Growth Rate Of Fish

As with all animals the growth rate of fish changes according to their age. At the fry stage they grow at a phenomenal rate and they slow down as they mature. However the rate of growth is also controlled by several other factors. The most obvious of which is the availability of food. High protein ,special growth foods can be bought for some fish to encourage good growth rates. Also the concentration of oxygen in the water will affect growth.

There is another controlling influence which is more significant and that is hormonal. All fish secrete a growth controlling hormone into the water surrounding them. The concentration of it in the water affects their growth rate. So a lot of fish in a tank or one large fish will mean a higher concentration and so a slower growth rate. Fewer, smaller fish will therefore grow more quickly. The only way to counteract this hormone is to carry out water changes on a regular basis. Hence in a goldfish bowl where the water is changed regularly the fish will grow faster than in a tank where the water is rarely changed.

Buying New Fish.



When buying new fish for a tank it is very easy to get carried away and buy totally unsuitable specimens. There are several simple guidelines that you can follow which will ensure a happy, healthy tank.

Firstly donôt be tempted into buying large fish for instant effect. Remember, that, big fish do not stop growing, they just keep getting bigger. Also the bigger the fish the better the filtration and oxygenation has to be. The smaller the tank, the smaller the fish should be and the fewer of them. Buy slow moving fish such as fan tails or small ones such as minnows. If you really want to have a large specimen of say a catfish, then keep it on its own in a 4 foot tank. Under no circumstances should small fish be kept with it as it will eat them, this goes for most large fish.

After deciding upon the type of fish to be purchased inspect the dealers tanks carefully. If there are any dead fish floating in the tank or any that are obviously diseased , then dont purchase any from that tank because

others might be infected. Dealers tanks are not immune to losses but they should remove any dead or suspect fish as soon as they see them. In fact it is against the law for them to knowingly offer any unhealthy fish for sale. Most dealers are very fair about problems with newly bought fish and although they wont take full responsibility for them they will often replace, free of charge, any fish that die within a very short time after purchase.

After selecting your fish examine them carefully before they are bagged up. If there are any obvious signs of damage other than a few scales missing then ask to put them back and change them. A simple guide to a healthy fish is to look at the dorsal fin, that is the fin on the back, if it is erect the fish is usually healthy but if it is lying flat on the back the fish is suspect. Also if the fish are hiding in the tank then donôt have any of those.

When the fish have been bagged up take great care in getting them home. All too often children can be seen carrying bags of fish and they are swung around and banged on everything in sight. Another point is to keep the fish somewhere cool and dark, such as the cars boot, if it is a hot summers day, on the way home. Upon getting the fish home it would be ideal to quarantine them for a few weeks if they are going into an existing tank (see chapter on quarantining) but if this is not possible then add a little general purpose medicine to the tank as a preventative measure. Next float the bag with the fish in for about 1/2 an hour to equalize the temperature. Then open the bag and slowly mix the water from the tank with that in the bag. Spend several minutes doing this until the fish are finally released.

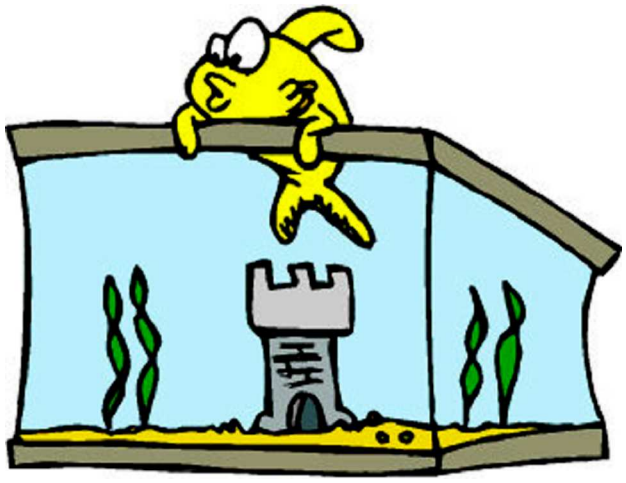
These simple rules wont prevent you from losing fish but it should mean that you start your tank with healthy specimens.

Fish Under Stress.

Stress related problems are now considered to be a major problem in modern day life with many illnesses attributed to it. Animals can also suffer stress if they are kept in confined cages or poor conditions. A lot of zoos now acknowledge this problem and are improving the surroundings for their animals by giving them more space. What a lot of people donôt consider is the stress that their poor goldfish are constantly exposed to. This stress can lead to all sorts of problems some of which can be fatal. Imported fish probably suffer the most as they undergo a lot of travel in crowded conditions. First of all they are caught and sorted in their place of rearing, then they are bagged and boxed up ready for shipment. The larger fish are often drugged in an attempt to calm them down to make transport easier and stop them thrashing about. The fish are then moved by plane to the country of their destination where they are again sorted before being treated and quarantined.

Although the fish are disease free when exported mysterious diseases often occur at this stage because of stress. After the importer has dealt with them they are then put in tanks ready for sale to the retailer ,unless he imports fish himself. Here they stay in crowded conditions until they are sold and moved yet again. Only after all this handling and moving about are the fish finally sold to the public. Again they are caught and bagged up for you to take them home. If oxygen is pumped into the bag it will reduce the stress a little and means they can travel further, but without it the fish will only survive for a couple of hours in crowded conditions before they go into shock. If this happens they must immediately be put into highly oxygenated fresh water to revive them. When you release the

fish into your tank they are again put under stress because of the different water conditions. The temperature will almost certainly be different as will the chemical make up of the water including the P.H. Large fast moving fish in small tanks can mean that the fish is so cramped it cant exercise properly which again can lead directly to damage as the fish bangs about in the aquarium, as well as stress.



Indeed Koi Carp have been known to get so excited that they jump out of the tank and even bleed from the gills. If conditions are cool and damp when a fish jumps out of the water, such as outside in the rain on a cold Autumn day, then the fish may survive for quite some time. In fact on some Chinese fish farms they transport large koi carp by wrapping them in wet hessian sacks and then stacking them on shelves in the back of a van. In this way they can transport large numbers of fish short distances without having big expensive lorries holding large heavy vats of water as is sometimes done in this country.

Artificial Respiration For Fish.

If the fish is inside in a centrally heated house when it jumps out of its tank survival is severely limited. If they are replaced in healthy water quickly it is likely that no real harm will be done to them. When the fish is replaced in the tank or pond it may be still and appear to be dead, but, even in some circumstances like these it may not be too late to resuscitate it. Gently hold the fish with your hand firmly round its main body and slowly move it forewords and backwards through the water. This action will force water slowly through its gills and if any spark of life remains it will encourage it to start breathing again unaided. If after a minute or two the fish wriggles in your hand immediately release it and allow it to swim off to fully recover on its own. But if after this time there is no sign of life with no movement then the fish was out of the water to long before resuscitation was attempted.

