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APRIL 1992
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PRACTICAL Fishkeeping

BRITAIN'S NO.1 MAGAZINE FOR ALL FISHKEEPERS

Above: vampire Pleco - see page 16
Below: Long-finned Koi - page 103

What made a reader's Damsel blind? See page 88

YOUR FREE GIFT

ABOUT PFK

WHERE TO FIND

INFORMATION FOR TROPICAL FISHKEEPERS
pages 4-7, 10, 12, 16, 23, 27, 36, 46 to 53, 74, 92, 116, 128, 138, 142 and 170.

INFORMATION FOR MARINE FISHKEEPERS
pages 4, 10, 16, 27, 46 to 53, 57, 68, 74, 88, 92, 96, 116, 128, 138, 142, and 170

INFORMATION FOR COLDWATER & POND HOBBYISTS
pages 4, 9, 10, 16, 44 to 53, 74, 92, 103, 108, 116, 124, 128, 138, 142, and 170.

■ PRACTICAL FISHKEEPING,
Emap Pursuit, Bretton Court, Bretton, Peterborough PE3 8DZ.
Tel: 0733 264666

● Cover pic shows a brackish water-loving Scat. Pic by Max Gibbs, The Goldfish Bowl, Oxford.

Avoiding new tank syndrome

Even with a very good filtration system, you cannot stock a new tank very heavily straight away. There simply won't be enough bacteria on the media to deal with the excretia in the tank.

The use of zeolite to remove the ammonia might allow you to stock more fish - but it would also interrupt the 'flow' of nitrites to the bacteria and stop them multiplying.

Some filter starters now on the market claim to contain sufficient bacteria for you to instantly stock with a full quota of fish. Others claim to aid the filter process by breaking down the detritus helping filter bacteria to get to work. The air will bring sufficient bacteria eventually; adding old water or a sponge from an existing set-up will accelerate the process.

The best compromise is probably as follows - condition and dechlorinate the water to be used, and use one or more of the filter starter type solutions or powders, alternatively wash out an old filter sponge or the like in the tank. After running the filter for a few days, stock with just a couple of fish to begin with, and gradually build up to full stocking.

Remember the additional cost of an air pump. The recommendation here is to use these for tanks up to 24" only. They may need to be bulky and unsightly in large tanks.

■ Most common choice at all levels of fishkeeping is the undergravel filter. This consists of a layer of gravel over a raised grid at the bottom of the tank. Water is pumped through gravel placed over the grid (or plate). To perform at its best this system needs regular cleaning. It's suitable for even the most advanced fishkeeping, and often forms a part of more complicated systems, when it can be fed from an external or internal filter.

This often means using it 'reverse flow' - that is with water pumped down the uplift and up through the gravel, thereby keeping the gravel cleaner and less clogged than 'standard flow' systems where detritus is sucked into the gravel.

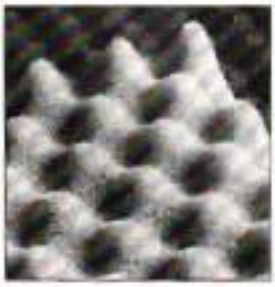
Choice of gravel size is important, taking into account the fish to be kept, as is choice of gravel type. Constantly running water through gravel means that any hardness will be leached into the water. You may want this, and choose coral gravel or crushed shell - but you may be keeping Neon Tetras or Discus and need hardness-free gravel.

WHAT DOES IT COST?

Guide prices for filters:
Sponge filters - £3 to £10
Bubble-up type filters £2 to £10
Undergravel filters, including plates, uplifts (not air pump) £5 to £20
Gravel around £2 per kilo or less
Internal power filters - £10 to £80
External hang on filters - £15 to £45
External free-standing filters - £30 to £200
Trickle filter units - from around £200

Though it's often debated, undergravels may not be a good choice for those who wish to grow plants.

■ Internal or external filters have many fans. The internal filter usually consists of a pump/powerhead mounted over a chamber filled with foam (though other media can be used). The pump sucks water through this foam and spurts or trickles it back, often creating a distinct current.



Foam media has thousands of surfaces for bacteria

Regular use of a small brush, and a squeeze of the foam in tank water will suffice to keep these filters in tip-top working order, and they are perhaps the easiest to maintain.

External filters usually hang on the side of the tank - or more commonly these days sit underneath it. Both types allow the use of large amounts of media without paraphernalia in the tank, and both types will give plenty of water movement - the hang-on type in the shape of a 'waterfall' - the under-the-tank type by means of a large pump/powerhead.

This sits on on top of what is effectively a bucketful of media which can be sectionalised (usually in three sections) to contain several different types of media - which are often as detailed above - mechanical, biological and chemical. The most expensive versions include a heater in the unit.

This type of filter can be time-consuming to maintain, but allows you to use a lot of media effectively.

■ Trickle filters need not be complicated, though they are among the most expensive units to buy.

The actual principle of trickling water through a 'dry' media is easy for the home handyman to set up. Remember though, that the water will need to be pre-filtered mechanically to remove clogging detritus.

WHAT ON EARTH IS?

A **Aeration** - is essential in most tanks, both for filter bacteria and fish (though some fish may actively dislike the resultant commotion.)
You do not put oxygen into the water by bubbling-in air bubbles - what you do do is disturb the surface, and create greater gas exchange between air and water through a larger surface area of water being in contact with the air (either at the surface or 'around' the bubbles.)

Aerobic - requiring air to create energy. Beneficial anaerobic filter bacteria require oxygen to oxidise nitrites to safer nitrates.

Adsorb - Adsorption is the process by which a substance such as charcoal binds other substances onto its internal or external surfaces - as opposed to absorption which mean soaking-up.

Ammonia - Ammonia (NH_3) is a combination of nitrogen and hydrogen which appears in your aquarium due to the decomposition of urea and protein.

C **Chlorine** - Chlorine (Cl) is a gas with pungent smell and pale yellow colour used to reduce the bacteria content of tap water. It can be removed by vigorous aeration - perhaps over a day or more - or by the use of water conditioners.

D **Detritus** - Also sometimes known as mulm, this describes the mixture of tiny waste items that gathers at the bottom and in the filters of any tank set-up.

Discus - Discus (*Symphysodon discus*) are sensitive disc-shaped cichlids from the Amazon and tributaries. Their natural habitat is in soft, low pH (6) water. This is not a fish recommended to beginners.

M **Media** - The material in your filter. It may be just a surface for bacteria or may play a more active part in filtration. Some modern media are: Resins (removal of nitrates, phosphates, softening water etc.) carbon, zeolite, filter mats, filter wool or floss, peat (acidification), ceramic media and plastic media (many types of both), sintered glass, crushed shell, foam (including foam balls, block and sheets) and of course many different types of gravel.

N **Neon Tetras** - A small Characin with very bright blue and red colouration which must only be kept in shoals and preferably in acid water.

Nitrates - The end result of the process below. Nitrates can be diluted by regular water changes, removed by bacteria or various resins. Fish build up resistance to nitrates as nitrates build-up in your tank. Beware of stocking new fish into such an environment - high nitrates may well kill them.

Nitrogen cycle - The process in which ammonia is broken down into nitrites and thence to nitrates by aerobic bacteria.

What should I start with?

The ideal filters for the beginner who aims for a simple tropical community are undergravels, an internal to suit the size of your tank, or indeed both. An internal well-maintained will tend to suck out the worst of the loose **detritus** before it clogs the undergravel.

More complicated fish may need more advanced systems. It's cost effective to have foam or box filters available as simple back-up units should you have problems, or find yourself with sick fish or fry. A foam filter plus a bucket in warm place will make a temporary home for many fish. ■

NEXT MONTH: The other essential requirements of tropical fish.

Practical Fishkeeping's A to Z OF FISH HEALTH

JERZY GAWOR continues his alphabetical advice on fish health problems.

B

Bacteria

Probably the most diverse group of living organisms on Earth, the Bacteria belong to the plant kingdom, ranking lowest in its orders of species.

As you read this article, bacteria are playing many roles in your life and in the environment. From a beneficial point of view they help your body break-down food materials, and are active in the decomposition of waste matter; on a more negative note they also cause various infections and diseases and spoil food.

• **The bacteria that are of specific interest to fishkeepers, fall into two broad categories.**
Beneficial - Those bacteria primarily involved in water purification.
Pathogenic - Those bacteria causing disease in fish.

■ **Beneficial** bacteria notably **Nitrosomonas** and **Nitrobacter** species are the 'hub' of the Nitrogen cycle responsible for conversion of fish waste - ammonia - to the least toxic nitrogen product called nitrate. This is an aerobic process, (meaning that the bacteria require oxygen).

In an aquarium or pond system containing growing fish, the ammonia excretion levels are high. Part of the job of your filtration system (commonly referred to as 'biological filtration') is to ensure that ammonia levels are kept at or near zero levels. As little as 0.01

Top: Tablet food forms one part of the balanced Diet of these Corydoras.

Right: While floating food provides much of these fish's vitamin requirements.

mg/l. (ppm) can harm and damage your fish, especially if the oxygen content is low, the temperature and pH are high, and the contact time is lengthy.

Your biological filter requires these major considerations to function efficiently each as important as the other.

a. Prior removal of suspended solids.
b. A large surface area upon which the bacteria can grow.
c. Optimum aeration.
d. Optimum contact time between bacteria and water.

a + b + c + d = 100% ammonia removal

■ **Pathogenic** bacteria cause a variety of fish diseases in ornamental aquaria and ponds. The main bacterial families affecting our aquarium and pond fish are:

Pseudomonadaceae
Vibrionaceae
Mycobacteriaceae
Cytophagaceae

Between them, these bacteria account for many losses suffered by fishkeepers. Typical symptoms of bacterial infection include reddened areas below the skin, ulcers and lesions, septicaemia, loss of tail and finnage, gill damage, protruding eyes, and damage to internal organs.

Most bacterial infections occur where conditions of poor water quality, overcrowding and stress occur. Thus the best advice is to plan your aquarium or pond system correctly **before** you begin to introduce livestock checking, and ensuring ideal parameters of water quality and low stress levels.

To treat a bacterial problem efficiently, it must be rapidly and correctly identified. When diagnosed early, treatments available from aquatic specialists should help, but you must also make all necessary improvements in aquarium or pond conditions.

More severe cases require identification of the bacterial types involved and selection of a specific antibacterial product.

Antibacterial treatments can take the form of baths, external application to affected areas, injection and oral administration via the food. Generally the latter two methods require the use of antibiotics under the guidance of a Vet.

It is important to conduct a complete course of treatment at the required dosage with these products.

KEY FACTS

- **Allow sufficient time for your beneficial bacteria to build-up in your aquarium or pond system before you begin to load with livestock.**
- **Do not allow your filtration material to clog with debris otherwise the bacterial action will be severely diminished.**
- **Always aerate your system adequately especially when keeping Marines.**
- **Use of Oxygen towers and Ozone is recommended.**
- **Check fish for obvious signs of bacterial disease before you buy them.**
- **Seek immediate guidance on sick fish and treat quickly as recommended.**

Balanced diet

Consider a fish in its native environment be it lake, river or ocean, feeding almost constantly throughout the day/night cycle (species dependant).

It is ingesting many different types of foods, living and dead, plant and animal. By the sheer variety of 'food material' it is logical to conclude that in a natural (and unpolluted) environment a fish will be gaining all the benefits of a 'balanced diet'.

It will be providing its body with a full complement of **proteins**, fats, carbohydrates, **minerals**, vitamins, trace elements and fibre, the proportions varying according to fish species and type (e.g. carnivorous, herbivorous or omnivorous).

Every nutrient that is required for energy, growth, repair, health, breeding and normal species behaviour can only be obtained from a diet that is balanced, and there are many examples of things that go wrong when even traces of certain minerals are deficient in the diet.

Most fishkeepers are content to feed their fish with one type of food, usually a flake variety.

While manufacturers go to great lengths to produce the many excellent 'artificial' diets without which the fishkeeping hobby would certainly not have developed to today's high standards, it is up to the fishkeeper to look more closely at the food requirements of his fish and provide what is necessary.

KEY FACTS

- **You will find that a variation of artificial foods will help. Feed your fish from more than one tin at a time.**
- **It is better to feed your fish several times a day with small amounts than one huge feed per day.**
- **Do not overfeed your fish.**
- **Watch your fish carefully at feeding times to ensure that they are all behaving well and that all the fish are obtaining some food.**
- **Add extra fun to your hobby and greater nutrients for your fish by hatching and growing your own Brine-shrimp.**
- **Supplementing flake and pellet foods with freeze-dried, frozen and fresh or live food will add to your fish's well-being, and generally reward you with a stronger, livelier, more colourful and more readily-bred fish.**

Bacterial infections are usually the result of poor water quality and may lead to loss of tail and finnage, along with ulcers and gill damage.

Baths (disease treatment)

While it is convenient in many cases to treat fish in the aquarium or pond, a bath immersion treatment is often more effective in certain diseases.

- **The affected fish are targeted more securately.**
- **The dosage of treatment can be increased.**
- **The duration of treatment is controlled.**
- **The delicate balance of your aquarium/pond is not affected**

Thus treatment with salt (or with freshwater for marine fish), formalin, quaternary ammonium compounds, malachite green, and antibiotics for example can be given at high dose for short duration, making them more effective against the disease organisms while offering a better safety margin to the fish through shorter contact time.

KEY FACTS

- **Always remember to use water of identical make-up and temperature when using a bath-treatment to prevent unnecessary shock.**
- **Aerate the system throughout treatment especially when used to cure gill problems or when using formalin.**
- **Transfer the fish from one system to the other as gently as possible with the minimum of stress.**
- **Time the whole operation carefully, watching the fish for signs of distress .**
- **Cover the treatment bath to prevent the fish jumping out, even if the bath is only for a minute or two.**

Bicohemical oxygen demand (BOD)

Directly linked to the oxygen concentration of your aquarium or pond water, the BOD represents the oxygen consumption by all the living organisms and biological processes within that body of water.

This is probably most relevant to those fishkeepers with a 'natural' unfiltered garden pond or aquarium, where not only the fish and

Breeding your own fish can add a new dimension to your fishkeeping Pic by Billy Whiteside

microfauna, but also the aerobic bacteria all demand their quota of oxygen to sustain life.

Oxidation of organic waste also uses up large quantities of oxygen (e.g. oxidation of hydrogen sulphide).

Ponds that have a large population of green plants (and this includes 'Pea-soup' algae) can become totally depleted of oxygen at night, especially during hot, humid weather where the oxygen carrying capacity of water is low.

Green plants use oxygen in the 'dark phase' of photosynthesis. Heavy fish losses can be experienced under such conditions and it is wise to invest in a pond-pump which will circulate much needed oxygen into the system.

The measurement of BOD is an important indication of organic pollution or overload of a system. The higher the BOD reading (on a Scale 1 - 10) the less desirable are the water conditions. The test is made by measuring dissolved oxygen in a sample of water (noting the level) and testing an identical sample for dissolved oxygen after five days. Sampling and storage methods of the water are critical.

Oxygen depletion causes fish to gulp strongly at the water surface. If the condition is not remedied rapidly total fish-kills often result. Without oxygen Biological nitration ceases leading to increase in Ammonia/Nitrite levels.

KEY FACT

- **Always ensure adequate aeration in your system.**

Breeding

Many of us have experienced the delight of finding tiny fish in our aquaria or ponds that were not there the 'night before'.

Such chance spawnings of fish, especially Tropical livebearers such as Guppies and Swordtails are extremely common.

Seeing these fish grow larger and exhibit adult colouration is the next stage of enjoyment.

Instead of waiting for chance spawnings, you can start a breeding programme with any number of different fish species. All that you require is a separate breeding tank, facilities to provide live foods of a small-enough size for the new fry, some high protein fry foods, various nets, egg disinfectants, and sundries.

Many species of tropical freshwater, marine and coldwater fish are being successfully bred by fishkeepers all over the world. Indeed many of the fish you see in your aquatic retailer's tanks have been commercially-bred for the hobby.

A good start would be to purchase *A fishkeeper's guide to Fish Breeding* by Dr Chris Andrews published by Salamander. ■

KEY FACTS

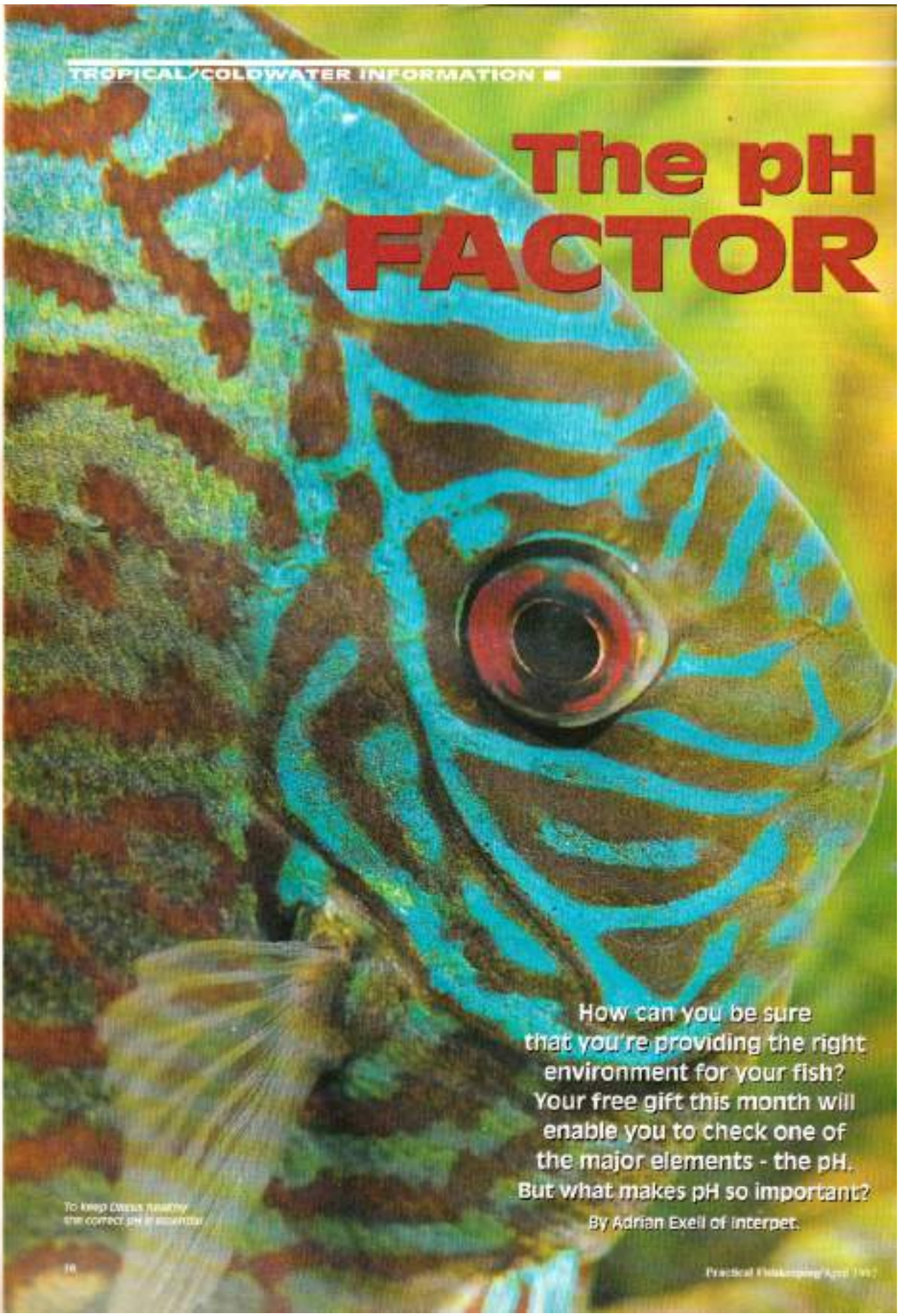
- **If at all possible select pairs that already have a track record for breeding.**
- **Often you will need to purchase several males and females, and allow natural selection and pairing to occur.**
- **Remove fish that are not playing a part in any courtship as these may be attacked by the breeding pair or indeed they themselves may cause mischief in the system.**
- **Always ensure the ideal environmental conditions for the fish you wish to breed.**
- **Separate eggs/fry from the parents if the species is known to be an egg/fry eater. Do not mistake the actions of Mouthbroaders!**
- **Ideally hatch your own brine-shrimp for feeding the fry (or rotifers if the fry are exceptionally small as in the case of many marine species).**

■ **Jerzy Gawor** is a Chartered Biologist, Member of the Institute of Biology and Member of the Institute of Fisheries Management. He has been involved in the Aquatic Industry for over fifteen years and runs his own Aquatic Consultancy Practice - **Aquality.** If you have any queries, questions or criticisms to put to Jerzy please contact him c/o **Practical Fishkeeping** enclosing an SAE. All correspondence will be answered personally.

The pH FACTOR

How can you be sure that you're providing the right environment for your fish? Your free gift this month will enable you to check one of the major elements - the pH. But what makes pH so important?

By Adrian Exell of interpet.



To keep Discus healthy the correct pH is essential

A peek into someone's kettle will reveal either a clean element or one coated with a white, chalky substance, depending on the local water type. This difference is caused by water hardness.

Water from different places varies because when it falls as rain, it comes into contact with different gases in the atmosphere and eventually different vegetation, soil and rocks. It dissolves some of these substances which become part of the water.

The important features of water for fishkeepers are the amount and type of minerals and salts dissolved in the water and the resulting pH (acidity or alkalinity).

Fishkeeping and water

The simplest way to provide your fish with the correct conditions is to find out what type of water is supplied to your tap and select fish with the requirements which match it. Alternatively, you have to adjust the features of your tapwater to the requirements of the fish you choose. Different fish species differ markedly in their ability to deal with different water types.

Rift Valley Cichlids and Marines live in huge areas of water which are very stable and not easily influenced by external changes.