White Koi often turn pink when placed under stress as extra blood is pumped to the skin. This is the reason fish are rested at koi shows prior to showing. There are other more natural occasions when fish are put under stress.

Breeding is perhaps one of the most important to remember as fish must be kept in peak condition if they are to breed successfully. Females specially will need extra care and a good general purpose medicine added to the tank to prevent problems.

Winter can bring many problems for the pond keeper but should pose no difficulties for the fish tank indoors.

Many fish die of mysterious diseases when they have just been added to the fish tank and often the dealer gets the blame unfairly. So next time you lose new fish ask yourself if you did anything wrong and decide if you put them under stress.

Quarantining Fish.

Whenever you buy new fish and add them to your tank you risk introducing disease and parasites. There are several reasons for this;

Firstly it is probable that the new fish have come from a different fish farm or even country, to the existing ones . Secondly, however well the retailer has looked after his fish , such densely stocked tanks often lead to minor problems and these can be passed on to your fish. For these reasons you may consider it worth while to isolate all new fish for a month or so before adding them to your tank. Hopefully the fish were quarantined by the importer or retailer before they were offered for sale, but, it is better to be safe then sorry.

To properly quarantine fish you will need a separate tank set up somewhere such as in a disused garage. Ideally this tank will be heated to speed up treatment. The treatment tank must have a very good air supply as well so install a fairly big air pump on it.

Also you will need to have an active filter in it so perhaps a chemical filter such as a carbon based one is best as this works the moment it is turned on unlike a biological filter which needs several weeks to start running efficiently.

The new fish should be treated for parasites as a matter of course and a little aquarium salt added to the tank will act as tonic. An inspection of the fish must be made regularly and the moment any problems show up they should be treated immediately with a proprietary medicine or if it is serious with something stronger prescribed by a vet. After a suitable

period of time has elapsed the quarantined fish may be added to the existing tank but keep an eye on them because problems could still develop.

For one thing the filter will have to adapt to cope with the extra fish in the tank. If the new fish start to get ragged fins it may not be due to fin rot but may be down to bullying and a bit of fin nipping by the original fish in the tank. If this happens add a mild general purpose medicine and this will help them to heal up and regrow. If quarantining new arrivals is out of the question then there are some precautions you can take when adding new fish .

Firstly, always buy your fish from the same retailer, this is no guarantee but usually he will get them from the same wholesaler. Secondly whenever adding new fish always add a good general purpose medicine that treats parasites as well as bacterial infections. Then if any problems exist, hopefully they will be treated before they become serious.

Fish Tanks And Holidays.

Pets are always a problem when going on holiday as you have to arrange for someone to look after them. However fish need not be a problem with a little careful planning. There are several things that you can do to ensure their well being.

The first is to clean out the tank a week or two before you leave it . This will give it time to settle down again and make sure that all is well. Another simple action or rather inaction you can perform is not to add any new fish for a month prior to your holiday. The reason for this is that wherever you buy your fish from there is always a risk of adding disease.

In some cases the fish will simply die and pollute the water but in the worst case scenario the whole tank may become infected and die while you are away on holiday with no one to treat them. Sometimes people leave food with their neighbors so that they can feed their fish in their absence. This is not a good idea unless they keep the same sort of fish themselves. It is very easy for an inexperienced fish keeper to overfeed the fish which will probably result in the aquarium becoming polluted very quickly. This will initially lead to fin rot and if not remedied will result in more serious problems. It is far better to leave the goldfish without food for a couple of weeks as they will happily live off their body reserves for this short time.

If the tank contains very small fish such as fry or highly active tropical fish then it is better to buy a food block. These come in a variety of sizes and contain food particles, minerals, essential vitamins and water stabilizers to maintain water quality. Another alternative to feeding blocks is an automatic feeder. These are usually battery powered and designed to deliver a small amount of food on a pre determined basis. They are expensive and work best with pelleted foods. Automatic feeders and feeding blocks are available from nearly all aquatic retailers who will happily give advice on their useage.

If you have live plants in your aquarium donôt forget to leave a light on for them. Better still put your aquarium light on an automatic timer so that it comes on for 8 hours or so a day. This may also help to deter burglars. Also it is a good idea to replace the air stones with new ones before you leave. If the stones become blocked while you are away they could stop the filter from working and as they are only a pound or so a pack it is a cheap precaution. You can always put the old ones back in after you return. It is worth checking that your air pump is running at full capacity as well.

Moving House.

Moving house is traumatic at the best of times but with a large fish tank full of fish it can be highly stressful, both to you and the fish. If you are going to move house in the foreseeable future and you donôt yet have an aquarium then be patient and wait. It is far better to set up a new tank after you have moved than to take one with you.

However, if you already have a tank then the best solution is to find a friend who can house the fish for you, perhaps in their own tank or even in a pond if it is summer. It would even be better to take your tank and install it in their garage for a week or two while you move. At least the aquarium can then be moved in a more peaceful fashion with all day to set it up properly.

It may be that you have no alternative but to move the tank full of fish on the day of the house move. If this is the case make sure that you have an

ample number of fairly large ,stout, polythene bags, which you can tie easily. These can usually be obtained from your local aquatic dealer for a few pence each and if kept and re-used will prove to be a valuable asset in your fish keeping paraphernalia.

On the day of moving catch all of the fish and place them in separate bags with a small amount of water in each out of the tank. Seal them tight so that the fish are submerged in water but only just with plenty of air in each bag. Donôt try carrying fish in a car in plastic buckets because the water will invariably slop everywhere.

Then pack all the bags into a large cardboard box making sure that there are no loose staples to puncture the bags. This will do two things, firstly it will stop the bags rolling around the car when moved and secondly it will reduce the stress on the fish as they will be in the dark. Next quickly empty the aquarium and remove all of the gravel. This can also be put in strong plastic bags or clean buckets.

Do not try to move the tank with gravel in it as a large tank may hold 1/2 cwt of gravel without any water. This weight in the tank unevenly supported could break the seal on the tank or even crack it. When the aquarium is empty transport it to its new home.

The back seat of the car is the best place as it is soft and will cushion any bumps in the road. If it is placed in the boot make sure that it is well padded underneath so that it does not crack. Also ensure that it canôt slide about and bang into anything.

Donôt under any circumstances ask the removal men to carry

your tank. They probably wont anyway. Set the tank up in its new home as quickly as possible. If the whole process of moving the tank is likely to take more than 2 hours it is advisable to take your bags of fish to the nearest aqautic dealer and ask him to pump some pure oxygen into them to make the fish survive longer. Another alternative, if you have got them to the new house but cant set up the tank, is to place the fish in the bath until ready.

Whenever transferring fish always remember to float the bag of fish for 1/2 an hour to acclimatize them to their new home. Before releasing the fish it is a good idea to add some general purpose medicine to the tank to prevent problems.

The addition of a dechlorinator is also advantageous but not so important. If the bottles say they canôt be mixed then donôt, just add the medicine as this is more important.

If you follow these simple procedures then your fish should survive the move without any problems but remember that they take priority over everything else on the day!

Oxygenation.

Research has been carried out into the absorption of oxygen into water and it has been found that more oxygen is absorbed through the surface than through bubbles of air being pumped into it. Therefore it is more beneficial to agitate the surface of the water and cause it to circulate in the tank than simply blast air into it. Green living plants are a net producer of oxygen because during the hours of sunlight they produce tiny bubbles of oxygen which they release into the water. The effect is small but continuous so is beneficial.

A far better way of putting oxygen into the tank is to circulate the water through a filter using an air pump or powerhead. Temperature also affects the absorption of oxygen. The higher the temperature the lower the oxygen levels will be. Conversely the colder the tank is the higher the absorbed oxygen content of the water.

This is why fish can survive in a pond when it is iced over for a few days. It is also why tropical and cold water fish should not be kept in the same tank because tropical fish have adapted over the generations to live in low oxygenated water whereas the coldwater fish will suffer.

If a coldwater tank is kept in a warm room where the background temperature is in the 70s then extremely good oxygenation must be provided and stocking levels must be kept to a minimum. The same rule that applies to ponds of 5 inches of fish per square foot does generally apply but a better rule for coldwater aquariums is one inch of fish per gallon of water in the tank.

However it is advisable to stock below this figure especially if setting up a new tank to enable the filter to cope better.

It is possible to buy test kits which check the oxygen levels but they are expensive and a little common sense will remove the need for testing.

Are You Poisoning Your Fish?

After getting an aquarium set up and established people often find that fish suddenly start dying for no reason. Various medicines are added with no benefit and the fish continue dying. Another cause should be looked for other than disease and this could well be poisoning. Very often the problem is the filter and is overloaded because it has not been cleaned properly or too many fish have been added too quickly to the tank. In these cases ammonia will rapidly build up to toxic levels.

The answer is to remove some of the fish and clean the filter giving it chance to build up efficiency. With a brand new tank it is advisable to wash it out thoroughly and soak it overnight before use. This is because the aquarium sealant used to make the tank is slightly poisonous and the tank may have accumulated some contamination on the retailers shelves anyway.

One problem which can only be put down to carelessness is the incorrect use of medicines. Incorrect dosage is a big problem as people often think that if a little is good for the fish then a lot must be better. Mixing chemicals can lead to problems with them interacting to produce a poisonous product. Whenever using chemicals in the tank the

manufacturers instructions should always be followed carefully and to the letter.

Always leave at least a couple of weeks between using different chemicals, a month would be better. Some chemicals remain in the water for even longer so do read the bottles.

The use of salt can be a problem, Table salt is poisonous and should never be used but sea salt, rock salt or a branded aquarium salt is a very good tonic in small doses. Always remember that until you change the aquarium water the salt will remain in it. Donôt keep adding more and more every few weeks or months because it doesnôt go away and eventually it will kill your fish.

When changing aquarium water remember that tap water has chlorine and often flourine in it. These chemicals are both harmful to fish as they burn the delicate gill membranes. To a healthy fish a partial water change once a week or a 3 monthly clean out shouldnôt hurt but steps can be taken to neutralize the chlorine. There is a chemical that all aquatic retailers sell which does an admirable job of this and also removes the dissolved metals such as copper lead and zinc.

The main things to remember are donôt overstock your tank, keep it clean and use medicines very carefully. If you do these things you wont poison your fish.

Tapwater Purefication Systems.

A lot of ordinary people are not satisfied with the standard domestic water supply that most of us get through our taps. For drinking purposes at least they resort to bottled water. Some go a stage further and install a home water purification system on their taps. These contain a micro mesh gauze with a gauge of so many thousands of an inch designed to stop any fine particles such as freshwater shrimp eggs from passing through. Also the system contains a canister, through which the water passes, holding a resin designed to react with any chemical impurities. When working properly it will remove not only chlorine and flourine but also lead, copper and zinc as well as any nitrogenous compounds such as ammonia or nitrates and will soften the water by removing the lime.

Even the cheapest systems are expensive and the best have a very limited life producing only a few hundred gallons of pure water before they need recharging. There are now systems which have been custom designed for the fish keeper and for anyone seeking perfect water conditions when using fresh water in their tank , they are a great boon. For coldwater tanks however they are an expensive luxury as most coldwater fish are fairly tolerant of water conditions.

Testing The Water.

The quality of water in your tank will vary from the moment the tank is filled. As the water matures the chlorine and flourine will dissipate leaving the water much softer and more suitable for the fish. However it is not all good news because if your filter is not working properly, as it is too new perhaps, you will get a gradual build up of nitrogenous compounds, the most poisonous of which is ammonia. Ammonia will reveal its presence in well oxygenated water because it will oxidise to produce a white scum.

Nitrite is another dangerous compound produced in a badly filtered tank and levels of even 1 part per million are toxic. If either ammonia or nitrite are present then a partial water change should be carried out immediately.

Nitrate is the third nitrogen based compound found in fish tanks and is far less harmful. Even the addition of live plants will help neutralize this problem because it is a natural plant food. All three of these compounds can be tested for with simple test kits available from any aquatic retailer.

Temperature is another important thing to check on in a fish tank for several reasons. Even coldwater fish have limits on what temperature is acceptable to them. Too high and they get short of oxygen and too low and the fancy varieties of goldfish develop fin problems and can even die. The ideal temperature for them is 60 - 70 degrees Fahrenheit .

There are numerous thermometers sold for the aquatic trade from traditional tube thermometers to stick on plastic digital ones. All will give a reasonably accurate idea of the tank temperature.