Other fish live in smaller water bodies, which are influenced by heavy rainfall and drought, which considerably affect the water's characteristics and they are more tolerant

What is pH?

Simply speaking, water is classified as being either acid, neutral or alkaline. pH is measured on a scale from 0 -14, 7 being neutral, 7 -14 being progressively more alkaline and 7 -1 being progressively more acid. This scale is logarithmic, meaning a change of one unit is actually a ten times change in the acidity or alkalinity, i.e., pH 6 is ten times more acid than pH 7 and one hundred times more acid than pH 8.

Most fish live in water which varies from pH 6 to 8.7, although there are some species which live outside this range.

Water tip: In the aquarium a minimum pH of 6.5 is sensible because filters do not work as efficiently below this level.

Measuring pH

Water's pH is closely-linked to water hardness. The harder the water the more alkaline it is likely to be, up to a pH of about 8.3. This is because the most common hardness salt, calcium bicarbonate, is alkaline in nature. It is also a buffer, which means that it resists pH change.

Soft water is usually acid in nature, it has no alkaline hardness salts.

It is important to note, however, that water authorities sometimes add lime and other alkaline materials to natural soft acid water to raise the pH.

Lowering your water's pH

The process of reducing pH and hardness are closely-linked. As we saw earlier, hard water is high in the material calcium bicarbonate, which is a pH buffer, and acts against processes which try to change the pH.

You therefore have to remove this buffer before you can drop the pH. The simplest solution is a partial deioniser, a resin, through which you pass your tap water. The resin removes the calcium bicarbonate, leaving behind all the essential trace elements.

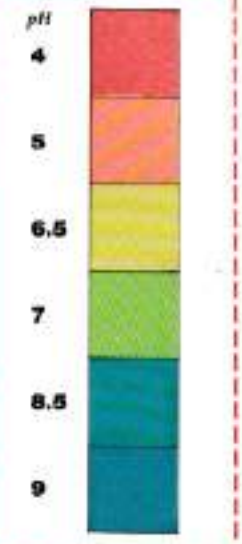
If you want an acid pH, add a pH adjuster. These slightly-raise the dissolved salt content, but offset this with a radically-improved pH stabilising effect.

Raising your water's pH

If the pH needs to be raised, then a pH adjuster should be added to achieve the required pH level. ■

■ Understanding these processes can help you prevent your pond or aquarium pH changing sufficiently to cause stress, disease, and in extreme cases death as a result of the pH level itself.

Use the free tablets on the front cover to check the pH of your pond or aquarium water. Make your comparisons with this broad range pH chart.



pH changes

Unfortunately, there are a number of processes which occur naturally in ponds and aquaria, that constantly threaten to alter the perfect pH that you have provided for your fish.

1 Carbon dioxide is added to the water by the respiration of fish, plants, and other living organisms. This forms carbonic acid and drops the pH. The carbon dioxide produced by respiration of living creatures and used by plants during the day usually only produces a relatively-small daily cycle of pH change, which is further buffered if any hardness is in the water. In general the fish can cope with this small daily cycle.

Good aeration and circulation of water in aquariums assists in the "gassing off" of the CO_2 into the atmosphere, further reducing its effect on the pH.

2 Carbon dioxide is taken out of the water by plants to photosynthesise and produce energy. This raises the pH.

3 In the late spring and early summer in ponds pH problems are common.
Very heavy algal blooms, such as green water problems in ponds, can cause massive pH rises. They do this by removing carbon dioxide from the calcium bicarbonates, thereby removing the pH resisting buffers and forming very alkaline lime water.

Algal blooms should be dealt with as quickly as possible, using a product which removes them without damaging any plants, and hence the balance of the aquarium/pond.

4 The process of breaking down toxic waste in filters causes the formation on nitrates and nitric acid, which can exhaust the pH buffer (if present), and cause sudden drops in the pH.
You can prevent this type of ultimate drop in aquarium pH, in a number of ways.

■ A simple and effective method is by maintaining a pH buffer level by adding suitable pH buffer salt to counter the acidification.

■ Water changes literally dilute the nitric acid content of the water. These are much more effective when coupled with a thorough removal of acid organic detritus from the substrate. The fresh water-change water also replenishes the aquarium's buffer levels.

■ The removal of nitrate, the end product of the filter's water processing activity, also reduces the acidification of the aquarium by literally removing nitric acid (nitrate is in fact just buffered nitric acid). This can be done very simply in a freshwater aquarium by using a nitrate absorbing resin which rapidly and safely takes up the nitrate.

■ Biological breakdown of nitrate in freshwater and marine aquaria can also be harnessed by a special systems like the Nitrex Box.

5 Calcium-rich substrates dissolve into the water increasing the hardness and buffer content to the water, and raising the pH.

In soft acid water aquariums, great care must be taken that the substrates and decorative material used are inert and do not contain lime or chalk, which will simply increase pH and hardness.

On the other hand, calcium-rich substrates and rocks (coral sand and tufa rock) will help to counter pH drops in alkaline aquaria.

The bearded catfish
(Corydoras barbatus)

This is a specialist species, best-suited to larger aquaria which should be carefully aquascaped using river sand and smooth boulders. Create a current with a powerhead or power filtration.

They can be easily spawned under the right conditions - which are neutral pH and soft to medium-hard water.

level, and/or low pH.

This condition should immediately be remedied by a series of water changes over a week to ten days - using the gravel cleaner....

The river Napo catfish
(Corydoras napoensis)

An ideal species for community tanks, which is wild-caught. It's happiest in large shoals, and will adapt to most water conditions, providing the filtration and maintainance is correct. It enjoys slightly acidic water and seems to adapt well to higher than usual temperatures.

This is one species that can be bred in the community tank, if enough plants are available for the fry to hide in.

The skunk catfish
(Corydoras arcuatus)

This is an outstandingly attractive species with strong patterning, which enjoys high-quality water chemistry, with a flow provided by powerhead or internal filter. Again, acidifying old water is not suitable.

This is a difficult fish to spawn in the aquarium, and when it spawned successfully, few eggs may be produced.

The Skunk catfish is ruined for appearance not colour

Shoaling

All Corydoras species thrive when maintained in shoals - better still in species groups - although various species can be kept together as one main shoal.

Species shoals ensure males and females develop together making spawning more feasible at a future date.

Some species can be extremely difficult to spawn - but keeping large species groups together until they are sexually mature can help.

Breeding Corydoras

Although a great many Corydoras species will spawn in situ, the chances of hatching and raising fry are always enhanced if the breeding pair are spawned in isolation in a specially-established aquarium.

Cooler fresh water changes usually trigger pairs into a spawning sequence (which can last a whole day) with their signals to the natural breeding clock.

Eggs which are deposited onto plants or the aquarium glass can easily be transferred into a breeding net (the type used for holding pregnant livebearers) until they hatch.

Feed them on infusoria and powdered flake until they are large enough to be allowed to join the adults - at about 6mm. Small as they are, they can safely be released to shoal with most adult species.

The River Napo catfish

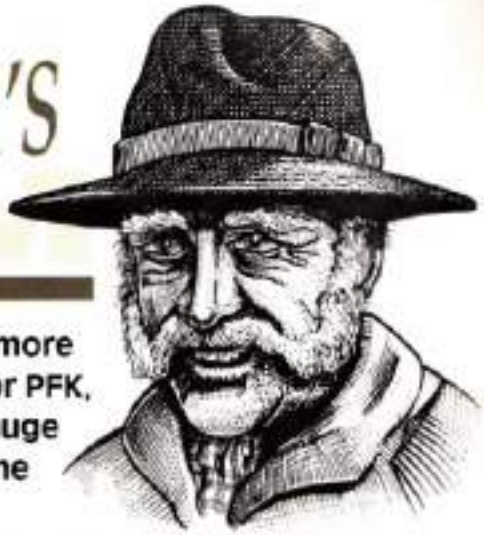
The pigmy catfish
(Corydoras pygmaeus)

This dwarf species is perfect for well-planted aquaria. It should be kept in shoals for the best effect as it is a mid-water swimmer. Easy to spawn in a planted tank, and fry can be brought on with adults.

The peppered catfish
(Corydoras paleatus)

The Peppered Cat is farm-raised in large quantities and widely available. It's very hardy and adaptable to a wide range of water conditions. ■

OLD FISHFINGER'S FORUM



Old Fishfinger has been keeping fish for more than ninety years. He writes exclusively for PFK, and welcomes the chance to share his huge experience with PFK readers. If only the Editor felt the same.....

Dear Old Fishfinger, I've heard that Mollies and other fish benefit from a vegetarian diet. Have you any advice about feeding cucumber?
P. Thrower, Kew.

In my enormous experience, you can't beat liquid manure three times a week Mr Thrower. **O.F.**

Dear Old Fishfinger, I'd like some advice about breeding with Groupers.
B. Wyman, Surrey

I'm somewhat surprised to get asked this question by a youngster, Mr Wyman. In my youth I was constantly pursued by fishkeeping groupers. Though some of them were charming young ladies, I always managed to avoid breeding with them (as you so courteously put it) and I advise you do the same. **O.F.**

Old Fishfinger is a regular visitor to the *PFK* offices, from which he occasionally manages to sneak away with a few reader's queries. He is happy to receive fan mail at the following address:

Old Fishfinger, C/O The Editor, Practical Fishkeeping, Bretton Court, Bretton, Peterborough.

● Please do not enclose an SAE for a reply as Old Fishfinger's handwriting is totally illegible.

Dear Old Fishfinger, I have a Perruno called Frank - can you tell me more about him?
Harry Carpenter, Albert Hall

Well Harry, he's a good strong lad, moves well about the tank, eats Dutchmen for breakfast. It's best to wear gloves when dealing with this one, but don't make a pantomime of it - y'know what I mean? **O. F.**

Dear Old Fishfinger, Can you give me some help with keeping Kribs?
D. Unce, Eton

While I can't condone this sort of cheating Mr Unce, I have found two very good methods are tucking them down your sock or writing them on your shirt cuff. **O.F.**

Dear Old Fishfinger, I'm having trouble with the media in my pond filter. Have you any suggestions?
L. Taylor, Burton on Trent.

I can sympathise with your problem Ms. Taylor. Since my dramatic arrival on the fishkeeping scene, I have been constantly troubled by reporters hiding in my filter, dustbins, and under the coal in my bath, all seeking to catch me with a fishkeeping grouper. My advice is ignore the media and say nothing. **O.F.**

Dear Old Fishfinger, I'm delighted to see you've emerged from hiding. Now I've found you, I'd like to have back the creatures you took from my invert tank for treatment in 1988.
D.R. Finlay, Tannoch Bray

How nice to hear from you Mr Finlay, and here's the sick squid I owe you. **O.F.**

Dear Old Fishfinger, My Royal Grammas are off-colour - please advise.
Name and address supplied.

I'm honoured to get your letter, your Highness (or may I call you Harry?) but you fail to say which of Her Majesty's fish are off-colour. Please write again. **O.F.**

Dear Old Fishfinger, I run six tanks at my home containing bread and butter and specialist fish. I keep and breed Discus, Uaru, Rams, Mbuna, various marines including sharks and octopus, and I regularly breed sea horses.

My best Koi, bought at 2" are now worth thousands of pounds.

My question is, how can I have problems like other fishkeepers?
Worried of Worthing

Well, Mr Worried, I always feel that following the advice in my column will answer all your questions. **O.F.**

MICHAEL ROBSON can't resist the new catfish that appear on the market. Here's how he keeps three of his favourites - plus the cat-like Myxocyprinus.

Up and C CATS

If your particular interest in the aquatics hobby is catfish then you have had a bumper year, for over the last twelve months various different catfish especially Corydoras and Plecs have been appearing, that are both new to the hobby and beautiful.

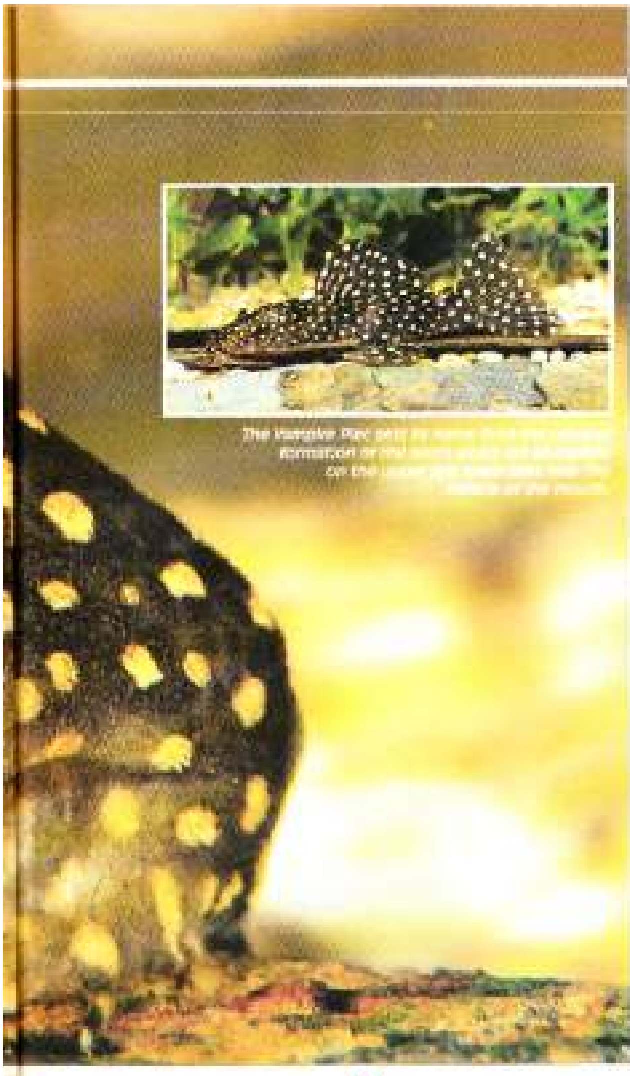
I am one of the lucky ones whose interest is in catfish, particularly those of South America. As the newer varieties of catfish have appeared in my local aquatic outlet, I have been purchasing them. Here's a little of what I've learnt about them.

Vampire Pleco

The Vampire Pleco is another one new to the hobby. I am not sure which part of South America this comes from but I suspect that this species comes from Brazil.

The body shape of this fish is very similar to that of *Leporacanthicus galaxis*, though the body colour is not as black as that of the Galaxis, it is more of a brown/black colour with both round spots and the odd elongated white blotch.

As with the Galaxis I suspect that this fish will grow quite large. The fish gets its name from the unusual formation of the teeth which are elongated on the upper



The Vampire Plec [illegible] formation [illegible] on the upper [illegible] of the mouth.

coming

and lower jaws near the middle of the mouth.

He is housed in a 42" aquarium along with some *Leporinus fasciatus* and *Corydoras reticulatus*, *lamy* and *sodalis*. It pays no attention to any of its tank mates. This fish is not very active during the day as are most Plecs, but again does venture over the whole aquarium at night.

■ CHECKLIST

Diet: As above
Temperature: 84° F/29°C.
pH: As above
Filtration: Bio-Foam 200 with four foam elements and a Fluval 4
Decor: The tank bottom is covered with gravel, with a large piece of bogwood in the corner.
Maintenance: As Emperor Peckoltia

Emperor Peckoltia

This fish has now been imported for over two years and when first appeared its price was in the second-mortgage league, but now has dropped considerably and can be picked up for between £30-£50.

I understand that it is collected in Brazil. It is black and white in colour, with alternating stripes, and over this has a beautiful blue sheen.

When first purchased my specimen hardly ventured out of its hidey-hole, a flowerpot, but after a year it can be seen hopping out of its hideout at most times of the day - particularly at feeding times.

It is housed in a 48" aquarium along with some Keyhole Cichlids (*Aequidens maroni*), some *Rineloricaria lanceolata* and an assortment of Corydoras.

It does not appear to be particularly aggressive but will chase off any fish that enter the territory surrounding its flowerpot. It hops alongside them and with fins erect, displays and slowly nudges the fish out.

It pays particular attention to the Corydoras that share its colour pattern like the *Corydoras sterbai*, *haraldschultzi* and *robinae*, but none of the confrontations are violent.

When I purchased the Emperor ▶

Bogwood, algae and the catfish diet

All the aquariums house bogwood with the Plecs, as they all graze on the wood, and it does seem to constitute an important part of their diet. Although none of the aquariums used are lit, rocks are placed in them which have a generous growth of algae on them, and are changed once the algae has gone through constant grazing. These rocks are covered in algae after being in a small tank under an ordinary 60 watt bulb and not containing fish.

In all the tanks where my fish are housed a small terracotta saucer is placed on to the bottom where the food is placed, this does help when it comes to cleaning the uneaten food off the aquarium bottom.

The Emperor Peckoltia does not appear to be particularly aggressive but will chase off any fish that enter the territory surrounding its flowerpot. It hops alongside them and with fins erect, displays and slowly nudges the fish out.

◀ tank or larger; you might just about scrape by with a 48", but this is not really recommended.

Decor and substrate

Ordinary aquarium gravel will be suitable for the substrate; if you fit a gravel tidy then allow some scope for digging, ie don't put it too near the surface of the gravel, as pits will be required as nurseries for the fry.

You should make several large caves out of well-bedded rocks, and/or well-weathered bogwood if you prefer.

Planting

Bearing in mind that this fish consumes large amounts of vegetation in the wild, you must reconcile yourself to a planless tank, unless you like the plastic variety.

You could, if you wish, try Java Fern, which is rather too woody for the tastes of many species - but if you want a good covering you will need to let it establish for a few months - or else you can cheat and use Java Fern-covered rocks/bogwood from another tank.

If you have a supply of Duckweed - or Indian Fern, which grows almost as fast as Duckweed in my tanks - you can use this to advantage, as it will supply relatively-natural vegetable food and cut, unlike plants which need to be rooted to thrive, be easily replaced.

Lighting and water movement

It is important, as with any fish, to consider special factors in its natural habitat. A fish that comes from slow-moving often murky waters is unlikely to appreciate bright lighting or turbulent filtration. So a single fluorescent tube will be adequate, and if you have used floating plants, so much the better.

Undergravel filtration driven by a sensible amount of air, or by low-powered powerheads, is ideal; if power filtration is used then try to avoid turning the tank into a simulation of a surf zone!

Water conditions

Natural water conditions - moderately hard and alkaline - should be simulated if possible, but these fish are quite tolerant as long as extremes of pH are avoided. The temperature should be in the 77-80°F range for general maintenance, raised by a degree or so to promote spawning when the fish are ripe - assuming any trigger is needed. Once the tank is up and running water quality should be maintained by regular partial water changes of 20-30% each week.

Pairing off and breeding behaviour

If a natural pair has formed it is probably best to transfer just these two fish to their new quarters; or else you can move the fish when smaller and let them pair off in their new home, removing the surplus individuals before the spawning pair try to do it for you.

The first signs of breeding will probably involve some serious digging activity, often round the bases of the rocks. Eventually one rock or other surface will find favour with both prospective parents, and this will be cleaned as a spawning site. Depending on the size of the female up to 500 eggs may be laid.

These are tended by both parents and hatch after about three days at a temperature of 80-82°F.

Fry care - feeding and culling

They are then moved to a large pit, usually close to the spawning site, where they take a further 6-7 days to become free-swimming. They may be moved from this pit to others during the wriggler stage, or once they are free-swimming, and the parents will go for a further 6-8 weeks before considering another family.

Obviously it is impracticable for the average hobbyist, however enthusiastic, to rear several thousand fry, and in any case this would be undesirable from the quality point of view.

Probably the best course is to remove part of the brood and rear these separately, culling meticulously to produce 50-100 top-class fry for sale. The rest can be left with the parents, who will probably eat them when they're ready to spawn again. This relieves the fishkeeper of the task of despatching them, and recycles the protein back to the parents.

Artemia nauplii, microworm, and sifted pond foods are suitable first foods for the fry, allowing them to graduate onto larger foods as appropriate. In the case of the fry remaining with the parents this may be particles of the adult's food. Those reared separately should be fed as growth dictates. Incidentally, the parents are quite likely to attack your intruding hand at this stage, so mind your fingers when feeding or carrying out essential maintenance. ■

Cichlasoma confusion

Cichlasomaniacs are all too familiar with the current confused taxonomy of their favourites, but for the uninitiated I had better explain the basic situation - even if you find taxonomy boring you may find this helpful in understanding the names currently applied to these fish.

At the beginning of this century **Dr Charles Tate Regan** revised the Neotropical cichlid genera, turning his attention to *Cichlasoma* in 1905. He subdivided this very large genus into several "sections", each of which contained species which were similar to each other and probably closely related - though there are a few species which, in typical cichlid fashion, don't seem to fit properly anywhere.

● Things remained thus for nearly 80 years, and although it became generally recognised that the genus needed to be split-up into several smaller ones, the amount of work required was such as to make the task an almost-impossible proposition, at least for a single revision.

In 1983 **Dr Sven Kullander** took the first steps by restricting the genus to South American species; unfortunately until such time as further revisions are made this leaves the rest of the species in a sort of "taxonomic limbo".

The previous generic name for many of them, *Heros*, was at the same time restricted to our old friend the *Severum*, so that cannot be used.

This is why we now put "*Cichlasoma*" in inverted commas - we have to call these fish something, and the parentheses indicate that the name we are using is not a correct scientific one.

Therapis is the Regan "Section" to which "*C.*" *synspilum* belongs, and eventually this will probably be recognised as a separate genus in its own right, possibly with a different name.

Other members of the section are "*C.*" *melanurum*, "*C.*" *maculicauda*, "*C.*" *hartwigi*, and "*C.*" *bifasciatum*, as well as several others.

● As if confusion regarding genus were not enough, "*C.*" *synspilum* has also had its validity as a separate species questioned. It was originally described in 1935, but later thought to be a form of "*C.*" *melanurum*.

The problem is that its counts and measurements are almost the same as those of *melanurum*, and, as taxonomists (at least until recently) worked only on dead, usually discoloured preserved specimens, it was counts and measurements that were the critical factors.