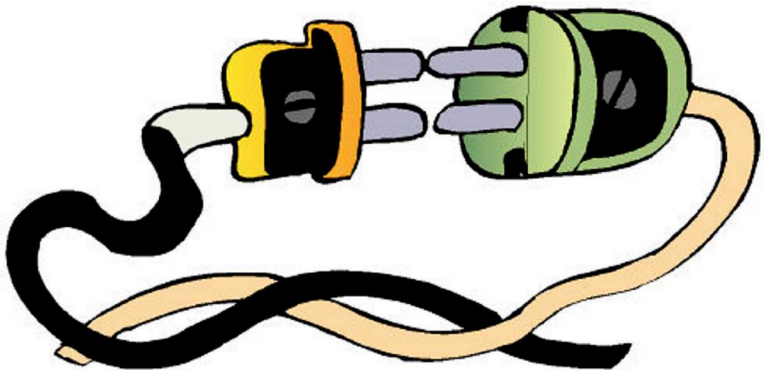
P.H. is the next most important thing to test for. This is how acid or alkali the water in the aquarium is. A P.H. level of between 7 and 8 is perfectly safe for most coldwater fish. (Tapwater is a neutral 7.) The water in an aquarium may change with age becoming acidic or it may become alkali if a concrete ornament has been added that has not been treated properly. If when testing the water you find that the P.H. reading is incorrect chemicals called buffers may be added instead of carrying out a water change.

The salt level of water can be tested using a hydrometer but unless you are using salt baths to treat your fish this only really applies to marine fish keepers. Another thing that you can test the water for is hardness, that is to say the amount of lime present. This is not really a problem for most fish keepers other than that it will leave scale deposits on the pipework in the tank (See section problems with limescale.) Oxygen levels are the last thing that can be tested for, but the test kits are very expensive and a little common sense over stocking densities will remove the need for this.

Fish Tanks And Power Cuts

Whatever the time of year it is there is always a slight risk of a power cut because of freak storms or other bad weather conditions. With a small tank or a goldfish bowl this doesn't pose much of a problem.

If the power is only off for a few hours there is no point worrying as no harm will come to the fish. The tank will gradually cool as the room temperature drops. A chill like this doesn't harm the fish unless it is a very large drop in temperature, it is a sudden change that causes problems. If the power is likely to be off for some days and there is no heating in the house it may be necessary to introduce more heat into the tank by floating bottles of hot water in the tank to keep the temperature up. This can only be done if you have a non electric heat source such as a gas ring on your cooker.



When the power goes off water sometimes siphons back down the air line into the air pump so a non return valve should always be fitted. Air shortage is likely to be a bigger problem than temperature and this can be alleviated to some extent by buying a battery operated air pump which although not very powerful will help keep a supply of oxygen going into the tank. This in turn will keep the bacteria in the filter alive if you are

using an air operated filter. To help reduce the loading on the filter all feeding should be stopped until power is resumed.

External power filters must be checked to see that they are operating correctly when the power comes back on again because sometimes they develop air locks. If the power is off for many hours you will need to do a partial water change because the bacteria in your biological filter will have died. You will have to treat the filter and tank as if it were freshly set up and keep the loading on the filter as low as possible for a week or two by feeding the fish very sparingly. Also it is a good idea to carry out water checks using one of the many test kits available to check the PH levels and the Nitrite levels.

After a couple of weeks it will be safe to let things get back to a normal routine as the filter will then be back up to full operating capacity and you can enjoy your tank with no more worries.

The Aquarium And Medicines.

Many people keep fish and some are fortunate enough to never have to resort to using medicines for treatment but for most of us there comes a time when the only recourse is some kind of treatment for an ailing fish. Salt, the course sea salt or rock salt variety not the table sort which is poisonous to fish, has been used for decades if not centuries as a cure all treatment. Used carefully in the correct dosage it is a powerful treatment against most problems with fish and a lot of people only use this type of treatment spurning modern medicines. However there are many medicines, tonics and remedies which are possibly safer and easier to use and in some cases much more effective. Chemicals are available to specifically treat fungus, white spot and other parasites, ulcers, fin rot and other bacterial infections.

As with any medicine, none are guaranteed to work in all cases and you may develop favourites which you have tried and tested to your satisfaction, but there is a quite bewildering range to choose from and if in any doubt you should seek advice from your retailer who should have a reasonable working knowledge of the medicines that he sells. In some cases there is a need for a more powerful medicine to cure a valuable fish and in this case you need to seek the help of a good vet who can administer more potent drugs than can be bought over the counter. Medicated foods can also be bought on prescription to treat fish.

Along with medicines there are many aquarium remedies such as algicides which are designed to clear the water in the tank by killing the algae.

Also available is a dechlorinator for removing chlorine and flourine along with poisonous metals from fresh water. As with all treatments you need to know how many gallons of water your tank holds. The shop where you bought it will be able to tell you but if you cant find out measure the capacity in cubic feet by multiplying the length x width x depth and then convert this to gallons by multiplying by 6.25. Although now I suppose this should be done in metres and litres now we have gone metric.

Fish Diseases And Parasites.

Fish, like any other animals can catch various diseases and are afflicted with a range of parasites. Some are relatively trivial and easily treated with a salt bath or proprietary medicine but others need much stronger medicine which can only be prescribed by a vet.

As with most ailments prevention is better than curing the problem after it occurs and maintaining healthy water in your tank should prevent most problems. Below are listed some of the most common problems affecting fish and their symptoms.

ANCHOR WORMS . This parasite is quite large and easily seen with the naked eye as they grow to about 2cm in length. Their very distinctive shape, as the name suggests , is recognizable as an anchor. The parasite makes a sizeable wound in its prey and grips on tightly. It can damage the fish quite severely if they are removed clumsily , but a parasite treatment should easily kill them. They are most often seen on Koi Carp and rarely in an aquarium.

BLACK SPOT. This is another parasite and not to be confused with the natural black markings that a lot of goldfish have when young. It is actually caused by a cyst forming in the fish around the parasite which gradually gets bigger making a black circle on the fish. It is relatively harmless but as with any infection should be treated with an anti parasite treatment.

CARP POX. As this is a viral infection there is no treatment for it, but the one consolation is that it does not kill fish, it merely disfigures them .

It can be likened to a Human catching a cold as it is relatively harmless. The symptoms seem to be most prevalent at low temperatures such as winter in a pond. In the summer the symptoms often disappear as they do when the fish gets older. An infected fish will develop white lumps on its body. It is contagious so infected fish should be isolated from other carp related species. Again this problem seems to be most common with Koi keepers and ponds so should present little problem for aquariums.

DROPSY. There are some new medicines on the market which claim to be able to treat this viral infection. If a fish is badly infected it should be destroyed as the disease is slightly contagious. The disease is thought to be caught from the infected fish having eaten fish droppings. Dropsy cause the fish to swell up as the osmotic process that regulates the fishes body fluids fails resulting in the fish storing water . This eventually makes the scales stick out like a pine cone. Dropsy is quite rare in ponds but a fairly common problem in aquariums.

FIN ROT. This is a bacterial infection which is very common in poorly maintained aquariums. It is caused by bad filtration leading to polluted water. The bacteria often cause the fins to be reddened and will gradually cause the fins to slowly be eaten away leaving only the bones. However with prompt treatment the fins usually regrow as good as new. Any bacterial treatment will cure this disease and it should never be fatal.

FUNGUS. This looks like a tuft of cotton wool growing on the fish. In very green water it may appear green but is otherwise white in colour. The infection is actually secondary in nature. That is to say that the fish must already have a problem such as an open wound before fungus develops. The problem may be caused by any number of things including pollution so to cure it you have to find the original cause as well as to treat the fungus.

GILL FLUKES. These are small parasites that embedd themselves in the delicate membranes of the gills. In an infected fish the gill flaps often stick

out and appear reddened making breathing difficult for the fish. Any proprietary anti parasite treatment should cure the problem quickly and effectively.

GILL ROT. This bacterial infection is particularly nasty and difficult to treat. It is often seen in Koi that have just been imported from a breeder who was not fussy about his water conditions. In a badly infected fish not only will the gill smell and be seen to be rotting but the gill flap will have a hole in it. In extreme cases the fish should be destroyed.

LEECHES. These are of course a parasite and as such are easy to get rid of. They can be removed physically but it advisable to wear gloves because they can latch onto your hands and if pulled off will leave a barb in the flesh which will fester. They do not appear very often in aquariums but can arrive on plants as eggs. LICE. these are a special variety specially adapted to live in water on fish. They irritate the fish causing them to rub on ornaments and the side of the tank but don't cause any great damage. However they can spread disease and if suspected should be treated with any parasite treatment to destroy them.

MOUTH FUNGUS. This is not actually a fungal infection but is caused by a bacterium. In an infected fish a small wisp of fungus may be seen to emerge from the fishes mouth and gradually part of the mouth will be eaten away. If the infection is not to severe it may be treated with a good medicine but in bad cases the fish will have to be destroyed. It does not seem to be contagious. 56

PROTOZOAN INFECTION. Protozoa are tiny organisms that are bigger than a bacteria but smaller than a parasite. They invade the victim by entering its bloodstream and devastating the immune system. It is a particularly nasty problem as some fish are naturally immune and can act as carriers which then infect other fish .Hence two apparently healthy batches of fish mixed together can result in one batch dying. Infected fish die quickly but the organism can also exist free swimming in the water. It is best eradicated by carrying out a water change before treating with a

protozoan treatment. However treatment is difficult and heavy casualties can be expected from any infestation.

S.V.C. This is short for Spring Viraemea of Carp and is a notifiable viral infection which only affects carp related species. Any dealer who gets infected with this disease has to cease trading and advise The Ministry Of Agriculture and Fisheries immediately ,so it is very unlikely that you will have any fish with this disease. It is a devastating disease that sometimes breaks out in the Spring but there have only been a handful of cases in recent years.

ULCERS. These are often the result of minor damage to a fish such as occurs in the breeding season or from a parasite infection. The minor wound may not heal properly and infection can then set in . In minor cases it may be treated but with severe damage it may be very difficult to effect a cure and may be best to kill the fish.

WHIRLING DISEASE. This is not actually a disease but is a parasite infection. It sometimes appears on newly imported fish which have been reared in dirty overcrowded conditions. The parasite bores its way into the brain of the fish and affects the way it swims causing it to spiral through the water. Any infected fish should be destroyed as there is no cure for this condition.

WHITE SPOT. This problem should not be confused with fungus as it is very different. Firstly it is caused by a tiny parasite that becomes active when the fish has had a chill . This usually happens with newly bought fish that have not been acclimatized properly to their new tanks.
That is to say they have been taken out of relatively warm water and placed in a cold tank. Any infected fish will exhibit tiny white spots the size of a pin head all over their bodies. The problem spreads rapidly from fish to fish and if left untreated will, in a few days, kill all the fish in the tank. However it is relatively easy to treat and treatment works best at higher temperatures. In fact some cures claim to work within 24 hours.

Swim Bladder Disorder.

Swim Bladder Disorder seems to affect Fancy Goldfish such as Black Moors and Fan Tails more than other varieties of fish. This could be due to the fact that it is caused by air being trapped in the swim bladder which is connected to the stomach. In fancy varieties of goldfish the fish is ball shaped unlike the streamlined shape of most normal fish. This compresses the stomach and intestines into a tight tangle instead of being stretched out. Indigestion then causes air to sometimes get trapped leading to the problem.

The non functioning swim bladder means that the fish then loses its buoyancy control. This results in the affected fish swimming at odd angles in the water ,upside down or even causes it to remain at the surface unable to sink. This problem can be very difficult to cure but there are several treatments that may be tried. The first is to raise the temperature of the aquarium. This can safely be done by adding a thermostatically controlled aquarium heater to the tank. If this does not work the next best treatment is to feed foods with a laxative quality. For larger fish washed, chopped earthworms or maggots are very good.

For smaller fish any of the live foods commonly available for aquariums such as bloodworms are ideal. Even dried insect foods have some laxative qualities but they are not as good as fresh, live food.

Another perhaps more palatable food for the squeamish to give their fish with swim bladder problems is Elodea or oxygenating plant. Not only is it very nutritious for the fish but it has laxative properties as well. Even well tried and tested remedies such as these are not always effective and there are no proprietary medicines as yet on the market for swim bladder

problems. If the fish is still feeding then it might as well be left alone because sometimes this problem will cure itself naturally.

On the other hand in extreme cases where the fish cant feed any more it may be more humane to simply kill it in the approved method. It is worth remembering that dried foods are often to blame for swim bladder problems and indeed a fish that swims normally most of the time will often exhibit symptoms shortly after being fed dried food. To prevent this occurring an occasional treat of some diced fresh earthworms is advisable.

Spreading Diseases

Our hands are covered in bacteria and may also have residues of soap and other chemicals on them which are poisonous to fish. For this reason alone it is a good idea to keep your hands out of the fish tank at all times. Another point to remember is that not only can you pass on problems to your fish but there are diseases that they can pass on to you. These diseases are called Zoonoses. The most infamous one is called Wiels Disease. This is not actually caught from fish but comes from rats living in water and is then passed on to humans. Thankfully it is very rare as it is a potentially deadly disease and if caught needs prompt treatment. However it is only really a danger in wild ponds, canals and rivers.