Over the past few years, however, live colouration has become an important criterion in taxonomy, and as *synspilum* differs markedly from *melanurum* in this respect, and has a different distribution, it is now once again generally considered a separate species, albeit probably very closely-related.

As is often the case, science has simply caught up with the hobbyist on this point, as *synspilum* is quite obviously different from *melanurum*, and from other Therapis, when you see one swimming round your tank, especially when it is an adult in full colour.

The incredible red head distinguishes it from all of them except "*C.*" *festae*tum, and these too are easily differentiated as *festae*tum has horizontal bars on the head, a longitudinal band, and a series of vertical bars on the body.

As can be seen from the photo, in *synspilum* much of the rest of the body may also be reddish copper-gold, with rather irregular black patches and bluish areas, particularly on the belly and fins. The eye is a beautiful turquoise blue.

Females are just as colourful as males, and it is hopeless to try to sex this fish on the basis of colour.

■ **Taxonomy** The science of the classification of living and extinct organisms.

■ As you will have realised by now this is not a fish for the person with a small community tank, but as long as you are prepared to provide it with the correct conditions, it is perfectly feasible for the novice to keep and breed the fish successfully. Like other large cichlids they are likely to become family pets. So, if you have room for a large tank why not give them a try?

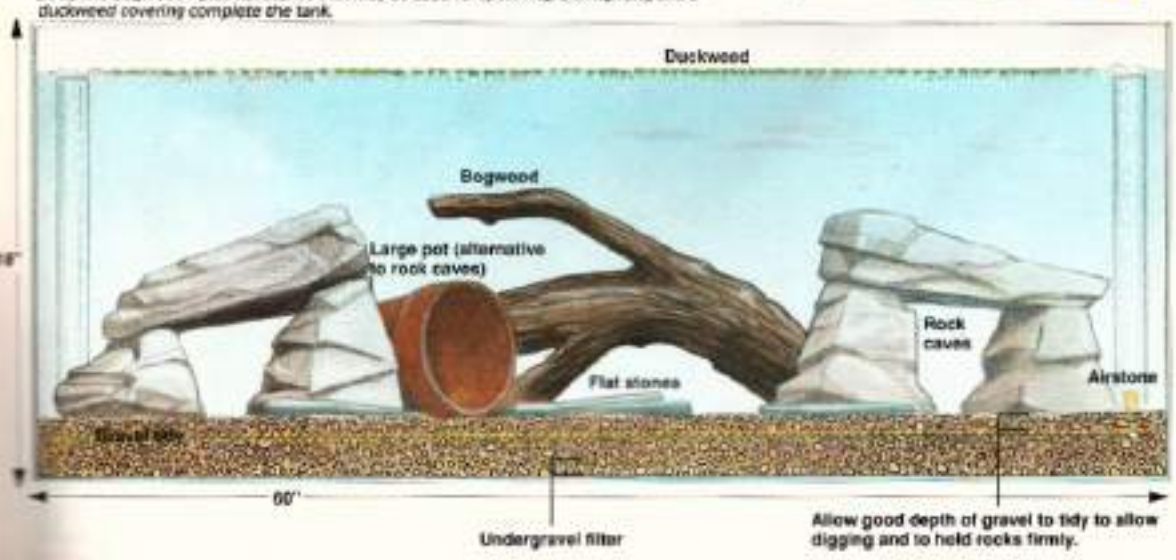
Left: The "hump" is more pronounced on the male fish.

Above: Glorious colours.

Right: The less-pronounced hump of a female Quetzal.

■ There is a BCA Information Pamphlet on this species; price 50p plus SAE from the BCA (PFK), 7 Dellamere Avenue, Sale, Cheshire.

The Quetzal really requires a five foot tank, ideally it should have plenty of hiding places - rocks, pots, and bogwood - plus flat stones that may be used for spawning. Dim lighting and a duckweed covering complete the tank.



The Orange Chromide Etroplus maculatus (this is a "man-made" red version) is a cichlid from India and Sri Lanka where it lives in the estuaries. It needs two teaspoons of salt to every 2½ gallons. All pictures by Max Gibbs, The Goldfish Bowl, Watford.

SALT

is the spice of life

The mixture of environments in the coastal areas of the World has led to a rich variety of life. But as Dr. DAVID FORD of 'Aquarian' points out, few of the many available fish have found their way into the hobbyist's tank.

Articles and books on brackish water fishkeeping are few and far between. This is because it is considered such a minor part of the hobby, with just couple of species available Mollies and Scats. The true facts are very different.

The choice and variety for the semi-salt aquarium is vast and fascinating. It is one section of the hobby that will have to be market-driven. When there is a demand for brackish fish the trade will stock them. So, what are the choices?

Estuarine fish

There are hundreds of species of fish that can be called "brackish" because they live where two water worlds meet - the estuaries. The three major types of estuaries are:

Coastal Plain

During the last ice age the lowering of the seas allowed rivers to deepen their valleys and the modern seas have invaded these valleys to give flooded plains of brackish water.

Fjords

Where the valleys are deeply cut into rock, the invading seas have produced the fjords.

Bar-built

These are the most interesting to fishkeepers because they occur mainly in tropical areas where rivers give high rates of sediment accumulations trapping pools and lakes of brackish water.

Estuarine waters are classed by geologists into another three types:

Salt-wedge

Here the waters are mainly sea with freshwater flowing over the top. Both types of water and a brackish mixture can ebb and flow together. The best example is the Mississippi delta.

Fjord type

The inflow of seawater here is so deep that the overlying freshwater traps the deep waters making them sometimes anoxic (totally lacking oxygen). There are few examples of brackish fish for the hobbyist here.

Mixed

The classic brackish water system where oscillation of the neap and spring tides gives "tidal prisms" of mixed waters and mixing of the flora and fauna that live in each world.

Such a rich source of food gives an ecosystem almost as diverse as the Coral Seas. It is often a nursery for fish species that normally live in the separate worlds of freshwater rivers or the sea.

Stormy romance?

My tank holds Oscars, an Upside-Down Catfish and a 4" Red-Tailed Shark.

About a month ago, the Oscars started going off their food, except for the occasional earthworm. They have begun to show aggression to each other. They square up to each other, with their noses almost touching and their mouths wide open in a threatening attitude. They back off six inches and then charge like two bulls, with the female grasping the male by the bottom lip for a few seconds before he escapes. They may continue this for up to five minutes. Afterwards they appear to be the best of friends again. Is this a mating ritual or do I have a pair of schizos in the tank? Your comments would be much appreciated.
R. Jeffery, Dorset

Oscars can be quite aggressive. I have seen them jaw-lock with quite a few other species of fish, as well as other Oscars.

They do have an inbuilt desire to lay down dominance over one another. The loser will go and hide, but the next minute they will be as "chummy" as ever.

Given optimum conditions, Oscars will breed in captivity, but sexing is difficult. Are you sure you have a pair? **PD**

Which catfish?

My four foot tank contains a mixture of cichlids; a pair of Synodontis eupterus, a Whiptail and two Plecs. I would like to add another catfish. Please could you advise me on what to buy? I can afford something in the region of £80. Please could you also give me a little information on the S. eupterus?
James Smith, Leics.

Synodontis eupterus, the Feather Fin catfish, grows to 6", eats chopped worms, shrimps and bloodworm and enjoys a good quality flaked food. I would advise that you look at smaller robust African species such as S. alphivorus and Mochokiella paynei.

There is also a rare Synodontis species, called Robert's catfish, Synodontis robertsi, which would be within your price range. **DS**

Wooden cat

Q **I have just bought a Wood catfish, but I cannot find any information on it and since I introduced it to my tank, I've never seen it. Please could you give me some information on this species?**
• Lee Cant, Kent

A The fish which is usually sold as a wood cat is *Parauchenipterus galeatus*. This catfish is widespread in South America, being found in many of the Amazonian waterways. Its colouration - light brown with dark brown/black irregular flecks and blotches, make it look like a piece of wood, hence its common name. It hides in crevices in fallen logs and among roots by day and it is an active nocturnal hunter. It may reach 200mm in length and should be kept with similar sized companions. Its diet consists of small fish and shrimps. **GS**

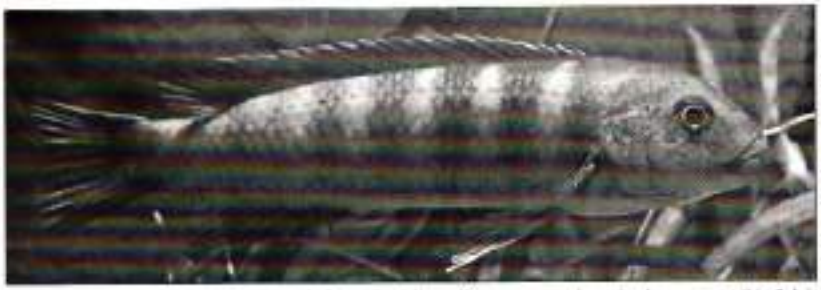
Oscars are notoriously messy feeders and require excellent filtration.

A touch too much

Q **In my four foot tank I have two Oscars, two Tinfoil barbs and a Sailfin Plec. Is my tank overstocked? I ask this because my water is never clean. My Oscars are spending a lot of time moping on the bottom of the tank.**
• M. Castick, Bury

A Your aquarium is certainly overcrowded. You have fish which are notorious for making the water dirty, so must either have a greater volume - a bigger tank - or a better filtration system. Otherwise you will need to separate the fish.

Not only is the water cloudy from dirt, but the fish will be excreting ammonia which is poisoning them. Always remember that fish have to swim in their own "loo". That's why your Oscars are moping. **DF**



Don't confuse P. elongatus (shown here) with P. ornatus. The latter is a peaceful fish, whereas elongatus is a real killer.

Over-crowding needs good maintenance

Q **Could you please give me some advice on how to set up a Mbuna community? I have a 48" x 15" x 24" tank powered by a Fluval 303 external filter. Is this the type of filtration you would recommend?**

Are there any fish I should avoid?
• David Welton, Coventry

A Mbuna have a basic requirement for moderately hard, alkaline water which should be extremely clean and well-oxygenated. In addition the fish belonging to this group require huge amounts of rockwork, arranged to produce numerous caves to simulate their natural habitat. They thrive on what would normally be regarded as over-crowding, as this reduces the potential for territoriality and hence aggression. Because they are mouthbrooders it does not matter if a male holds only a small or temporary territory, as the eggs are safe in the female's mouth.

With an overcrowded tank and fish which require very pure water, it is obvious that maintenance is very important. Your filter is fairly powerful and should be up to the job, but I must admit that I personally prefer undergravel filtration for almost all purposes.

Water changes should be around 30% per week.

Most Mbuna species are compatible, but there are a few points to watch out for.

The longitudinally-banded *Melanochromis* react very strongly to other fish with the same pattern and are very hard on their females. So stick to a single species from this group and a single male with 3-4 females if possible.

Avoid the "true" *Pseudotropheus elongatus*, as this fish is a real killer. Don't confuse it with *P. ornatus*, which is small and peaceful. These two species are often confused, but are easily distinguished - ornatus has bars on the snout, elongatus doesn't.

In smaller tanks avoid the larger species, such as *Labeotropheus fuelleborni*, or *Petrotilapia*, but this should not apply to you, as your tank is a good size.

Some fishkeepers make the mistake of mixing other types of Malawis (usually *Aulonocarat* and *Cyrtocara moorii*) with Mbuna. This can be done successfully, but requires a tank large enough to provide open habitat for the other fish (as well as the rocks for the Mbuna) and that the Mbuna do not outnumber the others - Mbuna are far more boisterous and a small number of *Aulonocarus* in a predominantly Mbuna tank tend to be scared all the time, even though rarely actually attacked. **MB**

Get the water right

Q **I want to set up a four foot tank for Dwarf Cichlids. I would like to decorate it with bogwood and Java Fern. I'd welcome any information you can give me. The water in my area is fairly hard.**
• D. Hubble, W. Midlands

A Unless you can soften your water, I'm afraid you are going to be very limited on your choice of fish, as most Dwarfs require soft water with an acid pH. You should stick to Kribs, *Nannacara*, *A. cacatuoides* and *A. steindachneri*. You could also try *A. borelli* (which is usually sold as *reitzigi*.)

If you can soften your water then it will be easy enough to acidify it using peat filtration; if you don't soften your water then the dissolved salts will buffer it back to neutral/alkaline as fast as you try to acidify it.

You must not fall into the common error of trying to fill your tank with Dwarfs using the usual inches of fish/surface area criterion.

With any cichlids it is territorial requirements that are the limiting factor and even though it is a good size it will not hold more than three pairs of Dwarfs (or trios if you go for *Apistogrammas*). You can fill it up with Tetras and other small community fish to act as dither fish and bring the cichlids out of hiding.

Remember that Dwarfs like small caves and from my experience I question whether you can create these with bogwood. Perhaps you should conceal some small flowerpots under the wood. I'd also use more in the plant line than Java Moss. The odd large smooth stone and clumps of plants - including Java Fern which is indestructible and will grow on the bogwood - will give you a more varied effect. **MB**

No shells

Q **I have a four foot Tanganyikan tank with undergravel filtration through coral sand and limestone as decoration. In the tank I have a newly acquired pair of *Lamprologus brichardi* and a pair of *Neolamprologus multifasciatus*. Over the eighteen months I have had the *multifasciatus* they have showed signs of wanting to breed but have failed to do so. The *Brichardi* have just bred for the first time and have a healthy brood of 20 or so fry.**

What should I do with the *multifasciatus* - should I obtain a second female, or swap the existing female with another one?

Don't add more rockdwellers if your L. brichardi are breeding.

Would the addition of a pair of *Lamprologus lelaupi* impare the breeding of the *brichardi*?

If I decide to remove all the fish but the *brichardi*, how many resultant pairs of offspring should I allow to breed in the same tank as the parents?
• A. Miller, Surrey

A Nowhere do you mention having any shells for your *multifasciatus*. If you don't have any, then this is almost certainly the reason for your breeding failure. I suggest you visit your local "Deli" which should be able to sell you the type that come with edible snails!

I will have to take your word for it that they are a pair - but I wonder how you are so sure, as it isn't all that easy to sex these fish.

It would be extremely rash to add a pair of *lelaupi* to a tank in which you have *brichardi* breeding. It would be an expensive way of obtaining corpses. The only safe way to do it would be to remove all the fry, totally re-arrange the tank and, effectively, start up again. You would probably be alright to another shell-dweller, providing you add plenty of shells. But another rockdweller, would be competition for the *brichardi*.

The decision as to how many fry the *brichardi* would allow to grow on to adulthood is in their hands, not yours. Some pairs will not tolerate any other adults, others will tolerate another pair, or maybe even two pairs.

I would leave half a dozen fry once they get to 1". These should be able to find nooks and crannies in which they will be safe. In my long experience of this species, I have noticed that as long as you have only a few juveniles over 1", these seem to stop growing at around 1.25", until an adult dies, whereupon a young fish will fill the gap and grow on to adult size at a remarkable rate.

If you leave too many fry then there are likely to be losses, as they will scrap among themselves. **MB**

Large tank required

Q **I am going to set up a two foot tank. Would it be suitable to keep a *Leiarius picus* in? Please could you tell me what size this fish grows to and whether it should be kept on its own or in a shoal.**
• Mark Wells, East Sussex

A *Leiarius picus* is a very large South American Pimelodid which may reach 600mm in length. It has exceptionally long barbels and, when kept in confined spaces where it cannot move these appendages freely, it will often take fright and dash around the aquarium, causing considerable damage not only to the tank decor, but to itself. In extreme cases the fish has been known to leap from the tank.

A 60cm tank would be too small. The minimum size for a small specimen would be 120cm with a fully grown fish requiring an aquarium of some 2.5m x 75cm x 75cm or more, plus a suitable filtration system.

This fish should be kept on its own, or if enough accomodation and filtration can be provided, with large fish such as *Mylossoma* sp.

Its diet is varied, but it is predominantly a predator, so food should consist of fish, earthworms and so on, supplemented with pellet foods and fruit. **CS**

Plec is at fault

I would be pleased if you could advise me on my plants, especially the Amazon swords. They keep tumbling lace-like and the green colour fades leaving lace-like veins. Some of the leaves turn yellowy-brown and I wonder if it is through lack of food.

The tank contains a mixture of community fish and a Plec which keeps the tank very clean.

The tank gets plenty of natural light during daytime hours plus natural sunshine.
J. Stanley, London

The Plec is certainly partly to blame for the decline of your Amazon Sword plants. His main diet is plant food and many Plecs are very partial to Amazon Swords, which they can turn overnight into a Madagascar Lace Plant.

Your main problem, however, is that your plants generally are dying of starvation. The fading colours and yellowish transparent appearance are clear indications of iron chlorosis caused by deficiencies in iron and trace elements.

Your plants also have a deficiency in CO_2 and light. Plants need to photosynthesise in order to grow. Natural daylight is not enough to allow for this process. **BG**

Tips on backdrops

I have a six foot long tank which houses a Giant Gourami.

I am wondering how I can decorate the tank without using up too much space. I don't like the look of the printed backgrounds as they look false. Have you any ideas?
B. Beattie

Instead of having a printed background you can leave the glass clear, but mount plastic plants on a shelf or plinth fixed behind the aquarium. Seen through the water the scene can look very dramatic and gives the impression of great depth to the water volume.

The cheap polythene tubs for window gardening can be used internally. Hide it by smearing silicone sealer all over and adding gravel in a pebble-dash way. Fill with loam and add real plants, topping with gravel. Lower it into the back of the six foot tank to give a backdrop of aquatic plants, but has open space at the middle and front. **DF**

Choosing ar

Tips from professional lily grower HARRY HOOPER.

Top: Glorious pure white Nymphaea virginalis.

Right: *All planting baskets with heavy garden soil, or aquatic compost, spiced with a little well-rotted cow manure or bonemeal hoof and horn. Ensure the crown just protrudes above the growing medium. Top with pea gravel.*

Below: Nymphaea *Norma Gray*. Bottom right the delicate *N. Maurice Laydeker*.

Pond keepers are extremely fortunate to have a vast selection of waterlilies to choose from, available in many shades of colour.

Another bonus is that, depending on variety, they are suitable for growing in various depths of water.

Some varieties of waterlilies are fairly new to cultivation whereas the majority of well known cultivars date back years. Of all the aquatic plants the water lily is undoubtedly the most beautiful, therefore when selecting lilies, never buy the first one that takes your eye.

d planting lilies

Tips for choosing the right lily

■ **Size:** Always make absolutely sure that the variety you prefer will suit the size of your pond.

For example if you favoured a red variety and were taken by *Nymphaea Escarbouicle*, you would find this is a large variety. *Nymphaea* William Falconer, a medium grower, would be a better choice for the average pond.

■ **Depth:** Most reputable aquatic plant suppliers display charts offering information relating to the depth of water required for planting the different varieties of waterlilies. This might be:
V = vigorous 36" - 48" deep.
Med = medium 18" - 24" deep.
Sm. = small 9" - 12" deep.
T = tiny 6" deep (for the *pygmea* varieties).

■ **Health:** When purchasing lilies it is important to select healthy well-grown stock. You should not be tempted by the price alone as well-chosen lilies will give you many years of pleasure.

It's preferable to obtain pot-grown plants, making absolutely sure they are well-rooted, and at the same time it pays to inspect for any visible signs of disease or disorders.

■ **Mail order:** Alternatively you may decide to order your lilies via mail order. The plants will normally be sent bare-rooted. It is advisable to float them as soon as they arrive in a bucket of water until you are ready to plant them.

Buying bare-rooted plants should be limited to the early part of the season to ensure that they have enough time to produce fresh roots and become established during the summer months.

Planting

If you do purchase bare root plants, it is important when planting to secure the rhizome of the plant to the planting container, easily done with a piece of string.

This will prevent any risk of the plant floating out before fresh roots have started to develop. This obviously does not occur with well-grown potted plants.

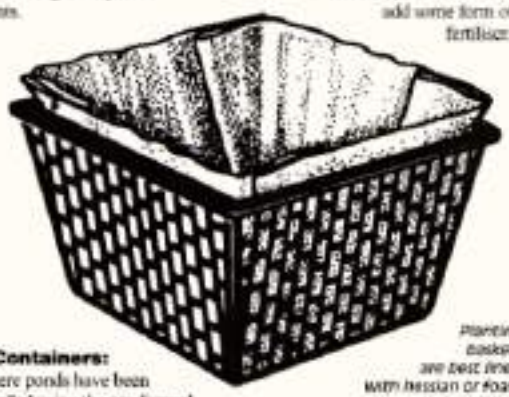
■ **Containers:** Where ponds have been installed using the pre-formed type of pool or the use of a flexible liner, the easiest and most convenient way to plant waterlilies is to use the specially designed baskets made of strong plastic.

With most designs of planting baskets, a hessian or foam liner is required to retain the compost when it is eventually placed in the pond.

■ **Soil:** The favourite growing medium for waterlilies is heavy garden soil that has not been in contact with insecticides or weed killers. The majority of water garden centres stock various brands of aquatic plant compost.

Under no circumstances use the peat-based seed or potting compost formulated for the growing of bedding and pot plants.

■ **Fertiliser:** When planting your waterlilies, it is beneficial to add some form of fertiliser.



Planting baskets are best lined with hessian or foam before filling

The old traditional method using well- rotted cow manure is as good as any.

Alternatively you can use a handful of bonemeal or hoof and horn mixed with the soil. Aquatic plant fertilisers are available in either tablet, granular or sachet form, they all work quite well, so it's just a matter of personal preference or availability.

When planting ensure that the crown (growing tip) is protruding above the growing medium.

The final job is to place a layer of pea shingle over the soil to prevent the fish from disturbing the plant or soil.

Before placing the planted lily into the pond it is best to saturate the growing medium using a watering can with a fine rose to settle the soil around the plant.

Planting lilies in natural or earth bottom ponds

Here there's no need for any form of container. The best and simplest method is to wrap the root stock of the lily in a square of sacking, filled with heavy loam, leaving the crown protruding.