One disease that can be caught from the fish tank is Coldwater Tuberculosis. Unlike normal T.B. it is not serious and only results in a rash on the infected arm which is readily treatable with anti-biotics.

There was a case of someone getting a tissue infection on their arm and they went to a doctor who told them it was fin rot which they must have caught from their fish tank.

However this was probably the doctor having a little joke at the patients expense as there has never been any other recorded incident. Siphoning water out of the fish tank can be very hazardous to your health as well. If you suck the pipe to start the siphon you may well get a mouthful of dirty water and we all know hat fishes do in the water! This may result in a bad stomach infection or even worse.

Another reason for keeping your hands out of the water of your fish tank is because from time to time you may find leeches appear. These will have arrived as eggs on the plants and hatched out. They are not dangerous but merely unpleasant as they will latch onto your hands and suck your blood. If pulled off they may leave barbs embedded in the skin which will lead to a minor infection. The best way to remove them is with a small naked flame such as a cigarette lighter.

You must also remember that some of the chemicals that you may use to treat your fish may be poisonous to humans. So the golden rule is keep your hands out of the water in your tank at all times.

Killing Fish

Occasionally it might be necessary to kill a diseased fish to put it out of its misery. A vet can do this if it is a very large fish with an overdose of anesthetic but it is hardly worth the effort with small fishes. At the trout farms fish are put in a bucket of salty water and electrocuted but again this is not practical and may even be dangerous to the inexperienced. The recommended way of killing small fish is to dash them against a paving slab. This isn't messy and is quick but for larger fish with more blood it is better to wrap them in a thin cloth, hold its tail and then bang its head against a rock.
To dispose of the body it is acceptable to flush small fish down the toilet or little Johnny might want to bury it in the garden and hold a ceremony.

Large fish have to be buried a good depth in the ground because of the risk of disease and the danger of encouraging rats or else they can be taken to the local vet for him to dispose of the same as for cats and dogs.

In America pet cemeteries are the latest craze and they are starting to catch on over here as well especially in the bigger cities. This is obviously a very good if not expensive method of disposing of the body of your fish and for a cherished koi carp or prize goldfish may help the family come to terms with their loss.

Thinking About Fish

3 Seconds Memory?

All animals have a memory but some seem to have better memories than others. The Elephant is said never to forget but the humble Goldfish is reported to have only a 3 second memory. Research has been done on this subject but what the method of testing the fishes memory was is unclear for they certainly have the ability to learn some things.

Fish in a tank will gradually get used to being fed at a certain time and even by a particular person whom they seem to recognize. When feeding time comes and the tank is approached the fish will become highly agitated rising to the surface in a frantic search for food if floating food is used. On the other hand if sinking food is used the fish will immediately dive to the bottom of the tank and search for it. Changing from sinking to floating food and vice versa will confuse them as they first get used to one and then the other.

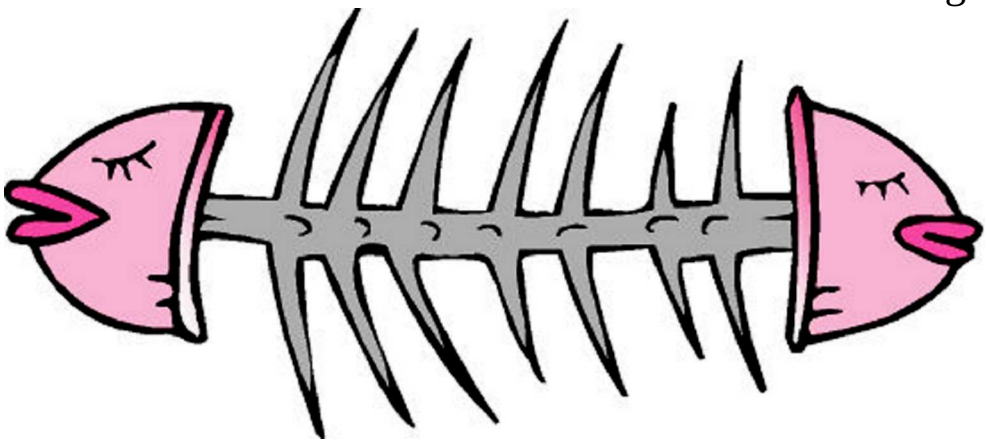
Fish in a pond will get used to the sound of footsteps going to the pond and again if fed regularly will soon associate feeding to the sound of approaching footsteps. This can be taken a stage further by ringing a bell over the pond when the fish are to be fed. It may take a little time but the fish will learn that the sound of the bell means that food is coming. They will even respond in the same way to a shout such as, "Dinners ready" but your neighbors might possibly look askance and regard you in a new light! If a fish pond has been raided by a heron but some of the fish have been left in the survivors will not be seen and will hide for several days.

This may well be an hereditary survival technique but what makes the fish suddenly start feeding again out in the open? Is it that they have forgotten the heron after a day or two? If so they must remember the attack for that period which is certainly longer than 3 seconds. Netting fish has the same effect. Indeed when trying to catch an individual fish it seems that the fish becomes aware that you are after it and the others in the tank will not pay any attention to the net as they just carry on swimming normally. If then left alone it is some time before the fish calms down allowing it to be caught more easily.

All of this behavior and learning ability would suggest that the humble Goldfish has more intelligence and a better memory than we usually give it credit for.

The Scavenging Nature Of Fish.

A large number of fish are omnivorous by nature, that is to say that they will eat meat as well as vegetation. This is especially true of the Carp family of which the Goldfish, Shubunkin, Black Moor etc are all members. The meat in their diet normally consists of worms, insects and spiders but they will also take real meat including the flesh of their brothers. Most big fish will, given half a chance, eat any small fish that is to slow to get out of their way and is small enough for them to get into their mouths. Their carnivorous nature can also be seen in a dealers tank where a fish has died and been left for some hours before being removed.



The fish will clearly be seen to have been partially eaten regardless of the cause of the fishes demise. This is one reason to remove any sick fish before they die as they risk spreading disease, not only while they are alive but also after they are dead, specially if they die in the middle of the night.

Fish will also eat other dead bodies such as rats, mice and hedgehogs that may drown in a pool. That is not to say that your Goldfish is related to the Piranha but merely that it is a scavenger, an opportunist feeding on whatever it can. Indeed it is a fact that some hobbyists actually feed their fish on canned dog meat and they seem to do perfectly well on it but this would be very messy to do in a fish tank.

Goldfish don't have teeth as such but have a strong cartilaginous lip with which they tear off their food and then they crush it with a boney plate at the back of their mouths.

So don't worry even if your Goldfish is starving because you have forgotten to feed it, your fingers are perfectly safe when you do feed it because even if you put your fingers in its mouth it cant bite you.

The Carp family of fish love to rummage through the gravel at the bottom of the tank looking for any tasty morsel that they can find. In a pool this action might result in the location of an insect but in a tank it can lead to the fish swallowing a large piece of waste matter. Normally it will spit this out straight away with no ill effects but on rare occasion it can lead to an infection with a particularly nasty viral disease called Dropsy. (See section on diseases) This is another reason for keeping the fish tank clean at all times.

Do Fish Sleep?

It will be obvious to anyone that has watched a fish tank that occasionally fish will lie motionless in the water and rest from their normally busy activities of continuously searching for food. But from normal observation it is not apparent that they actually sleep like other animals. The only way to determine this is to observe a tank in the middle of the night. To do this put the light out on the tank at the normal time of retirement for bed and then creep down a couple of hours later. When the light is put on immediately look at the tank and it will be seen that the fish are lying on the bottom of the tank perfectly motionless. If the light is left on for a few minutes they will become active and start their normal routine of searching for food.

It should be noted that fish sleep with their eyes open as do a lot of animals in the wild. This is of course so that the part of the brain that remains active during sleep can be on constant vigil for danger as in their natural habitat not all creatures sleep at the same time and some predators are active at night.

If any goldfish are inactive and lying on the bottom of the tank for any length of time during the day they should be examined carefully as there is almost certainly something wrong with them. If they feed normally when food is offered then it could be swim bladder disorder. (see chapter on diseases.) A healthy fish is an active fish.

Are Goldfish Monogamous?

Some fish such as Cichlids care for their young after birth by giving them protection and some fish make a pair bonding after egg laying and protect their eggs jointly. However in most cases fish just lay their eggs and then abandon them leaving them to live or die at the hands of fate. We have all seen trout spawning in the shallow streams and then dying immediately afterwards. A Goldfish will breed many times in its lifetime but invariably with a different mate each time. As with trout when conditions are right the fish go into a breeding frenzy with the males chasing the ripe egg laden females around the pond or tank. The difference with goldfish is that this happens continuously throughout the summer as females become ripe. Selection is by the fittest ie; the ones who survive the chase the best and spawning may last several hours.

When the female is ready to lay she positions herself over the selected plant life or spawning mop and the male hovers at her side beating his body rhythmically against hers inducing her to lay then he sheds his milt to fertilize the eggs. When the are both spent that is the end of the communion and they resume feeding and swimming around as normal.

There is some evidence that males select females by their characteristics as well as their sexual ripeness. This can be seen by the fact that in a mixed tank of mature fish sometimes a male might be chased by an amorous suitor especially if it is a full bodied fish such as a fantail.

Goldfish are not very selective over breeding partners because a pure bred goldfish will not only breed with a shubunkin, fantail, blackmoor etc but it is said that they will breed with larger carp species such as koi, which brings to mind the story of the dachshund and the alsation!

Therapeutic Fish

We are all starting to become aware of the therapeutic value to convalescing patients of stroking furry animals. The animals like being stroked and exude warmth and friendship signals to the patient making them feel more relaxed and happier. This method of putting patients at their ease is becoming popular with some hospitals, especially in childrenôs wards. The same applies to fish tanks. It is true that you cant stroke the fish but just sitting quietly, watching a mixed tank of fish going about their daily business is also restful.

The art of Feng Shui is gaining in popularity and according to its teachings goldfish bring prosperity and absorb any negativity present. So if there are any evil spirits in the room they will be absorbed by the fish instead of by you.

A lot of dentists and doctors waiting rooms have fish tanks in them for the patients to sit and watch. What it is about fish tanks that relieves stress and anxiety is unknown but even in the ruthless world of big business a lot of firms now have fish tanks in their reception areas for visitors to sit and watch whilst waiting for appointments.

Some restaurants have aquariums in them to help their customers relax so that they enjoy their meal even more. However certain Chinese restaurants keep their stock of fresh fish in these fish tanks. After the customer has been watching a pretty fish swimming around for a few minutes, it is a shock to them when the fish is caught and killed in front of them. Followed by the waiter asking "How do they want it cooked?" One wonders what effect this has on the mood of the customer.

Mixing Native Fish With Ornamentals.

Quite a few people have bought fish which have grown too big for the aquarium and then they have released the fish in the nearby canal or river. This is strictly against the law and can cause many problems with the spread of disease. This can be seen from the case of the Signal Crayfish. These were imported originally to farm for food because they grow bigger and faster than our native species. Unfortunately a disease which they carry was introduced into the wild when some of them inevitably escaped. This disease devastated the stock of native crayfish and added to the fact that the Signal is bigger and stronger, the native species has almost been wiped out entirely. Attempts have been made, so far unsuccessfully, to reintroduce them to some rivers.

Non native species can still cause a problem if they are healthy as can be seen from the case of the bullfrog tadpole. Every year 1000s of these are sold in the aquatic trade to the public and they rapidly develop into giant bull frogs.

These have been released in the past and are causing a wildlife disaster down in the south of Britain. They have been released in great numbers and are now breeding in the wild devastating the natural population of small birds, frogs and newts which they greedily devour.

If large growing fish such as catfish have been reared in your tank and they have got too big then the best thing to do is to ask fish keeping friends if they can find a home for them. Alternatively you could try taking them to a local retailer and asking if you can swap them for something smaller.

Some retailers like large specimens in their tanks to show off and so may oblige with unusual fish such as catfish.

The problem works in reverse as well because not only is it illegal to remove fish such as carp and tench from the wild but they can introduce parasites and disease into your tank. It is possible that the native fish are immune to a certain disease but your hybridized prize Goldfish is not. Nobody would complain over a few sticklebacks caught in the local brook and placed in a childs goldfish bowl but anything else is asking for trouble. It is far better to buy healthy disease free fish from a reputable dealer than to take chances.

It must also be remembered that the same law applies to plants in the wild as well. If you go removing great armfulls of oxygenating plant for your tank you may not only get into trouble but you risk introducing diseases, parasites and leeches into your aquarium.

Colour Changes In Your Fish.

All goldfish start their life as a dull green brown colour and gradually change to the well known orange color after a short while. This change can be speeded up by raising the temperature as it is in fish reared in warm climates or left to take its natural course which in this country may be a couple of seasons from hatching. Special foods can also be given with colour enhancers containing carotene to bring out the oranges and reds of the fish .