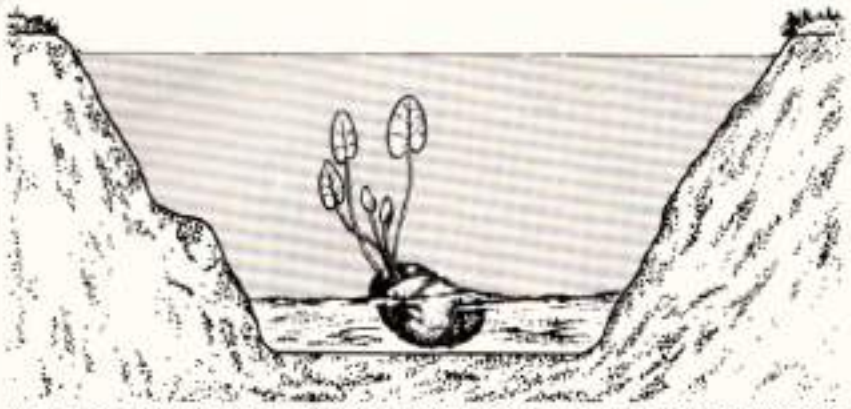
Tie securely with string around the sacking and place on the bottom of the pond. The lily will eventually grow naturally.

By still waters

Waterlilies should never be positioned near waterfalls or fountains as they prefer fairly static water.

Flowers produced by waterlilies will not open properly if subjected to a continuous spray of water. ■

◆ HARRY HOOPER is Secretary of the U.K. Branch of the I.W.L.S. He will be pleased to forward information on the society to potential members. Write to Harry Hooper, Mill Lane Nursery and Water Gardens, Mill Lane, Bradfield, Manningtree, Essex. CO11 2QP. Please enclose an SAE.



When lilies are planted in natural or earth bottomed pools, wrap the lily rhizome in a hessian square containing garden soil and tie up with string. It's important to choose a variety that will grow tall enough to reach the surface as you cannot raise such plants on bricks.

PFK PROJECTS

NUMBER ONE FOR

Build you

AUDREY REID went to find out how to do it...

That larger or extra fish tank may seem like an unaffordable luxury, especially in these recession-hit times. But is it viable to make your own and will you save any money?

I asked Malcolm Hendry, who has built more than 12,000 aquariums in all shapes and sizes.

He has compiled a set of seven easy-to-follow steps to construct your own tank.

He feels most people, given the correct materials and tools, can build their own all glass aquarium following his plan.

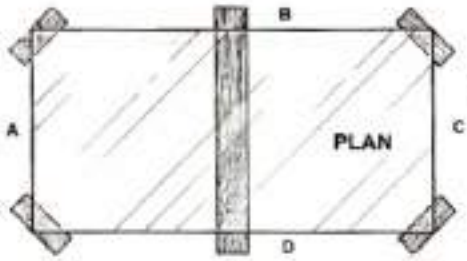
What about the cost? Buying new glass and having it cut to size can be prohibitively expensive for the home tank builder.

The majority of glaziers and glass merchants find themselves from time to time with either 'salvage' plate glass from broken shop windows or 'off cuts' from new shop windows, explained Malcolm. Most will be only too happy to supply the aspiring builder with the glass he requires.

So, having decided on the size of the aquarium you wish to build, head for your local glass merchant with the panel sizes you need.

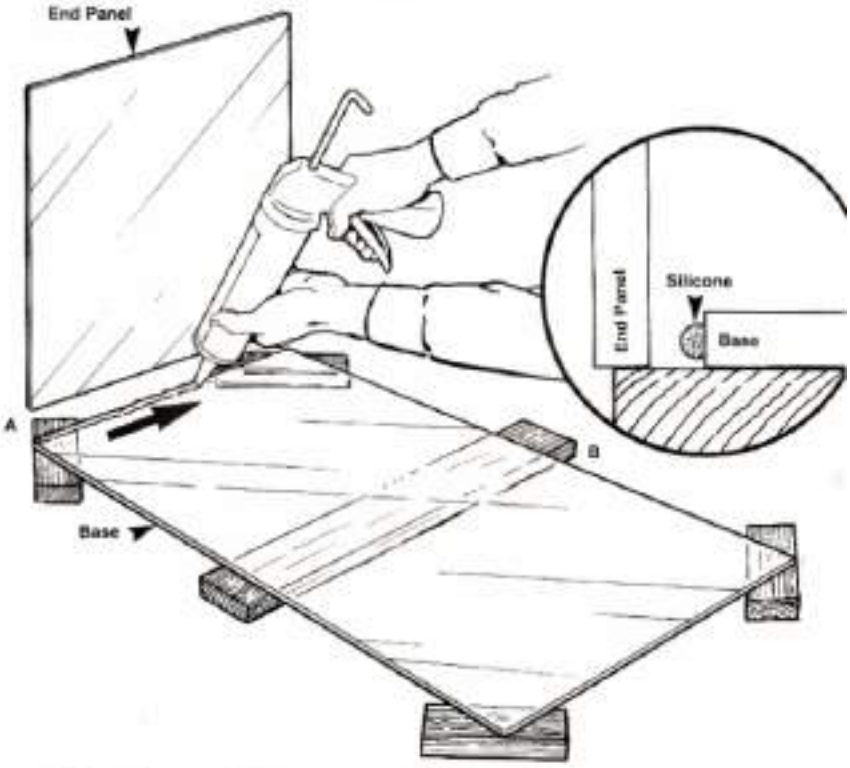
■ For example, for an aquarium 48" long, 24" high and 18" wide, made from ⅜" thick plate glass, your sizes will be:

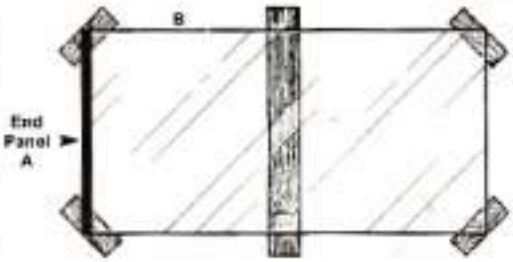
Two 48" x 24"
Two 24" x 17⅛"
One 47⅛" x 17⅛" for the base.
Two strengtheners or stiffeners 47⅛" x 2" **two** 17⅛" x 2" and **one** 17⅛" x 6"



Step 1

Place four pieces of wood, of even thickness, on a flat and level surface. Carefully position the base on the blocks of wood. If the aquarium is over 36" long, place a piece of wood under the centre of the base to avoid any sagging.





Step 2

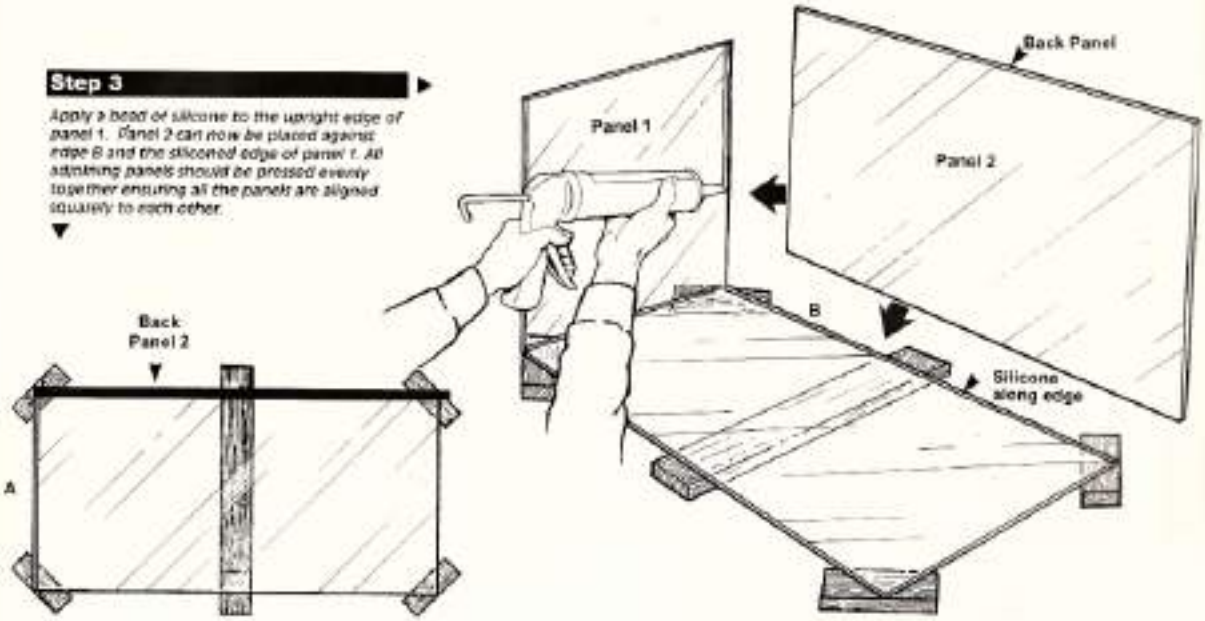
Using a silicone gun, apply an even bead of silicone along edges A - B of the base. Then take panel 1 and push the bottom of the panel against base edge A at 90°, ensuring it is pressed evenly along the adjoining edge of the base.

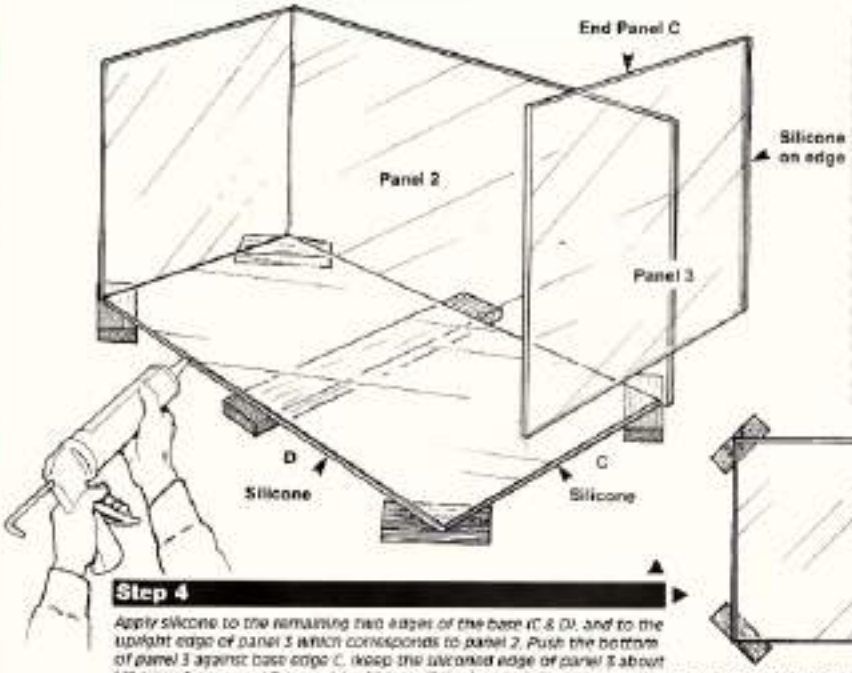
DIY FISHKEEPING PROJECTS

...r own tank?

Step 3

Apply a bead of silicone to the upright edge of panel 1. Panel 2 can now be placed against edge B and the silicone edge of panel 1. All adjoining panels should be pressed evenly together ensuring all the panels are aligned squarely to each other.





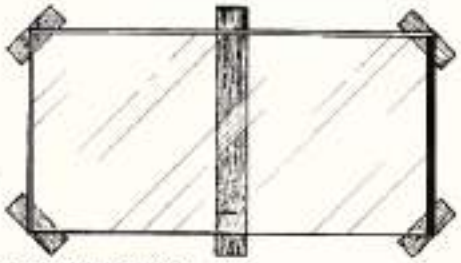
Safety first!

Ask your glass merchant to rub down the newly-cut edges as plate glass can inflict nasty injuries.

You must also buy three large tubes of silicone and a well-oiled silicone gun.

Choose a translucent silicone which does **NOT** contain a fungicide. there are many specialist aquarium silicones available.

If you are inexperienced in using a silicone gun, it is a good idea to have a couple of trial squeezes of the trigger, in order to get the 'feel' of the pressure needed to achieve an even bead of silicone on the panel edges. You may also need to enlist the help of a friend.

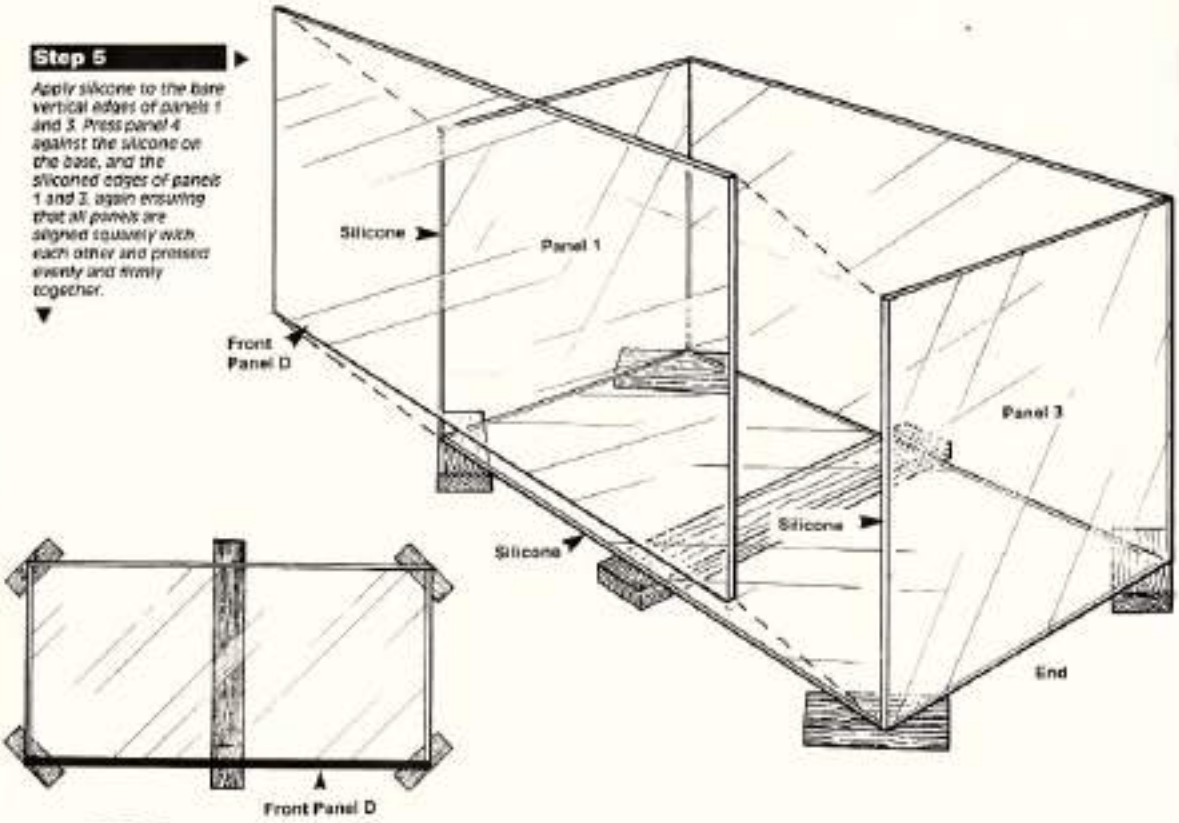


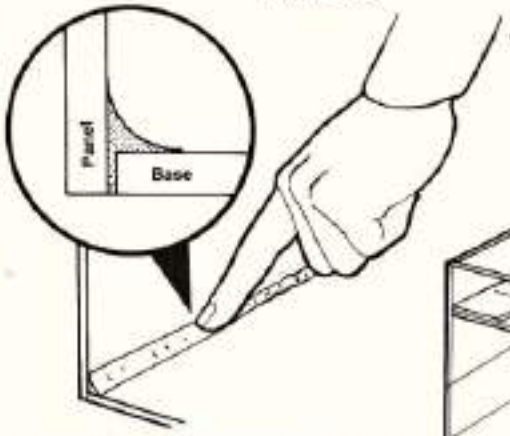
Step 4

Apply silicone to the remaining two edges of the base (C & D), and to the upright edge of panel 3 which corresponds to panel 2. Push the bottom of panel 3 against base edge C, keep the silicone edge of panel 3 about ½" away from panel 2 to avoid rubbing off the bead of silicone with the surface of panel 2). When the silicone edge of panel 3 is vertically aligned with panel 2, slide panel 3 against panel 2. At this point, the aquarium builder should check all panels so far erected, are aligned squarely with each other.

Step 5

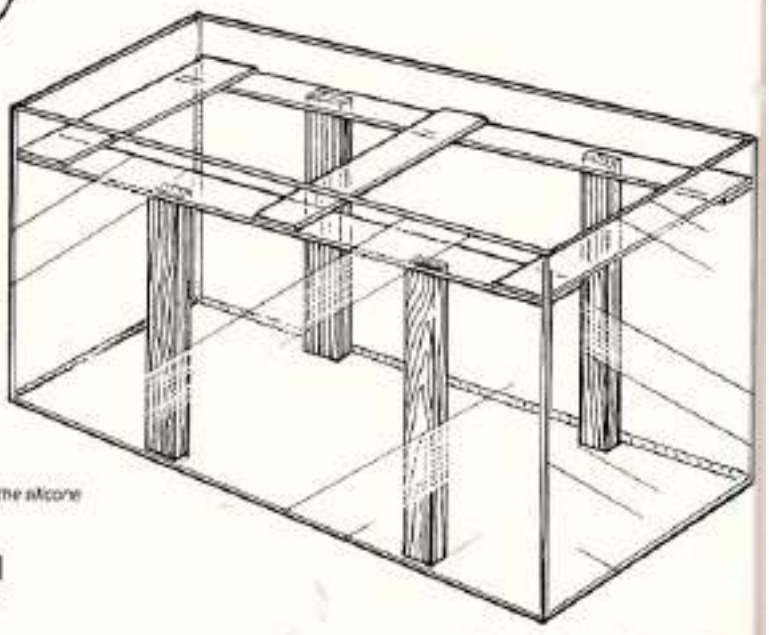
Apply silicone to the bare vertical edges of panels 1 and 3. Press panel 4 against the silicone on the base, and the siliconed edges of panels 1 and 3, again ensuring that all panels are aligned squarely with each other and pressed evenly and firmly together.





Step 6

Using the tip of your index finger, spread the bead of silicone which has been pushed out by adjoining panels into a rounded seal (see diagram) all around the base and up the vertical joints.



Step 7

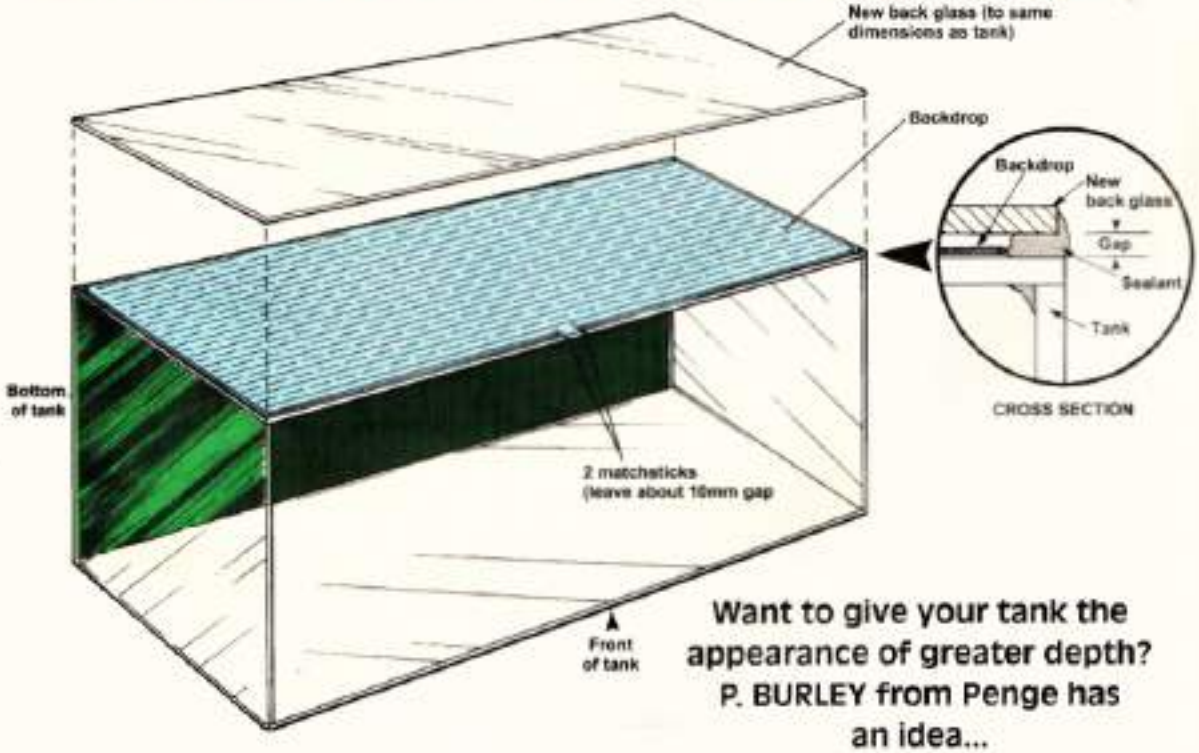
The fitting of strengtheners to the top or open part of this type of aquarium is important. This provides the all -round strength required to safely contain the sometimes vast amounts of water in a large all glass aquarium.
First, decide how far down from the top of the aquarium you wish to position the strengtheners to accomodate any desired equipment inside the top. Then cut suitable wooden stands with which to support the strengtheners until the silicone has set. Place the strengtheners as shown.

Step 8

Allow a minimum of 48 hours before filling with water. Be sure to rinse tank out thoroughly before use.