People often buy fish with attractive black markings on them and then are disappointed when they vanish leaving a plain orange fish but this is a normal colour change and can be expected. Attempts are being made to produce fish with black fins but as yet have only succeeded in delaying the change.

Sometimes a goldfish will develop black patches on its body for no apparent reason. This is likely to be caused by a small parasite which if left untreated will spread and may eventually harm the fish.

Any parasite remedy should cure the problem but it should not be left untreated. Occasionally goldfish will turn white as they get older and this can be likened to some people developing white hair. Some people never turn white and others change colour when quite young. Goldfish are the same although this change is much rarer. It is not just goldfish that change colour as in fact most fish do.

Black Moors take a year or two to develop their deep black colouration and even then a lot revert back to the orange colour of a goldfish. Shubunkins start out life as a pale fish with little colour and gradually get darker as they get older developing the red, blue and black that is typical of them. It is always a bit of a gamble buying very small Koi Carp because their colouration is not fixed until they become much bigger and mature.

The markings on a Koi are all important and enthusiast will go to extreme lengths to obtain the perfect specimen. Sometimes they will even have scales surgically removed to take away blemishes in an otherwise well marked fish.

Many other fish will exhibit lesser colour changes such as golden rudd and blue orfe which have not been perfected yet. In fact it is unlikely that you will find very small blue orfe for sale for this very reason.

Joining A Club.

The hobby of fish keeping often starts as a small bowl or tank to keep the kids quiet but very often it grows into an all consuming passion. Before long you have tanks all over the house and the garage is converted into a fish house. All you talk about is your latest additions to your tanks and how such and such fish has laid some eggs. Your wife is driven to distraction and tells you to take up golf to get you from under her feet. If this sounds familiar to you you might like to meet other people who indulge in the same hobby as you. This can be done at one of the many fish clubs and societies that exist throughout the country.

Societies often hold lectures by well known aquatic authorities and even have demonstrations by salesmen from various aquatic companies on their products. Other activities that they follow are day trips to distant shows, fish farms and other places of interest. Small societies also hold their own fish shows where you can show of your prized fancy goldfish or rare exotic whatever and win an award for your efforts in nurturing it to its present beauty.

Also of course you can just chat to fellow enthusiasts and swap tips. There are many pondkeepers and koi societies but there are also an ever growing number of goldfish societies. Their names and addresses are often to be found in fish keeping hobby magazines. If you dont see them advertised then try writing to the magazine who will be only to pleased to help.

Problems With Fish Tanks.

The most serious problem that new fish keepers face is that of the fish tank cracking when it is first filled This is invariably due to the tank not being supported evenly over the full length .It may be that the surface the tank is on is twisted slightly in which case another place should be chosen but usually it is merely a case of putting some thin polystyrene ceiling tiles under it to even out the bumps. Very occasionally it may be due to a faulty tank but this is rarely the case.

The glass often goes green with algae. This is due to too much sunlight falling on the tank and can be rectified by moving the tank to a darker spot in the room or alternatively buy a scraper or algae magnet and simply clean the glass every couple of days.

The water goes green. The filter becomes overloaded very quickly. Both of these problems are the result of too many minerals in the tank from overfeeding and the inadequacy of the filter system. The filter should be upgraded and feeding reduced. Also there may be too many fish in the tank.

When filled a new tank goes cloudy. All tanks when filled look cloudy because of the air bubbles in the tap water which will soon dissipate. Also if the gravel has a little dirt in it, as it always will, then this will float about for a few hours until the water settles down and the filter does its job of removing it.

The fins of the fish look ragged and eaten away. This may be due to one of the other fish developing fin nipping habits but usually in a fish tank it is due to fin rot. This is a bacterial infection in the fish and is due to a dirty polluted tank. The treatment is to simply clean the tank and use a proprietary fin rot remedy. The fish will usually make a full recovery with the damaged fins miraculously regrowing to its original shape.

The flourescent tube lighting the tank does not work. When a flourescent tube will not illuminate it is usually due to the starter motor in the control box being at fault. These only cost about î 1 and are easily replaced. Occasionally it is due to a faulty tube but this is easy to tell because the ends of the tube will go black when its life is over.

The fish start floating to the surface unable to swim properly. This is a problem called swim bladder disorder and is due to air being trapped inside the swim bladder because of a stomach disorder. (See section on diseases.)

Plants disappear. If goldfish varieties are kept in the tank they are almost certainly to blame for plants disappearing because they love to eat them. There is no solution other than to replace them with plastic ones. If other species of fish are kept then it is possible that the conditions are not right for the plants and they are just dying and rotting away. A little more light or perhaps a higher temperature is needed for them to grow.

Fish very often die when a new tank is installed. This is called new tank syndrome and is almost certainly due to a build up of ammonia due to a filter not working properly. A water test will confirm this and the cure is to add a bacterial solution to the filter and reduce feeding for a couple of weeks.

Tiny white spots appear on the fish. This is commonly called white spot and is due to a small parasite that becomes active when the fish receives a chill. It is easily treatable in a fish tank but spreads very rapidly.

The leaky tank. Sometimes older tanks spring a leak at one of the seems. This happens because the sealant used to make the tank never sets hard and over the years the glass sometimes moves. The cure for this is to clean the tank thoroughly and then squirt some new sealant in the joint. Failing this some of the very large aquatic retailers will replace the whole glass panel and reseal it.

Air pump not blowing bubbles. If the air pump is noisy then the diaphraghm has probably perished but if it is quiet it could be that the valves need replacing. A repair kit contains all the spare parts needed to service your air pump.

Useful Facts And Figures.

Cubic Foot = 6.25 Gallons = 62.5 Ibs
1 Cubic Foot = 25 kilos Cubic Metre = 35 Cubic Feet
1 Cubic Metre = 220 Gallons Gallons = 2200 lbs Or
1 Ton = 1000 Litres
1 Cubic Metre = 1000 Kilos Litres
10 Litres = 2.2 Gallons Gallon
1 Gallon = 4.5 Litres Gallon
1 Gallon = 10 lbs
1 Gallon = 4.5 Kilos

Pump running costs, 100 watts = 16.8 KWH per week
ie, 17 KWH units of elec cost £2.55
ie, 1 watt costs 2 ½ P per week
continuous pumping,
So 10 Watt Air Pump Costs 25 P per week to run.

Gallonage of Aquariums.

18 x 12 x 12 = 9 gall
30 x 12 x 12 = 15 gall
36 x 18 x 12 = 28 gall
24 x 12 x 12 = 12 gall
36 x 12 x 12 = 18 gall
48 x 18 x 12 = 37 gall