We start a new section of our projects pages outlining readers ideas and DIY projects. If you've an idea, however brief, send it to us (enclosing a diagram wherever possible) at:
Reader's Projects, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ.
We'll pay for every idea we use.

The 3D backdrop



Want to give your tank the appearance of greater depth? P. BURLEY from Penge has an idea...

I have always had difficulty with tank backdrops. I know that you can move a tank forward, curve the backdrop and shine lights down the back to add brightness and depth, but I have no room space for this.

I decided to find an easier way, and this is it.

1. Get a piece of glass cut to the same length and depth as the tank, 3mm thick.

2. Turn the empty tank on its side.

3. Cut your chosen plastic backdrop picture to size - 6mm smaller all the way round (ie 12mm narrow, 12mm shorter overall). If you use a double-sided backdrop place the side you want against the back of the tank.

4. Run some aquarium sealant over the 6mm uncovered area around the backdrop thickly and evenly. Leave an uncovered gap of about 10mm at the top. Place two matchsticks in this gap.

5. Place the other sheet of glass on top, squashing down the sealant and encapsulating the picture. Seal around the sides of both panels.

6. When the sealant is cured, fill the gap with boiled (therefore sterile) cooled water, and seal the hole.

7. Set up your tank, turn on the lights and admire your achievement.

WHAT DOES IT COST?
Glass plus silicone sealant 3ft tank £9; 5ft tank £13.

To me this method has several advantages:

- No lights needed at the back of the picture
- The backdrop's safe from prying fingers
- The water stays clear and in good condition because it's sealed in
- No dust or water stains on the picture
- Gives a nice depth and brightness

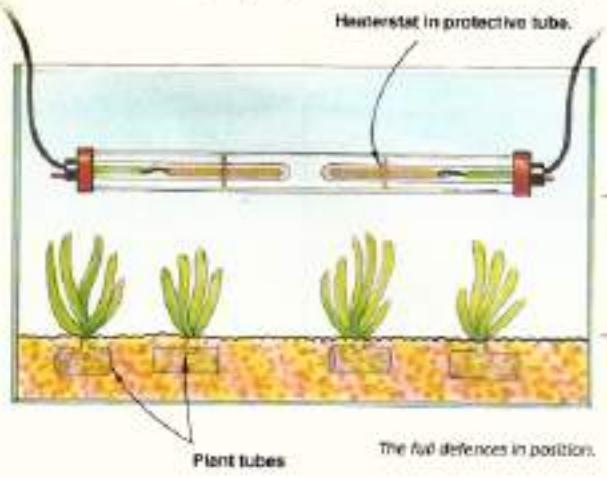
Frustrating th

P. E. MULLAN of Bexhill-on-Sea keeps some impressive tank-busters in a 48" tank. Here's how he protects those fragile plants and heaters.

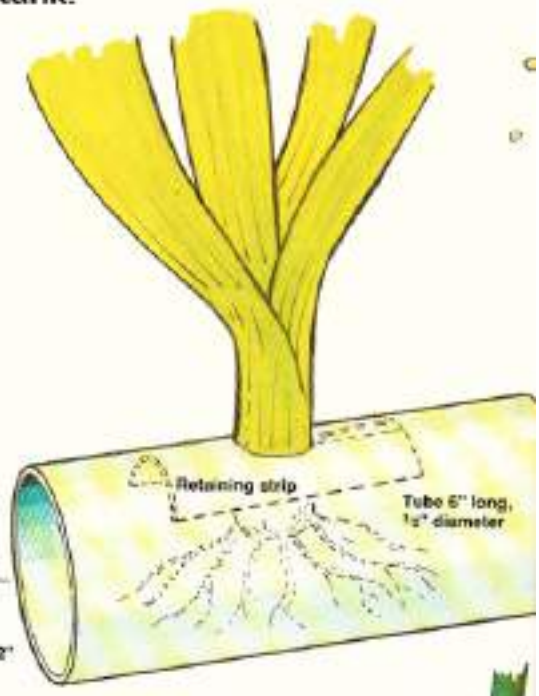
My 48" x 24" x 24" tank contains an 18" Pemuno Catfish; 9" Tiger Oscar; 5" Banded Dorie; 7" Royal Plec and a 3" Spotted Dorie. It looked rather bare with just bogwood and few rocks for decoration. I added several Large Amazon Swords, which looked great for half an hour before the Oscar dug them up.

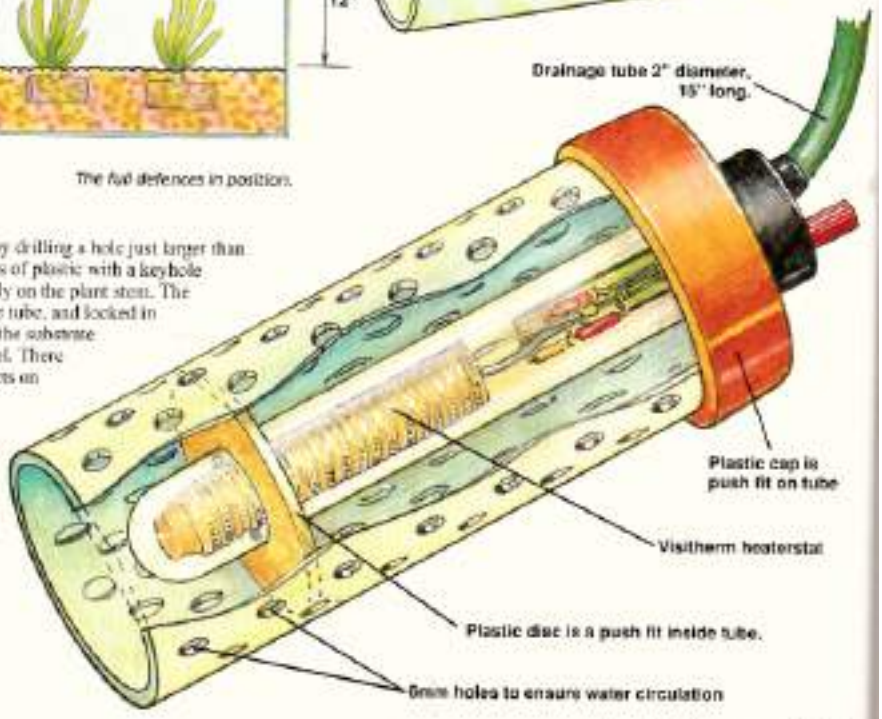
For several days I replanted each morning; the Oscar dug them up.

I then decided to try putting the plants in a piece of plastic drainage pipe.



The fish defences in position.



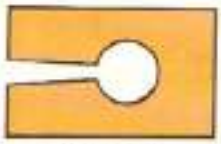


The plants are secured in the tube by drilling a hole just larger than the diameter. I then cut retaining strips of plastic with a keyhole shape cut out - again made to fit tightly on the plant stem. The plant is pushed through the hole in the tube, and locked in place, this assembly is then buried in the substrate after the tube is itself filled with gravel. There do not appear to be any negative effects on the plants.

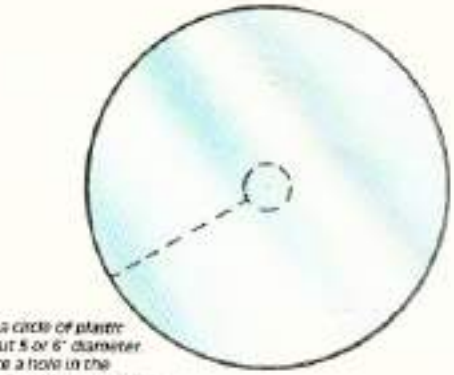
The method may have applications in undergravel run systems where the plants would be "protected" against the water flow. A growing medium could also be placed around the roots.

■ **To protect my heaterstats from the Oscar and the Perruno, I use a 2" diameter tube drilled with 6mm holes. The plastic cap and a plastic disc cut roughly to size, support the heaterstat.**

hose boisterous fish



Retaining strip
3" long 1½" wide

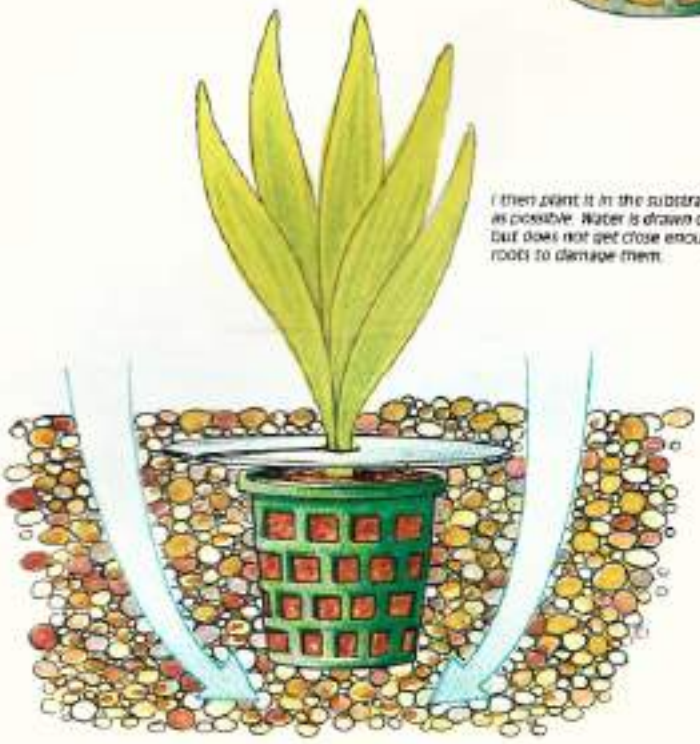


Cut a circle of plastic about 5 or 6" diameter, make a hole in the middle wide enough for the plant. Cut a slot to this hole.

I put my plants, when works, but I don't know if this is actually necessary. The slit is open and the "guard" goes around the plant.

ANDY PARKES of Blandford has another solution to the plant protection problem

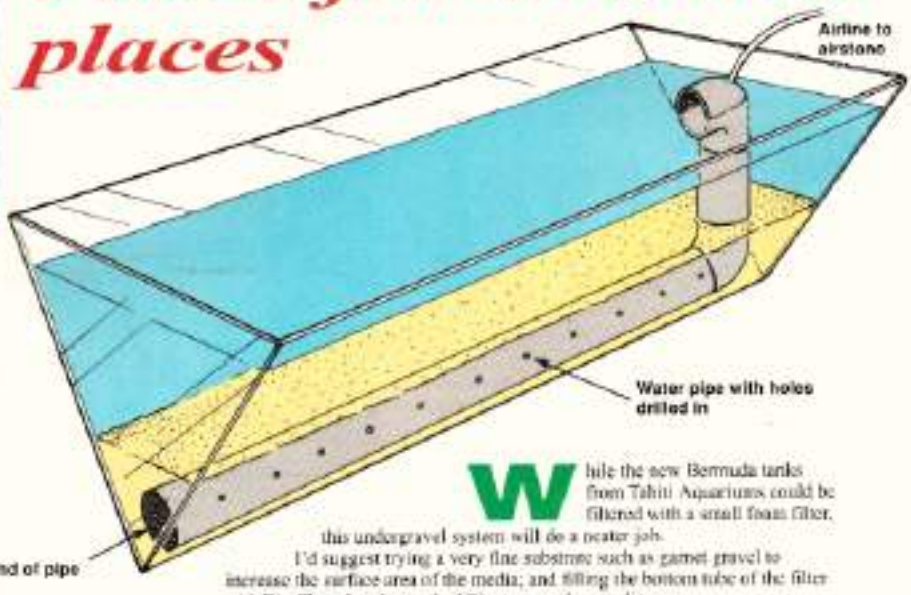
I keep all sorts of Oddballs, so I always have the problem of my plants being rearranged. My taste in decor does not agree with that of my fish, but I believe plants are a vital part of any aquarium. So I set about a solution which has led to healthy plants which remain where I want them - despite being planted in very high flow undergravel filters. The diagrams explain the details.



I then plant it in the substrate as deeply as possible. Water is drawn over the disc but does not get close enough to the roots to damage them.

Filters for awkward places

NICK GEORGE has a suggestion for filtering the new Bermuda tanks.

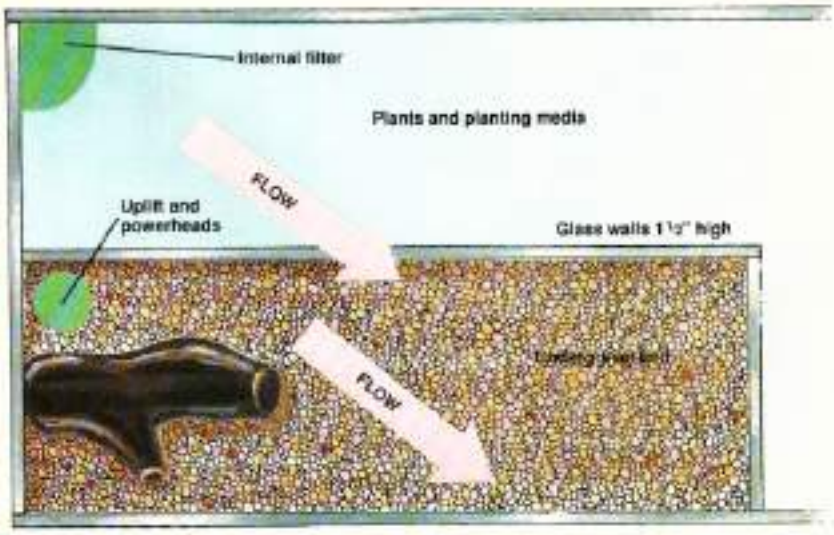


While the new Bermuda tanks from Tahiti Aquariums could be filtered with a small foam filter, this undergravel system will do a neater job.

I'd suggest trying a very fine substrate such as garnet gravel to increase the surface area of the media; and filling the bottom tube of the filter with Bio Chem beads, crushed Saporex or other media.

Mixing plants and undergravels

STEPHEN BROADBENT from Gloucester reminds us of a useful way of getting the best of both worlds.



Nearly everyone will agree that plants and undergravels are not really compatible; on the other hand I think undergravels are just about as good as one can get.

I use them, but I keep them separated from the majority of plants by surrounding them with strips of glass siliconed to the tank base. The undergravel plate is contained within a glass box. The plants outside it seem unaffected, their planted in aquarium peat mixed with Everite, topped off with at least 1" of gravel.

■ To minimise turbulence, which the plants don't appreciate and which can oxidise nutrients, I don't use air pumps, nor introduce air through the powerhead. There is plenty of surface movement which will maximise gaseous exchange.

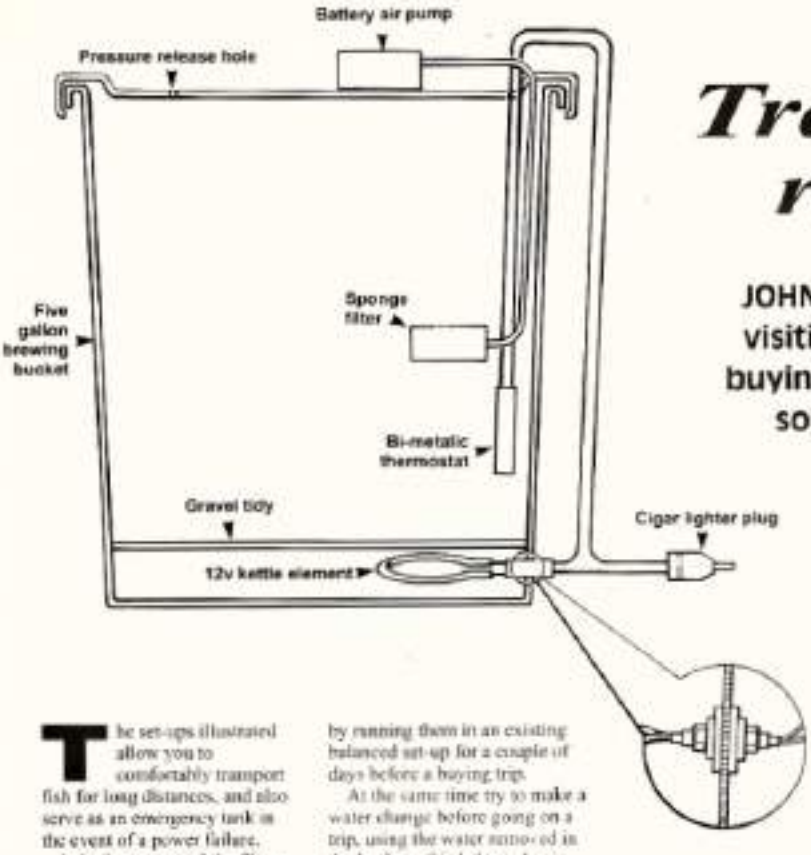
■ I use plants which are good oxygenators - my 48" tank originally had 75 straight and 50 twisted vallis, plus 50 or 60 other plants.

Fish number are comparatively low, and lighting is by a 42" domestic tube, on nine hours a day. I use Everite liquid fertiliser.

■ The result? Plants and fish are thriving.

Travelling right...

JOHN NICHOLS is keen on visiting new outlets and buying fish. Here's how he solved his transport problems.



System One

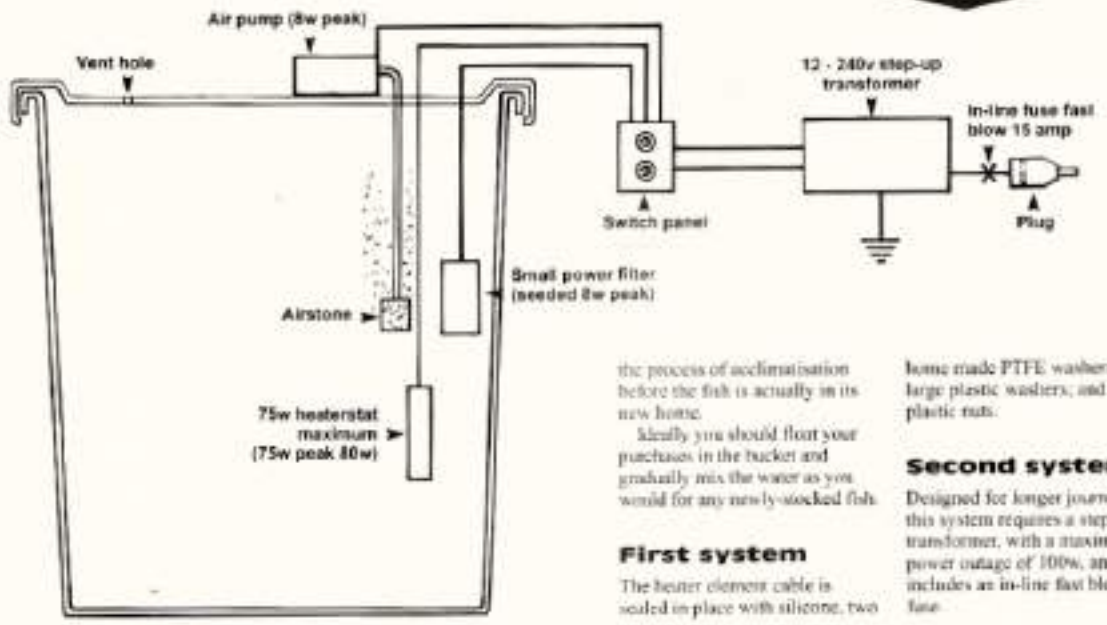
The set-ups illustrated allow you to comfortably transport fish for long distances, and also serve as an emergency tank in the event of a power failure.

In both cases, seed the filters by running them in an existing balanced set-up for a couple of days before a buying trip.

At the same time try to make a water change before going on a trip, using the water removed in the bucket - this helps to begin the process of acclimatisation before the fish is actually in its new home.

Ideally you should float your purchases in the bucket and gradually mix the water as you would for any newly-stocked fish.

System Two



First system

The heater element cable is sealed in place with silicone, two home made PTFE washers, two large plastic washers, and two plastic nuts.

Second system

Designed for longer journeys, this system requires a step-up transformer, with a maximum power outage of 100w, and includes an in-line fast blow fuse.

● **Carnivores** can be divided into those that lay in wait as opposed to actively hunting for their prey.

Of the aquarium species Lionfish, Groupers and Moray Eels can be considered 'lie in wait' predators while Hawkfish are active hunters. Both categories usually feed upon small fish and mobile invertebrates such as worms and crustaceans.

Others including *Anthias* species, Cardinal fish and the colourful Royal Gramma are zooplankton feeders specialising in feeding upon micro planktonic organisms, that is zooplankton of a size easily seen by the naked eye.

Above: An Atlantic Trumpetfish browses on the reef.

Feeding and environment

Many elements of marine aquarium care are interdependent and inexorably entwined.

Perhaps the easiest relationship to understand is the connection between feeding and water quality - the animals take in food and after digesting and extracting nutrients, get rid of the balance as waste.

This increases what is termed bioload, the amount of biodegradable waste that the bacteria in the filtration system need to break down to return the quality of the water to acceptable levels. Obviously the more waste the greater the bioload and even the most efficient filtration system will not prevent changes in water chemistry after feeding, if the aquarium is overstocked or the filtration system is not yet fully mature.

In terms of maintaining good water quality the feeding regime and stocking levels have a very big influence and a careful balance must be maintained between the capacity of the filter and the imposed bioload if detrimental fluctuations in water quality are to be prevented.

It bears repeating that the most common causes of these fluctuations are overfeeding, over-stocking, too heavy initial stocking or rapid increases in stocking levels.

Lighting and water movement are also important to feeding because they influence the way many relatively immobile sessile marine invertebrates gain their nutritional requirements.

These orders of marine creatures have evolved feeding techniques which rely upon their food coming to them, either by strong water movement or by farming microscopic algae in their tissues which can harness the radiant energy of the sun to manufacture nutrients by photosynthesis.

Lighting and water movement for these types of invertebrates are as important as the foods placed in the aquarium and this is often little understood. Living on sunshine, or in our case metal halide lighting, is not an easy concept to appreciate, but sunlight is the basic energy source for a coral reef's food production.

Finally there are the benthic foragers which comb the sea bed for small worms, crustaceans and other invertebrates. Butterflyfish are prime examples of this group many species of which feed exclusively upon coral polyps while other benthic foragers such as Porcupinefish, Boxfish and Puffers will eat anything they can catch.

● **Herbivores** are normally split between **territorial species,** such as Damselfish which farm a small area of reef, tending their tiny algal gardens defending their garden territory against all-comers, and **shoaling herbivores,** a good example being the surgeonfish which shoal in large numbers like marine cattle browsing the marine algal pastures.

● **Omnivores** comprise by far the largest group from cosmopolitan feeders such as the opportunistic wrasses which have broad tastes to specialised feeders such as angelfish which browse benthically upon sponges and algae. There are grazing species which feed mainly on food animal organisms but ingest large amounts of algae in the process. Conversely there are herbivore grazers, of which parrotfish are a typical example, which inadvertently graze upon sessile invertebrates when cropping algae from coral rock.

Species such as these which will accept a wide range of foods in nature are likely to settle down more easily to the aquarium feeding pattern.

● It can be possible to acclimatize a **specialised feeder** to substitute foods although there is always a danger of a reluctance to feed deteriorating into anorexia and premature demise.

This has rated some fish species impossible to keep as in the case of a number of polyp-feeding butterflyfish species.

Substitute foods can also cause other difficulties, a good example ▶

Above: Freeze dried foods retain a lot of the original nutrition.

Left: Groupers lie in ambush for their very fishy diet.

Below: Soldierfish are nocturnal predators.

Types of food for fish

The value of live foods as mentioned earlier cannot be overstated. All of the live foods of marine origin, especially, are beneficial providing a complete, natural nutrients package including essential trace elements and vitamins.

Some live foods, particularly crustacea, also provide roughage to aid digestion and contribute less detrital matter than non-live foods.

■ The most popular marine live food available is Artemia or brine shrimp which are reared in commercial hatcheries and sold as live adults. These are disease free and nutritious and are best fed when they are fresh from the hatchery and still contain the marine algae on which they in turn were fed, undigested in their stomachs. In this manner the fish gain the benefits of both food sources. Brine shrimp are also available in egg form and can be hatched in warm salt water to provide a continuous source of live food. It is difficult, however, to raise the newly-hatched nauplii to adult state, in my experience and this limits home-reared Brine shrimp to smaller fish species.

■ Live foods from fresh water sources can also be used although because most of these quickly die in salt water, care is needed to avoid any surplus that will foul the water when it dies.

You need to experiment but Daphnia, Tubifex and Bloodworm are usually accepted by marine fish as are the young of fresh water tropical fish such as new-born Guppies.

■ Frozen or fresh sea foods can be useful substitutes for live foods. White fish and shellfish are easily obtainable fresh, and lance fish, shellfish meat and mysis shrimp are popular frozen foods.

As a rule proprietary brands of frozen foods are irradiated with sterilising Gamma rays to avoid introducing harmful bacteria and diseases into the aquarium. Frozen foods, of course, should be treated like other non-live foods and be fed very sparingly to avoid leftovers fouling the aquarium.

■ Dry foods. A growing interest has been shown by manufacturers recently in broadening the range of freeze-dried foods to provide a useful alternative to frozen foods. Most of the live and frozen foods are available in freeze-dried form and there is evidence to suggest that there is little nourishment lost in the freeze-drying process.

Manufacturers have also been putting a lot of resources into providing a wide range of dry foods especially formulated for marine fish species.

The value of dry foods in their various forms should not be overlooked as a great deal of 'state of the art' research has gone into the major manufacturers' efforts to produce these high-quality nutritious foods.

One overriding advantage of feeding dry foods, is that you ensure that you are feeding a balanced diet, which will contain all essential components, vitamins and minerals.

It is important to avoid cheap products which often are formulated for freshwater aquarium use and contain lots of carbohydrate, fats, fibre and little else.

A good marine fish food is likely to contain marine origin ingredients such as fish, shrimp, squid or shell meat plus algae or other vegetable matter and should be fortified by vitamin/mineral supplements.

Look for products which contain a minimum 40% protein and no more than 5% fibre content - and also state that the vitamins and minerals have been added.

Natural colour enhancers such as xanthophyll, which produces a yellow pigmentation and carotenoid red coloration, are often added to quality products, as are various taste attractants to encourage species difficult to acclimatise to dry food such as Mandarins and butterflyfish.

High-quality dry foods are becoming increasingly more available, including some really top products from Germany, USA and Japan, to add to the excellent range offered by manufacturers in this country.

I have been trying a new range of foods from OSI, an American company with a good reputation in the States, which manufactures a massive range of both freshwater and marine food products.

I was particularly impressed by their Spirulina Flake Food which my Yellow Tangs (*Zebrasoma flavescens*) love, and is a valuable addition to dry foods formulated for herbivorous species and also a particularly high-protein Brine shrimp flake which all of my fish enjoy.

THE WETF

PAUL WILLIS from Bury St Edmunds is the first prize winner in our Wetpets sponsored competition for marine fishkeeping projects. He wins a reverse-osmosis set up. Other winners are listed below; but this month we investigate Paul's superb L-shaped tank.

STOCKING THE L-SHAPED TANK

Paul's current stock consists of the following incredible list:

- One Regal Tang, 2 years old
- Yellow Tang, 2 years
- Lipstick Tang, 2 years
- Sailfin Tang, 18 months
- Flame Angel, 2 years
- Cream Angel, 12 months
- African Angel, 12 months
- Twin Spot Wrasse, 9 months
- Lunar Wrasse, 2 years
- Dragon Wrasse, 9 months
- Three Banana Wrasse, 6 months
- Cleaner Wrasse, 10 months
- Harlequin Tusk, 3 months
- Copperband Butterfly, 10 months
- Lunula Butterfly, 10 months
- Double Saddle Butterfly, 9 months
- Semburst Butterfly, 6 months
- Eight Percula Clowns, 5 months
- Six assorted Damsels, 18 months
- Two Clown Sweetlips, 5 months
- Porcupine Puffer, 5 months
- Clown Trigger, 9 months.

Paul lives in a tiny bungalow, and had kept marine fish in a four foot tank for several years.

He then decided to fit into his lounge the biggest tank possible. Working overtime financed the tank (total length 15 feet) which arrived on June 30, 1990, and took six men to move into the house.

After eighteen months, despite a tight budget, Paul is fully stocked, with an incredible 37 fish, all of which he has bought small and watched as they've thrived and grown on.

Overtime and maintenance work on a marine tank in a Newmarket department store helps to finance Paul's hobby.

Above: A Lunula Butterfly is just one of the many inhabitants in Paul's 250 gallon tank

Left: The Porcupine Puffer will have to be handled with care once it reaches 6" or more. They can give a nasty bite

All winners

The following readers all win a Nitrogen for their marine fishkeeping projects.

Most of these and some of the other entries will be featured in future editions of PFK.

- G.R. Cook, Surrey
- Steve Bateman, London
- Steve Minns, Essex
- Andrew Tillett, Norwich
- Zsz Greppi, London

PETS WINNER

By buying his fish small and young he has managed to keep several species together successfully.

Above and right: Paul's tank requires a water change of 50 gallons a month.

Below: Triggerfish can be kept with smaller species, providing you 'grow them up' together.

Vital statistics

The tank has a 250 gallon capacity, and needs a water change of 50 gallons every month.

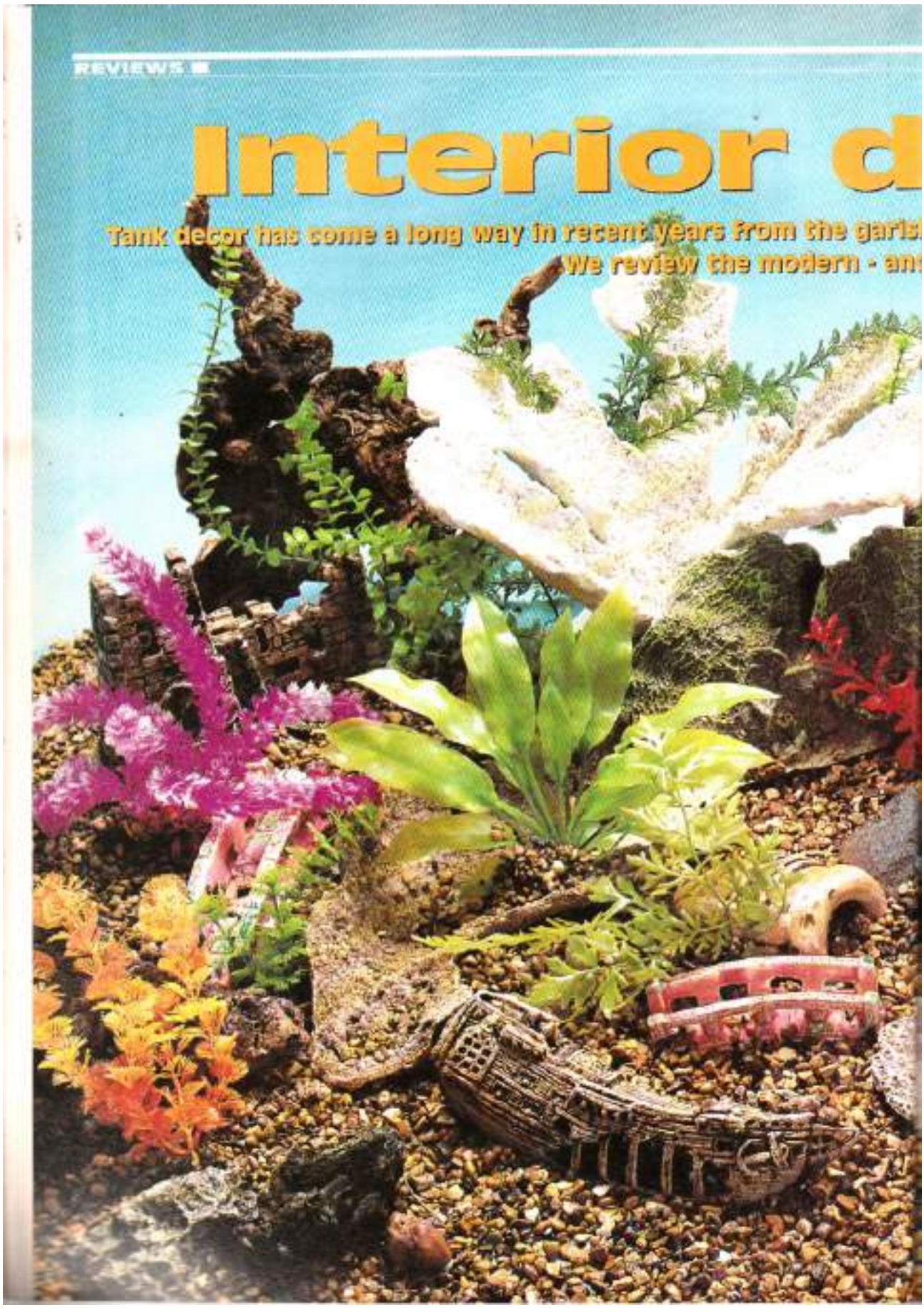
It's filtered with four powerheads running undergravels, a wet and dry gravity-fed trickle filter, and two external power filters.

It's lit with two pairs of five foot Northlight, and Grolux tubes, two 42" Grolux, and two single 12" Grolux and Triton tubes ■

Above: It took six men to get the 15' tank into the house

Interior d

Tank decor has come a long way in recent years from the garis
We review the modern - an



lecoration

ist backdrop, and the odd lump of rock with a few dying plants.
not so modern - substitutes.

1. Elkhorn Coral Reefform 2. Lettuce Coral Reefform 3. Cup Coral Reefform 4. Mopani Wood 5. Bideford Stickwood 6. Hobby Cavity Rocks 7. Hobby Grotto Ceramic 8. Flower Coral Reefform 9. Blue Tube Sponge 10. Ceramic Clay Pipe from Hagen 11. Hagen Skull 12. Hobby Pagoda Rock 13. Decoran Lim Slimestone 14. Bridge from Hagen 15. Cup Coral Reefform 16. Slimestone Stepwork 17. Reefform Elkhorn Coral with Hagen Bubble Diffuser 18. Hobby Lava Rocks 19. Bideford Slimestone Castle

Left: A selection of Aquascaper and Vibrascaper plastic plants from Hagen. Below left: Plantastics and Supernaturals from Interpet.

Time was that decor in a tank consisted of a backdrop, a gravel substrate and a few bits of rock from the back garden that you hoped were inert and wouldn't affect water chemistry.

Times have changed - and got greener - so that some typical decorations like coral are no longer acceptable, while style and fashion has made a good-looking living picture in your lounge far more important than the simple challenge of keeping pet fish alive.

The manufacturers' response has been the creation of some stunning artificial decor - plus some items that rate alongside flying ducks on the wall as pieces of what are called "art bingo" at the PFK offices. In this buyers' guide we cover and comment on the best (and some we wouldn't give tank-space to) and leave the reader to judge.

UNDERWORLD

Underworld has a wide range of tank decor, all aimed at helping the creation of a natural-looking tank. Most of the the items are very light in weight, which makes them especially suitable for aquaria.

Mopani wood

A nicely hollowed, gnarled and twisted wood from the Mopani tree which grows in dry areas of southern Africa. Ideal for cichlids and catfish tanks. Treat it as you would any other wood by extensive pre-soaking and rinsing - perhaps boiling.

Various prices depending on the size of the wood (around £5 a kilo)

Hobby Grotto Ceramik (Grotten Keramik)

Fascinating stuff this, extremely light and porous, and offering homes to both fish and inverts, with its various caves and grottoes. Porous enough to displace the minimum amount of water, this is very useful man-made 'rock' for marine tanks and for cichlids. Nice rich reds and browns in the colour, it has only one drawback in the shape of some sharp edges which may cut you or your fish.

Around £5.50 per kilo

Hobby Lava Rock (Grottenlava)

Again very light 'rock' this time with smoother edges, and natural in the sense that it comes from Icelandic lava flows. This mean there may be traces of metal in it and caution is advised before using it in marine tanks.

A lovely rich rust red colour, it retails at around £4.75 a kilo.

Hobby Pagoda Rocks

Each one of these is different. They are pieces of sharply stratified rocks, sculpted by the wind in a desert setting. They look artificial, but aren't. Brownish grey in colour they're recommended for freshwater tanks, but should be tested in low pH set ups with care as some may raise the pH. Heavier than the previous two rock types, they'd make superb caverns along with some slate.

Price around £3.50 a kilo

Backdrops from Interpet are easily cut to size.

Hobby cavity rocks

A lighter brown rock from Finland, reminiscent of rough-cuts of *gruyere cheese* (but darker in colour), it has "built-in" caverns suitable for smaller fish. Again heavier than the first two rocks with some slightly sharp edges. Again heed the warnings about pH.

Priced around £2.50 a kilo

Reeforms

These are ultralight alternatives to plundering the real reef, and come from the Phillipines. We'd only seen these in tanks before, and the initial reaction was that they were OK, but... We then sprayed them with water for our picture and the instant transformation showed just how very good they'd look in the right setting. There are 24 different sorts of 'coral' and three sponges. They're suitable for any type of tank and new freshwater (and marine) designs are available soon. They are easily brushed clean.

Look out for a special offer at the moment of four different packs of Reeforms suitable for tanks from 30" to 4ft at a 20% discount, and they come with a free high quality Reef Forms T-shirt. **Prices vary as follows on the items shown - Elkhorn Coral £19.99; Lettuce Coral £18.20; Flower Coral £31.99; Cup Coral large £9.25; Cup Coral small £5.60; and Blue Tube Sponge £13.36 (which make up one of the special deals) and a giant Elkhorn Coral which retails at £41.50.**

ROLF C HAGEN

Rolf C Hagen do a number of ceramic ornaments of both naturalistic and ornamental types. Many of these are not to our taste, but there's no doubt that even those items that would look more at home in a flower arrangement have been designed and coloured with fishkeeping in mind. They often look surprisingly good in the tank, and offer real benefits to the fish.

Left: The cleverly-designed uplit cover from Algarde needs a coat of algae to look its best.

Ceramics

We saw the **Clay Pipe Elbow**, an ideal home for many cats and catfish, and there are three other straight varieties. We also saw two **bridges** in a rather odd coral pink, and a surprisingly tasteful skull for piranha tanks (or as an unlikely spawning site for cichlids). Many of the other ceramics will provide really good hiding places or homes for your fish, and they are all reasonably priced. Check them carefully in low pH tanks as not all are fully glazed.
Example R.R.prices on the items illustrated are: Clay pipe £2.55; bridges £3.25 and £4.58; large skull £6.12

Right: Batsford products are based on real bits of wood, or serve a useful fishkeeping purpose.

Aqua-Decor Backdrops

Hagen have six of these selling off the roll in 12" 18" and 24" widths, and illustrating three tropically planted type backgrounds, two reef style backgrounds, and a kind of tropical poolside jungle for terrariums.
Prices are 65p per foot 12"; 89p (18") and £1.09 24".

Living World Aquascaper/ Vibrascaper Plastic Plants

These are nicely made and designed plastic plants with a sensible "foot" for burying in the gravel. The Aquascaper range includes 20 standard tropicals in sizes from 5" to 15"; and six foreground groups. Vibrascapers are naturalistic plants in bright colours - blue, pink, fluorescent green, that may or may not reflect their natural colours.

We find these look very good in tanks with a white or coral substrate - preferably stocked with black or silver Mollies.
Prices are as follows: All plants 5" £1.12; 8" £1.53; 12" £2.44; 15" £3.67; foreground £1.12.

INTERPET

Interpet also sell plastic plants and backdrops. They also have a number of plastic air powered ornaments which were included in an earlier review.

Plantastics

A nice story attaches to these very imitative plants. In order to make the most accurate moulds, the designer Allan Willinger had to devise a method of preserving aquatic plants in an unnatural environment while they were worked on. He is also supposed to have tracked down a naturally soft plant-like plastic and a surface treatment that reflects light like the real thing.

Supernaturals are the disco plants - Cabomba, Bacopa, Anacharis, Ludwigia, Ambulia and Moneywort in fluorescent orange, yellow, pink, red, blue, and luminous green.

Plantastics also make a specialist range of Amazon swords from 150mm to 330mm.
Prices are as follows: Plantastics and Supernaturals 6" £1.27; 9" £2.19; 12" £3.03; 15" £3.53; and 18" £4.30. Foreground plants large £1.70; small £1.27. Swords £3.18 to £13.98

Backgrounds

Interpet have two backgrounds (100 x 50cm and 70 x 37cm). These are made of card and feature a tropical tank scene on one side with extremely easy to use cutting to size markings on the back aimed at standard tanks.
Price: £2.28 and £1.79

BATSFORD PRODUCTS

Batsford's resin-based products also look far better in water than they do out. Their subtle colouration quickly blends into the aquarium, and many of their designs are modelled from actual logs and rocks. They come in two types, Simlawood and Simlastone with a new product Simla Coral recently introduced.

Simlawood

A lot of fishkeeping thought has gone into the design of these products. Thus they include uplit covering logs, logs that form caves, and a realistic log with a cavity for planting. Other Simlawood items are purely decorative.
Prices from £4.21 to £14.29 (our sample £14.29)

Simlastone

These items are equally cleverly-designed, with caves, backdrops, terracing, bridges, "dry stone" walls, and other rocky structures, some in fibreglass to save weight. The range also includes some of the more tasteful ornaments available, in the shape of sunken ships, castles and other buildings, link chains and a graceful (half-buried) grecian urn. It's nice to report that virtually all these have a sound fishkeeping function built into their design - in most cases they ▶

Marine Answers

Has my Damsel gone blind?

Q I have a 48" x 17" x 16" aquarium which has been up and running for six months. The filter is powered by two powerheads and the tank has a Fluval 303 external filter with carbon and filter wool.

Last week the fish began to shake themselves and to breathe rapidly. At the same time one of the Damsels became extremely distressed, swimming in an upright position and it went very dark in colour. I removed this fish and put it in a quarantine tank and I treated both the Damsel and the fish in the main tank with Cuprazin.

The three fish in the main tank responded well to treatment. The Damsel is still very dark in colour and I think it is blind, as it swims around and bumps into things, although it's feeding well.

Do you have any ideas?

• M. Jenkinson, Cumbria

Fish will be able to survive without sight, with the help of their lateral line. Pic. shows a Blue Devil.

A The Damsel certainly sounds as if it has gone blind through an undetermined infection. Its lateral line should enable it to survive and eat, but even this may have been affected if it is bumping into things. Keep it in the quarantine tank, cease medication and keep an eye on it for the next few months.

Only time will tell if it is going to be alright.

Too much phosphate

I have a four foot tank with undergravel filtration and an external filter with carbon and Siporax. It has a protein skimmer.

I am experiencing problems with a green filamentous algae (some of the filaments are 2-3" in length) which I have to remove each week when I do a 10% water change.

The problem seems to be getting worse. Will I have to strip down the tank and start again? I wish to eventually add invertebrates to this tank.

S. Hancock, Co. Durham

Green filamentous algae can be a big problem in some tanks. It is usually due to poor quality tapwater used for water changes. This may contain phosphates, sulphates and nitrates in abundance - enough to start a green algae plague.

You can buy phosphate test kits, but you'll need one that measures down to 0.1ppm or below.

The solution to your problem is to use a topwater filter such as a Nitragon or a reverse osmosis unit.

LETTER OF THE MONTH

S. Rogers of Romford, Essex wins an Interpet test kit for his Letter of the Month.

Picasso Triggerfish should not be kept together. Once the fish approach maturity one will almost certainly kill the other.

Q A little while ago I purchased a Picasso Trigger. He was about a quarter of an inch long. He does not seem to have a top trigger. Could you tell me if it's likely to have been bitten off or whether he will have been born like it. Do you think it will ever grow back?

He is in a three foot tank with another Picasso Trigger which is 3" long. They get on fine, which I thought was against all the rules.

A It rather sounds as if your Picasso Trigger has never had a 'trigger'. It will therefore most probably never develop one. This is not a problem, so long as the fish shows no discomfort and is feeding well.

Yes, it is against all the rules for two Picasso Triggers to share a tank. But they are only young. However, they do grow quite quickly and one day you'll only have one Trigger left, as the most dominant one will assert its authority. You have been warned.

Growing algae

Q My tank houses a Regal and a Yellow Tang, a Foxface, Tomato Clown, an Angel, Damsels and a Cleaner Shrimp.

Please could you tell me the best form of algae to keep in a fish-only aquarium? I purchased some *Caulerpa sertularoides* some time ago, but it was devoured before it had a chance to become established.

I have not been able to purchase any more - it seems to be short supply. Can you help?

• Alan Dalton, Herts.

A Your Tangs, Foxface and Angelfish will all eat algae quite readily and this should be supplied as part of their main diet. This means that it will be impossible to grow it as part of the decoration, or to expect it to be self-sustaining.

Your best bet is to feed a leaf or two of blanched lettuce or spinach every few days and let them browse on it. Clamp it between the two parts of an algae magnet and sink it to the bottom of the tank.

Alternatively, set up a 24" tank and grow *Caulerpa* separately. However, it will be unlikely that you could produce enough to satisfy the appetites of the Tangs on a continuous basis. Any good dealer should be able to order several species of *caulerpa* for you.

Algae should be provided to supplement the diet of Tangs and Angelfish. Pic. shows a Fireball Angel.

Copper is the only cure

Q I have a problem with my marine fish - in particular with a Regal Tang which is scratching itself against the tufa rock. I have used MarinOomed, but the problem persists.

The fish is eating well, but every now and again it goes to the surface, collects a mouthful of air and then returns quickly to the bottom, chewing and releasing air at the same time.

The tank is 60" x 24" x 18" and has been running for twelve weeks. It houses a Yellow-Tailed Chromis, a Clownfish and a Sailfin Tang. It has undergravel filtration run by two powerheads, with a protein skimmer.

• R.W. Salem, Devon

A It is almost certain that you are going to have to treat your tank with a copper-based remedy such as Cuprarin. This should effectively see off any disease which it appears the Regal Tang is suffering from.

I would be inclined to add an external canister filter to your set-up, such as an Eheim 2215. Pack this with activated carbon and filter wool, but don't use the carbon while the copper remedy is in use as it will adsorb the treatment.

Losses are not normal

Q Please would you advise me regarding my marine tank, which is fairly new. I keeping losing my fish - especially Dwarf Angels.

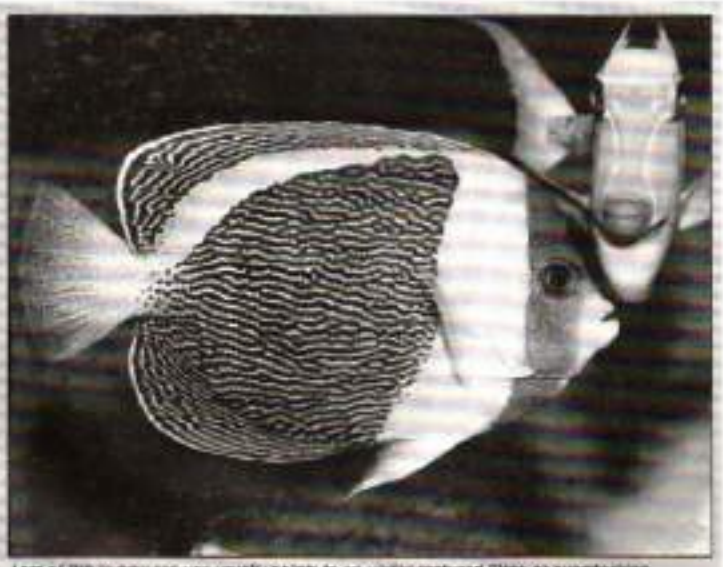
My tank has been matured since last December and I have lost a Fireball Angel, a Swallow Tail Angel and a Cream Angel. In addition to these I have recently lost a Clown Wrasse and a Black Trigger.

The aquarium is 3'6" x 18" x 12" and is well filtered by an external Fluval 301, two powerheads and a Fluval 3 internal filter. The tank has a protein skimmer.

Nitrite is 0.1 and Nitrate is 12ppm.

At the present time I have one small Clown, a Royal Gramma, a Yellow Tang, a Firefish, and an African Blenny. My dealer says I am doing all the right things and that it's fairly usual to lose fish with a new tank.

• Thomas John, Swansea



Loss of fish in new set-ups usually points to an under-matured filter, or overstocking. Pic. shows a Dubouley Angelfish.

A First of all, your dealer is quite wrong to suggest that losing so many fish is normal for a new tank. There is no reason to lose any at all.

Your tank will hold about 26 gallons nett. If it is to be a fish-only tank, then you can only stock 6" of fish slowly during the first six months. You already have 9" of fish, by my reckoning, in the first two months. This is far too much - no wonder you're losing fish. My advice is to stop buying fish for at least six months or more and hope that the ones you have survive. Do not replace any that die.

In the meantime, do yourself a favour and read as many books on the subject as possible: then you won't have to rely on misleading information from inexperienced dealers.

No butts...

Q I have a five year old three foot tank housing fish and inverts. It is filtered solely by the undergravel method, run by two powerheads. I conduct a 10% water change every three weeks.

I am having some trouble with my nitrate level, which is 40-50ppm. My tapwater contains 20-30ppm, but I've found that the level in my water butt which collects water from the conservatory roof, is only 5-10ppm. Is there any reason why I shouldn't use this water for my aquarium?

I would like to add to my filtration system. Would it benefit from a trickle filter?

• Hywel Williams, Surrey

A The reason you have a nitrate reading in your water butt is because bacterial action is taking place therein and the end result of this cycle will be nitrate. Don't use this water as it will be polluted with airborne 'nasties'. A trickle filter, while improving your water quality to some degree, may not be entirely necessary in your case. I would invest in a good protein skimmer and an external power filter packed with activated carbon instead. You may wish to add a trickle filter at a later date.

If you have any spare cash, use it to invest in a tapwater pre-filter, such as the Nitragon and increase your water changes to 15% every fortnight.

NICK DAKIN is your expert on the saltwater scene

You must include a stamped, addressed envelope and attach the Marine Answers coupon, below, when you write in with your query or your tip to:
Marine Answers, Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ.

We regret that queries sent without a stamped, addressed envelope will not receive a reply.

■ DON'T FORGET – the Star Letter and Tip of the Month in every Marine Answers wins an Interpet Test Kit.

Use the address above for tips and letters.

MARINE ANSWERS

☐ Nick Dakin

Young fis

KIT TIP

No 3. The Cable Tidy

How does it work?
All the tank equipment is wired into the cable tidy, instead of onto separate plugs. Then a single cable can be plugged into the mains. The equipment can be switched on and off by two switches on the front of the unit, and a red light tells you the power is on.

If you situate the cable tidy as close to your tank as possible, you can cut the wires on your equipment fairly short, to get rid of all those unsightly trailing cables.

What extra equipment do you need?
All you have to add is a length of cable and a plug with a 5 Amp fuse - and your tank equipment of course.

How do I use it?
Take the cable tidy apart and you'll see the connections for all the relevant equipment are clearly labelled, along with the terminals for each wire - live, neutral and earth. Most modern aquarium equipment no longer has an earth wire, but if it does, you *must* make sure you wire it into the earth terminal. The model illustrated has the facility to take a heater and a separate thermostat if required, lights and a pump, with a spare terminal which you could use for a power filter.

Good features
Cable tidies reduce the need for countless trailing wires and plugs. They usually come with self-adhesive pads, so it can be mounted anywhere in the vicinity of the tank.

Are there any drawbacks?
If you cut the wires on your equipment very short, it makes the whole effect tidier, but means that you could have problems if you shift the equipment around, or buy a larger tank, as the wires may not be long enough.

Underwater Safari

The Glassworm is a useful source of live food

This month our series on aquatic insects continues with a look at the Glassworm

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●Picture by Pete Gathercole.

IN THE BEGINNING...

Nostalgia invaded the PFK office as we worked on our largest-ever issue this month. Looking back we discovered.....

■ **In the first ever issue of Practical Fishkeeping, December 1978, we listed the top 25 community fish. Right there at the top were: Guppy, Platy, Swordtail, Molly, Bronze Corydoras, Zebra Danio, Neon Tetra, Black Molly, Cardinal Tetra and Harlequin. Some things never change...**

■ The magazine carried an article which announced that due to the high cost of electricity, there was a large growth in membership of specialist goldfish societies, as fishkeepers deserted their tropical tanks, in a bid to cut down their electricity bills.

■ **There was also a story from the Belle Vue fish show, in the same issue:**

"One of the most unusual fish on show at Belle Vue was a 2" Red-Tailed catfish. The big cat, which grows to 4' in the wild, attracted a lot of interest, because of its rarity.

"It's not likely that many will ever be acquired in this, or any other country and it's unlikely that the catfish would ever be very popular with fishkeepers."

■ **More blasts from the past next month.**

■ Quick tip

Insure yourself. Due to lack of space last month, we omitted the warning from Magdala Thomas' article that you should be fully insured before doing any work on someone else's tank.

How old is your fish?

Have you got a GOLDEN OLDIE?

Our editorial secretary Sue has three goldfish in her two foot tank, one of which is at least twenty years old. Can any readers top that? Write to Young Fishkeeper, Golden Oldies, Bretton Court, Bretton, Peterborough PE3 8DZ

shkeeper

Quick tip

When adding remedies to your tank, count the drops out into a separate container first. This way, if the top comes off the bottle, or you lose count of the number of drops you've added, you won't run the risk of overdosing your fish.

WIN A SHARK FOR YOUR TANK

If you can identify the four pictures above, you could be well on your way to a prize

We're giving away a Shark in this month's competition. But don't worry – it's not the watery variety. It's a Shark **PF1** internal power filter from **Independance** (UK) Ltd., worth over £30. Suitable for tanks up to 40 gallons, the PF1 is a really good looking piece of equipment – and it comes with a free plug! All you have to do is identify the four pictures above, then fill in the coupon and send it to:

Young Fishkeeper April Competition, Bretton Court, Bretton, Peterborough PE3 8DZ.

The closing date is **April 30.** The first name drawn from the bag on May 1 will win the Shark PF1. You must be aged 17 or under to enter.

A..... **B**.....

C..... **D**.....

Name.....

Address.....

.....

..... **Age** .....

YOUNG FISHKEEPER WINNERS

The winners of the Hexafun tanks, from **Reef Aquatics**, in the February competition were: Simon Webb, Dorset; Michael Hewitt, West Sussex; Kathryn Quinn, Newcastle; Kirk McDeat, Devon and Darren Newton, Lincs.

Floyd by fran

FOR MARINE 1st INFORMATION

Unwelco GUEST

What's that creeping from your living rock? PHILIP HUNT has some suggestions.

One of the interesting and sometimes infuriating facets of running a reef aquarium is the apparently spontaneous appearance of various organisms which enter the tank either as larval forms or hidden in living rock or the bases of sessile invertebrates.

Some of these creatures are interesting and entertaining, adding to the appearance of the aquarium. Some are beneficial to the system, but others can give major problems.

The marine invertebrate keeper will encounter more uninvited guests than other hobbyists if he or she uses living rock to decorate their tanks.

Mantis Shrimps

One group of unwelcome animals are the Mantis Shrimps. These fall into two main groups, *Squilla* species, which resemble a praying mantis, and *Odontodactylus* species, which look like lobsters without claws.

Both types are voracious carnivores, preying on fish and other crustaceans, but *Odontodactylus*, which can grow to six inches (fifteen centimetres) in length, is also a threat to the very fabric of the aquarium.

This type of Mantis Shrimp kills its prey with a 'punch' delivered by modified claws. The strike of *Odontodactylus* has the distinction of the fastest movement ever recorded in the animal kingdom, and the force of a small-calibre bullet - enough to shatter aquarium glass.

While Mantis Shrimps are fascinating creatures, they have no place in aquaria, except perhaps on their own.

Like bristleworms they should only be handled with forceps or aquarium tongs, as either type could do considerable damage to the fishkeeper's hand.

The presence of a Mantis Shrimp is usually signalled by a loud clicking or cracking noise coming from the tank, usually at night. Disappearing fish are another clue!

To catch the offending shrimp, it is often necessary to strip down the entire tank, rock by rock, until it is found.

Sometimes the source of the noise is a Pistol Shrimp (*Synalpheus* species) another common accidental introduction, and one which is quite harmless. Again, 'quarantining' may help to prevent Mantis Shrimps getting into the aquarium.

Crabs

Other crustaceans which can cause problems in reef aquaria are various species of crabs, notably various swimming crabs, *Macropipus* species, which may sneak into the aquarium in crevices in rock when small. Like most of the true crabs they can be very destructive in the reef tank.

Only Anemone Crabs (*Neopetrolisthes* spp), the Arrow Crab, (which has the virtue of eagerly devouring other juvenile crabs), the Boxing Crab *Lybia tessulata* and the various dwarf hermit crabs are acceptable.

Molluscs

Various kinds of molluscs are also frequently introduced into aquaria by accident. Some of these, such as most small snails and limpets, are quite harmless. Others, especially bivalves, tend to be filter feeders with heavy appetites, which often die of starvation in the reef tank. These should be removed before they pollute the tank.

One interesting family of molluscs which occasionally pop up in aquaria are the chitons. They are primitive molluscs which have a curious segmented shell. Most chitons are rather sedentary animals, living in one spot and venturing short distances in search of food.

Welcome worms - fanworms

Not all worms which turn up, uninvited, in the aquarium, are unwelcome. Many tiny fanworms, both those living in calcareous tubes encrusting the surfaces of rocks and aquarium equipment, and those living in tiny rock burrows, are attractive additions to the tank, making the rockwork look more natural.

Case study - my meat eating chitons

The textbooks will tell you that chitons are herbivorous, but this is not necessarily the case. I had found a chiton living on the back of a rock which had a zoanthid colony growing on it. I left the chiton alone, thinking that it was a vegetarian, and thus harmless.

One day, however I noticed that one of the zoanthids had disappeared. Keeping an eye on the colony over the next fortnight I saw that another half-dozen polyps had followed the first.

I also noticed that the chiton was growing rather quickly, so put two and two together and removed it, whereupon the polyps stopped disappearing. It just goes to show that you can't believe all you read.

Bristleworms

Perhaps the most commonly encountered accidental introductions are bristleworms. These are polychaete worms, closely related to tubeworms. They range in size from five to twenty-five centimetres in length, and tend to be pink or brown, with fluffy tufts of spines (setae) protruding from each segment.

Bristleworms are predators with a taste for corals and anemones, which they eat by nipping them with their sucker-like mouths.

Eradicating bristleworms can be difficult. They are most active at night, when they emerge from the gravel and rocks.

The large ones are easier to catch, as obviously there are fewer places for them to hide.

The small species are more difficult, however, though 'fishing' with a pair of forceps after dark can be quite effective. A Lancefish bait placed in a convenient place in the aquarium can be used to attract them and then they can be picked off, the bait being removed afterwards, of course.

There are few predators of bristleworms which can be safely introduced into a reef tank though doubtless a large crab or Triggerfish would devour them happily, but would also probably eat all your expensive corals as an appetiser.

Some Hawkfish will eat bristleworms, as will some wrasse, though the latter tend to be "asleep" at night when the worms are most vulnerable.

Another good predator is the arrow crab *Stenorhyncus seticornis*, which is safe in reef aquaria so long as they don't contain small shrimps, which are also to the crab's taste.

The best solution to bristleworms is to remove them as soon as possible when setting up a tank, perhaps by quarantining living rock and corals before introduction into the display tank. Bristleworms of all sizes should always be handled with forceps; those fluffy white spines can break off in the fishkeeper's skin. They can at best be itchy, at worst venomous.

me S

Terebellids

Another family of worms which are welcome are the terebellids. These worms have a similar food-gathering strategy to the more familiar filter-feeding tubeworms, but instead of the feathery heads of fanworms have long, sticky tentacles which they wave in the current or drag over the substrate in search of food particles which are then carried back to the mouth as the tentacles are drawn in.

Some terebellids live in burrows in the substrate, others build tubes of coral sand which they pick up, piece by piece, using the sticky tentacles. One specimen in my own tank has tentacles about a foot long, whereas the body of the worm, in its sand tube, is only about an inch in length.

Above: Not all worms which turn up unbidden in the aquarium are unwelcome. Many tiny fanworms, both those living in calcareous tubes encrusting the surfaces of rocks and aquarium equipment, and those living in tiny rock burrows, are attractive additions to the tank, making the rockwork look more natural. Our picture shows Feather Duster Tubeworms Sabellastarte magnifica.

Left: Another good predator is the Arrow Crab Stenorhynchus seticornis, which is safe in reef aquaria so long as they don't contain small shrimps, which along with juvenile crabs are greatly to the Arrow Crab's taste.

All photographs by Max Gibbs, The Goldfish Bowl, Oxford.

Brittle stars

Other welcome guests are Brittle Stars, which often turn up in zoanthid colonies or tangled in the branches of gorgonians. They are inconspicuous during the day (though occasionally a couple of slender arms will be seen waving from the base of a rock) but are very useful as scavengers.

Shrimps and copepods

Other useful scavengers are the many kinds of tiny shrimps which can be found by simply turning over a rock in any reef tank.

In addition to their role as refuse removers, these crustaceans also provide a valuable food source for some fish, particularly Mandarins, which are next to impossible to maintain for long periods in aquaria which are not well stocked with inverts and living rock.

Mandarins also enjoy eating one of the two types of accidental introductions commonly seen in fish-only tanks, namely copepods.

Their presence in large numbers in fish-only systems is an indicator that the aquarium is overfed, or that uneaten food is not removed thoroughly enough.

They seem to be harmless in themselves but conditions under which copepods flourish, are also conditions under which various fish parasites, notably gill flukes, thrive. The solution is to cut back on feeding.

Scavengers

In the reef tank many of these accidental arrivals play a very important role as scavengers, especially the various worms, brittlestars and shrimps. The way that most invertebrate and mixed systems are set up, with intricate rockwork and powerful water movement, makes it very difficult to spot uneaten food particles, and the various scavengers are vital in picking this surplus up, and preventing it from decaying and fouling the tank. Similarly, if a fish or shrimp dies, trying to remove the carcass from within the labyrinth of rockwork is a nightmare, and often it is better to simply check that no nitrite or ammonia surge occurs in the tank, doing partial water changes if it does, and leave the corpse to the scavengers. After about a week, in a well established system, there will be nothing left. You shouldn't try this in a fish-only system, however!

As a final word, unless you can be 100 per cent certain that any animal you find in your aquarium is harmless, always use forceps or tongs when removing your uninvited and unwelcome guests. Many marine animals are poisonous, and you could receive a nasty sting - or worse.

Porcelain Anemone Crabs Neopetrolisthes maculatus and the Boxing Crab Lybia tessellata are acceptable accidental additions. All others should be removed as soon as they are spotted.

Flatworms

The other pest seen in fish-only systems (and in reef tanks) is the brown flatworm. Like copepods, these 3-4 mm brownish worms thrive in overfed aquaria, and can only be eradicated by syphoning them out at every opportunity, which may take months. ■

Case study - my mystery guest

Disappearing zoanthids were a clue to the presence of the most spectacular uninvited guest I've yet observed in my system. The polyps began to disappear shortly after I introduced some large blue mushroom polyps which were growing on a piece of dead coral.

I suspected a large bristleworm. One night, after 'lights-out' in the tank, I saw a hefty worm moving under the mushroom polyp colony. It looked, as far as I could see, like a bristleworm, until I caught a glimpse of its head, which seemed to have antennae of some kind.

Next time I was doing a partial water change, I decided to investigate further, and took the piece of coral, complete with mushroom polyps, out of the tank, and working quickly to avoid damaging the polyps, cracked it in half with a cold chisel. Within was the worm.

It was no bristleworm, however. It did not have the spines of a bristleworm, having what looked like feathery gills on each segment instead. Sure enough, it had four processes around the mouth which looked like antennae. When I consulted a textbook it seemed that these were nuchal organs, important in food detection.

The worm was about 16 inches (40 centimeters) long, when fully extended. Its size, however, was not its most interesting feature. When I picked it up, using forceps, it emitted a blue glow of bioluminescence along the length of its body, and dropped bioluminescent slime.

I have no real idea what this species is, beyond guessing that it is a clamworm or nereid.

Fortunately, however, a few weeks before I found it I attended a lecture given by a Dr Peter Herring, of an oceanographic research institute based in Godalming, on the subject of marine bioluminescence. I preserved the worm in alcohol and dispatched it to Dr Herring in the hope that he could identify it; I'll be interested to find out exactly what it is.

Large bristleworms are among the definite pests in the aquarium. They are predators with a taste for corals and anemones, which they eat by ripping them with their sucker-like mouths.

Above: View from the guest bedroom of Ray Talbot's split-level pool. Right: Koi are fed year-round in the indoor pools, kept at 55F.

The Koi market is an endless source of innovation. NICK FLETCHER went out and about to look at one dealer's new ideas.

Practical Pond
The real things

No Koi dealer is recession-proof. But there's nothing like countrywide economic hardship to sort out the stayers from the stumblers.

I went along to see Ray Talbot, of Norfolk-based **The Real McKoi**, to see what the trends might be for the coming pond season. I came away with the impression that, long-term, the Koi hobby has nothing to fear as long as people like Ray stay in business.

Okay, fish sales haven't been wonderful - can anyone honestly claim they have? But there's still much scope for innovation on the dry (or, rather, wet) goods side, and in this respect, Ray has been very busy.

That's on top of securing a supply and maintenance contract for ponds at the latest Center Parcs complex at Elveden, and getting some surprise, but welcome, publicity as a result of treating a large, valuable and decidedly sick carp for an angling syndicate. Apparently, Ray pulled the fish back from the dead, anaesthetising it on the bank, trimming back rotted fins and administering an antibiotic injection. The fishermen were so concerned for its welfare that they closed the lake for the remainder of the season, and the fish has since been spotted several times, fully recovered. Ray discovered that his exploits had been recorded in a specialist fishing magazine.

Eradicating blanket weed

Ray uses his outside pond for retailing fish to early-season buyers and, as luck would have it, sold two Koi just as I arrived.

That, he said, was a mixed blessing, because in catching the fish, he inevitably disturbed the bottom and affected water clarity. Normally, the pool would be like the proverbial dry gin - thanks to a device known as the 'Eradicator'.

Since UV became popular, green water has ceased to be a problem, but blanketweed has replaced it as the number one gripe of the pondkeeper. The Eradicator may well be the solution: tests conducted by Ray have certainly proved encouraging, and it would take a long string of coincidences to attain the results he has achieved by any other means.

The Eradicator is based, says Ray, on 'partial reverse osmosis by magnetic interruption', and it was originally developed to reduce the hardness of pond water by coagulating limescale, so that it could be collected by a filter.

Magnets have been used before for this purpose, but never in such a way that water has had to pass through several opposing magnetic fields. Hold a knife blade over the housing and it goes all over the place, proving the point.

In the first of several experiments, Ray pumped water through the device into the bottom of a pump-fed biological filter. Next, an Eradicator was fitted on to the pick-up feed pipe of an ITT ▶

Re-vamping the Real McKoi

Since I was last at Garboldisham (the Real McKoi can fairly be described as out in the wilds), Ray has re-vamped the garden. There is now only the one pool, which he designed with the specific purpose of encouraging Koi-keepers with limited space. It's really two ponds in one, upper and lower. The top pond, which measures 9ft x 9ft x 4½ft deep, is the one that holds the fish. Water feeds into the lower pool, slightly smaller, via a surface skimmer and a bottom drain - in other words, at two levels (controllable by valves).

Then a submersible pump, concealed in a sump, conveys it back up to a blockwork filter filled with Canterbury spar.

■ **TIP:** If you construct filter chambers from blocks, try laying the first three courses flat, the remainder upright. In this way, you will achieve a 'hopper' shape and provide a suitable ledge on which rests the perforated sheet that keeps the media clear of the void below.

■ **TIP:** In large filters, even the most rigid perforated sheet can sag, especially if you use a heavy media. Ray gets round this by building a support 'spider' from a cross-fitting with elbows and straight pipework (see diagram over page).

Coldwater Answers

■ Bad vibes

My garage is to be demolished very soon and I am worried that the pneumatic drill which may be used to break up the concrete base will upset or even kill my fish in a pond about 30' away.

The pond contains half a dozen goldfish and some Orfe and Tench.

Have you any ideas about what I should do?
T. M. Fry

The vibration from breaking up the concrete floor certainly would disturb your fish but there is also the added problem of lime dust from the work contaminating the pond.

A child's paddling pool would house the fish temporarily, but this should be placed either inside a shed or garage, in case the temperature falls drastically overnight. You will also need to run an airstone from an aquarium pump to the fish to provide them with plenty of oxygen and to monitor the water for ammonia and nitrite.

You may try contacting How Kang Koi who are based at Portsmouth, telephone 0705 663912. They may be able to help you with a view to hiring a show vat for Koi. **BB**

How do I get rid of Blanketweed?

Q **I have a 2000 gallon pond with a 18' x 9' surface area. A 12" diameter pipe feeds a gravity filter, 6' x 3' x 3'6" deep. The filter has three chambers: one for settlement, the others are filled with Litag. The water is returned by a central heating pump via a small header pond which I wish to plant out as much as possible.**

My problem is with blanketweed which was brought in on a lily plant. I did think about emptying the pond this spring and coating the concrete with a rubber paint, but what about the plants. Can they be treated or will they have to be discarded? And will I then be left with a poundful of blanket weed?

Which plants can I use in my header pool?
• Royston Williams, Gloucs.

A Blanketweed is not a symptom of poor water quality - rather the reverse - it means your filter is converting nitrite into nitrate, as it should. But that very nitrate is sustaining the algae. Coating the concrete with a rubber paint will not help. This would still give a "key" to the algae: the only surface inimical to blanketweed is smooth fibreglass.

I doubt whether the introduction of Water Lilies can be blamed for the problem either. The algal spores are airborne and blanketweed will colonise any suitable pool, irrespective of whether or not it is planted. In fact, Water Lilies should help, not aggravate the situation, as all plants are consumers of nitrate. However, planting your header pool may be the key. Suitable plants are *Myriophyllum*, (Parrot's Feather) and Watercress. Don't collect the cress from the wild; you buy the stuff as a salad garnish from most supermarkets and it will root quite readily in a glass of water.

Finally, do investigate siporax as a filter medium: it appears to convert nitrate one step further along the trail, to nitrogen gas. **NF**

Myriophyllum, or Parrot's Feather makes an ideal choice for header pools.

When connecting a split level pond by means of a waterfall, make sure you take the height of your top pond into account when choosing the size of your pump.

Ponds on a split level

Q **I intend to start building two ponds in my garden. I will link the two by a waterfall, because my garden is split level. One pond will be approximately 8' x 6' x 3' deep and the other 10' x 8' x 3' deep.**

I will install a filter system and UV using a 1200gph pump. Each pond will have shelving for marginal plants and will have a fibryl lining.

As my garden faces south, I am concerned that the sun will affect the lining edge not covered by the water level. To avoid this I propose to place a layer of mortar on the lining and lay bricks on top which will be covered by slabs.

Do I need to treat the mortar? Can I use house bricks? Should I coat the brickwork and mortar to make them waterproof? Also, would it be advisable to install another pump in the first pool to avoid the build up of waste?
• David Porter, W. Midlands

A Before you buy your pump, make sure you take into account the height of your top pond, as you may find a 1200gph pump may not be sufficient. Most pump manufacturers supply the information concerning the number of gallons per hour the pump can manage, at a given head of height. Also, before even digging the holes for the ponds, you might be advised to put in a concrete collar where the pond edge will be. The best way to place the liner on this edge is to put a row of bricks directly onto the collar, bring the liner over this row of bricks and then lay another row. Once again, bring the liner back over these bricks and have the edge of the liner at the pond edge of the bricks. Thus the liner is effectively seated between three rows of bricks and brings it up above water level, preventing seepage.

You should certainly seal the mortar using G4 which is available from aquatic centres. House bricks should also be treated with G4 and it will also help to waterproof them.

There will certainly be a build up of fish waste in both ponds as the faeces tend to drop out of suspension and accumulate on the bottom. Even the pond pump will be subject to this accumulation of waste. To remove it, syphon the debris off or use a pond vacuum. **BB**

Pond is a death-trap

Q **On moving into our new home last year, we inherited a small pond.**

Following the frosts this year I retrieved four dead frogs and one dead Orfe from the pond. We tested the pond water and discovered dangerous levels of nitrite. We carried out a number of 50% water changes. The level is still high. What else I can do? The pond has no filter.

• C. Hillier, Middlesex

A The nitrite levels were aggravated by the decaying bodies of the frogs and fish - and probably decomposing vegetation too. You have an anaerobic death-trap on your hands. You do not say whether any fish are still alive, but if there are, carry on with the partial water changes.

Start from scratch this spring with a thorough clean-out and then treat the pond as though it were a new one, going through the necessary maturation process. **NF**

Quarantine is no guarantee

Q **I understand that I should quarantine newly-purchased Koi before introducing them to my pond. Is this correct and how should I go about it?**

A You are not quite right in assuming that you, the Koi-keeper should quarantine newly purchased fish. This is the job of the dealer... providing you buy from a reputable source, you can be sure this will have been done for you.

Newly imported fish often suffer from external parasites, such as anchor worm and flukes, which standard dealer practices will remove before the Koi goes on sale.

If you subject your fish, which will already be disturbed by the journey from the dealer to your pond, to a further spell in 'solitary' you are more likely to lose it from stress than from specific infection or parasite infestation. Those who show their fish and spend thousands on a single Koi do advocate quarantine, which is more likely to mean housing their new arrivals for months, rather than days, in a whole separate pool: in this instance, the stress factor does not apply.

Many ailments, especially viral ones such as Fish Pox, can make themselves apparent a long time after purchase: in other words, unless you go the whole hog, like the very top Koi-keepers, quarantine is no guarantee that all will be well. **NF**

If you have one of these in your garden, then you have problems. Once they've found an easy supply of fish, Herons will soon wipe out the contents of your pond.

Join the club

Q **We have heron trouble. Our pond is surrounded by crazy paving and slabs and so it's not possible to put canes around from which cotton can be stretched across the pond.**

Do you know of a company which produces self-supporting fencing which is flexible and can be placed around the pond which is an informal shape. It would need 60' of fencing to surround it.

• J.P. Belsey, East Sussex

A Welcome to the Heron Club, of which I am an unwilling member. Each morning before I leave for work, I bid a cordial (?) farewell to the one perched on my roof and each night I count my fish to see if he's penetrated the net I hurriedly stretched over the pool.

I know of no fencing of the type you describe - and even if there were, you would be spending a lot of cash to install a feature that you plainly would not want, were it not for the heron's attentions.

You would be better off to install a deterrent device, of which there are several types (all advertised in PFK). The Wurzel is the most sophisticated and its inventor has studied heron behaviour and come up with a radical audible warn-off. Less expensive, although requiring a firm base to install the tripwires, is a device which triggers gunsaps, at the same time flashing open predator-like "eyes". And in this issue, I review yet another anti-heron gizmo which switches on the fountain when the heron alights.

If you have trees or fences around the pool, the cheapest and most effective deterrent would be heavy-gauge fishing line stretched about seven feet above the pool. This will interfere with the bird's flight-path. **NF**

If you want a coldwater aquarium stick to the more domesticated species rather than attempting native fish which are prone to disease and parasites.

Not an easy project

Q **I would like to set up a 42" x 20" x 15" tank in my lounge to house small specimens of our native freshwater fish. Please could you give me any advice?**

• I. Dennis, Kent

A A home aquarium of British Freshwater species sounds like a good idea, but there can be many problems.

The aquarium is too warm in the house. Local fish always carry parasites - not just the external ones which may respond to treatment, but internal ones such as tapeworms. In the warm, crowded conditions of the home aquarium, the parasites overwhelm the fish.

A cooling system can be installed but you may have condensation problems on the external glass.

These problems can be overcome, but where is the pleasure of fishkeeping in something which is always on the edge of disaster?

I would stick to domesticated species, such as Goldfish or Koi. For a coolwater tank you can get Paradise Fish, White Clouds, Blue Acara and even many Barbs and Killies. **DF**

■ Use cooking salt

Six months ago I moved house and acquired an 18' x 9' x 2' pond. It contained a Golden Tench, Golden Orfe, Goldfish, Comets and Shubunkins. I added six Koi.

A couple of weeks passed without problems. Then two of the Koi and a couple of Orfe began to have problems swimming and were wagging their heads and going backwards.

I isolated them in a holding pool and treated them with salt baths, but they all died. Now the remaining Koi and Orfe are exhibiting similar problems. All the other fish are fine.

D.C. Preston, Northants.

It is very difficult to identify the problem with your fish, without seeing them. Make sure the water is free of ammonia and nitrite - the latter is a skin irritant and can certainly affect the behaviour of the fish. Goldfish are extremely hardy and will survive in conditions which would kill any other species of fish.

It seems unlikely to be an infectious agent that is causing the problem as only Koi and Orfe are affected.

If you want to treat the pond, try cooking salt at a half-ounce per gallon of water. Chemicals will affect your filter and it would be unwise to subject the fish to poor water quality. **BB**

■ Goldfish IQ

Please could you send me some information on the learning behaviour and intelligence of goldfish?

K. Stepney, Lincs.

My own opinion is that all cold-blooded animals are endowed with responsive behaviour that can be mistaken for higher intelligence, when what we are really dealing with are reflex actions to given stimuli - as in Pavlov's dogs, which salivated when a bell they associated with food was rung.

Fish are not capable of establishing a relationship with their owner in the same way as dogs and cats, but I'm convinced that my Koi can distinguish me from other people approaching the pond. They rise to the top for food, having associated my particular shape and footfall with food pellets, and they know I don't pose them any threat.

I dismiss the popular theory that goldfish have a memory of only nine seconds' duration. If so, how do they recognise flake food or develop brand preferences? **NF**

Black Water is stagnant

I have Golden Orfe, Comets and goldfish in my pond. It has no filter or aeration system. After returning from a week away I found the pond to be deep black; the fish were visible a few inches from the surface. The fish appear healthy.
D. J. Wiltshire, Bristol

In the absence of any filtration or aeration to your pond system, it is likely that the black colour of the water is due to stagnation. The fish would swim to the surface of the pond as the water in this area has more dissolved oxygen content - below this layer, the water has become devoid of oxygen. Under these conditions there is a proliferation of anaerobic bacteria which can lead to the release of harmful by-products, such as methane.

If there is a thick layer of sediment on the bottom, start using a product like A.B.A. to help remove this sludge - but you will have to minimise the aeration of the water while you use it as it can cause a heavy demand on the dissolved oxygen to remove the sludge. It would be in your interests to fit a filtration and aeration system to the pond.

While you do this, monitor the water for ammonia, nitrite and dissolved oxygen.

Soot fallout shouldn't harm your fish, though it does look unsightly.

Trouble with soot

Q **I have two ponds, one holding 1500 gallons and a larger one which is 20' x 6' x 2'. They contain mixed fish, including a breeding pair of Golden Orfe. I am intending to build a third pond, with dimensions 20' x 6'x 2'6".**

However I am having a problem with soot from a neighbour's chimney which falls into the pond at regular intervals. My neighbour's house is the only one in a block of seven with a coal fire. She says she has had the chimney swept, but the problem persists. Her house is still council owned.

What I would like to know is: what damage is the soot doing to my fish and do I have just cause to go to the council to get something done about it?
• H. Hunt, Wilts.

A I wonder whether you can lay the blame for the soot entirely on your neighbour, as I would have expected any "fallout" to have settled some distance away.

If she burned smokeless fuel, the soot problem would disappear. Have you suggested this?

I doubt if the soot would actively harm your fish, but a little goes a long way. If you cannot resolve the matter amicably, I suggest you contact the local council - not with a view to making a direct complaint, but just to establish what the regulations are concerning open fires. If she is in breach of these and will do nothing to remedy the situation check with other neighbours, to see if they are suffering from any soot fallout on washing lines and so on.

Remember, before you approach the council, that they may be more than interested in the quantities of water necessary to run your ponds...you may end up with the officials knocking at your door.

I hope the matter can be cleared up, as living at war with neighbours can be stressful - and fishkeeping is all about relieving stress. **NF**

Orfe are more susceptible to poor water quality than goldfish.

A total water change...

Q **The other day I did a very stupid thing. I left a hosepipe running overnight and most of the next day while attempting to top up my pond.**

To my horror, when I realised what had happened it was already too late for some of my fish. I had several deaths, particularly of Orfe and small goldfish reared from last season. The larger Koi and goldfish, although obviously in some distress, have so far survived. The dead fish had a thin coating of mucus over their bodies. I have an overflow system which was unfortunately partially overwhelmed by the situation.

While it is academic, I would still like to know, if possible, the reasons behind the deaths of these fish.
• Stephen Robinson, Carlisle

A Orfe are much more susceptible to suspect water quality than goldfish, or even Koi. I cannot say for certain what caused your fish deaths, but the coating of mucus on the casualties suggests there was an irritant in the water which they tried to combat. This could have been chlorine, chloramine or any number of additives.

You effectively subjected your fish to a total water change with raw tapwater and there could have been another stress factor in the swift change of temperature.

Partial water changes are beneficial and certainly recommended, but Koi keepers in the top bracket always run such water through a device that takes out chemical compounds before it reaches the pond. **NF**

Sole occupant

Q I have recently purchased a house with a 750 gallon pond on top of the septic tank, housing one 10" Koi.

The pond is murky with dead leaves which are decomposing. There's an underwater pump feeding either a fountain or a 30 gallon filter tank. The tank has a 2" layer of foam in the bottom and a bottom outlet feeds a triple waterfall. Should the tank have any other filter 'media'?

The pond is 18" deep. What should I use to clean it? Should there be any sand or gravel on the bottom of the pond for plants to root in? All it has now is a mass of blanketweed around the pump (which works well).

• R. N. Walton, S. Glamorgan

A UV unit is the only cure for green water.

A You seem to have inherited a typically horrible pond with a typical occupant - a Koi which has clearly not read PFK, otherwise it would swiftly develop psychoses about its inadequate accommodation and peg out!

Actually the fish is in fine fettle because it is the sole occupant: 750 gallons of water would probably sustain it, filtered or otherwise. If you want to leave the pond more or less as it is, then a kid's fishing net is the best way to remove the dead leaves without disturbing too much sediment. The filter appears to be top-fed by the pump. By all means retain the foam, but also install a perforated grid in the base of the tank, over which you should place Littag or Spar. Over this, replace the foam, which will then act as a prefilter and which can be washed out as and when it clogs.

Don't put gravel in the base of the pool. This will make matters impossible if you subsequently need to hoover it out. If you wish to have plants, choose fleshy-leaved varieties and plant them in individual pots. If you choose a waterlily, site it where the fountain does not play on it.

If you want to get rid of the green water, which is not harmful, a UV is the only sure remedy. NF

Stress-related symptoms

Q We have a pond holding 8000 gallons of water, 20m x 1m x 1m, with a round area at either end. At the end of October we decided to modify it.

We had a number of Koi and Goldfish which had lived together for up to ten years and many were quite large. All were healthy. The pond was heavily silted.

A smaller pond was pressure cleaned and filled with direct mains water. All the fish were immediately transferred to it.

At the end of November, when the extension and new filter were completed, the fish and plants were replaced in the main pond which had also been pressure cleaned and the mains water hose was left flowing overnight in order to refill the pond.

Within a fortnight the fish developed fungus, fish pox, white spot and chilodonella. A large number of fish have now been lost.

What caused this? Is a complete water change advisable? When is a suitable time to consider re-stocking?

• S. Smith, Torquay

Stocking levels should be kept to a minimum, until the filter matures.

A Your original pond dimensions fascinate me, as it seems you had a canal rather than a traditional pool. Such a pond would be extremely difficult to filter and the reason why your fish did well in it was undoubtably down to low stocking levels and a balanced plant population.

When you decided on the re-vamp, I'm afraid you did everything wrong: transferring the fish from mature water to mains tapwater and then, when the extension was completed, doubly stressing the fish by repeating the error. Your fish responded by exhibiting classic stress-related ailments - viral, bacterial and fungal problems, which only became evident when their natural defence mechanism was at a low ebb. In a new pond, which is effectively what you have, the filter must be allowed to mature the water, which can take weeks or even months. During this time, stocking levels must be minimal: you cannot hope that it will sustain its previous population right from the off. NF

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The prize is a 36" x 12" x 18" tank complete with a Regal cabinet with built-in cupboard and shelves in a walnut finish. The hood incorporates waterproof fluorescent lighting.

■ **This month's competition begins on March 30 and to enter all you have to do is to study the three questions. The answers to all of them can be found on this page and in John Allan's Eheim advertisement on page 26.**

■ **When you think you have the right answers, dial our competition hotline on 0891 600 067.**

■ **The recorded message will read out the questions in the order they appear below, and the choice of answers a, b, or c. All you have to do is say loudly and clearly yes to the answers you think are correct.**

The Gem 2000S tank and cabinet from John Allan Aquariums Ltd

■ **If you answer all three questions correctly, you will be asked to leave your name and address.**

■ **Please state whether you would be willing to receive details of any further promotions.**

■ **Keep the competition handy when you 'phone. Calls cost 36p per minute cheap rate and 48p per minute at all other times.**

■ **The names and addresses of all the correct entrants will go into a draw after the closing date which is April 20. The first name drawn out will win the tank.**

■ **For more details of Juwel and Gem tanks, and Eheim equipment, contact John Allan Aquariums Ltd., Eastern Way Industrial Estate, Bury St Edmunds, Suffolk IP32 7AB. Tel. 0284 755051.**

QUESTIONS

1. What is the code number of Eheim's automatic feeder?
a) 3200
b) 3580
c) 2600

2. How many suckers are shown in the picture of Eheim accessories?
a) 22
b) 6
c) 3

3. What is the name of John Allan's other tank series besides the Gem?
a) Jewel
b) Juwel
c) Diamond

• DIAL 0891 600 067 •

Everything you wan

KOI

This month ALEXANDER ARROWSMITH returns to discuss Koi nutrition.

Koi have not yet abandoned carp-like feeding habits. These entail grubbing around in the murky bottom silt of a muddy pond for invertebrates.

The fish relies little on sight, because its paired barbules have nerve-endings to tell the small brain what is edible.

As it makes its way along, the carp also takes in a certain amount of plant matter.

The invertebrates include quite large creatures, such as freshwater shrimps and crayfish. These are crushed, at the back of the carp's throat, by the pharyngeal teeth.

From there, the food passes to the gut - Koi do not have a stomach as such, only a very long intestine. Here, nutritive material is absorbed through the gut wall into the bloodstream, while bacteria break down less-digestible substances such as cellulose. The speed at which digestion takes place is directly dependent upon water temperature. Examination of the faeces is often a good pointer to the health or otherwise of Koi, which can become "loose" or constipated.

In our (hopefully) crystal-clear water, Koi have little opportunity to sift the silt. Instead they rise to the surface to take what we provide and show off their colours to the best advantage.

Wild fish "accidentally" provide themselves with the right mix of fats, vitamins, minerals, proteins and carbohydrates; our Koi have no such choice.

When to feed

Most Koi-keepers don't feed their fish enough. Yet we have all seen obese Ogons and Bunter-like Bekkos wallowing around pools.

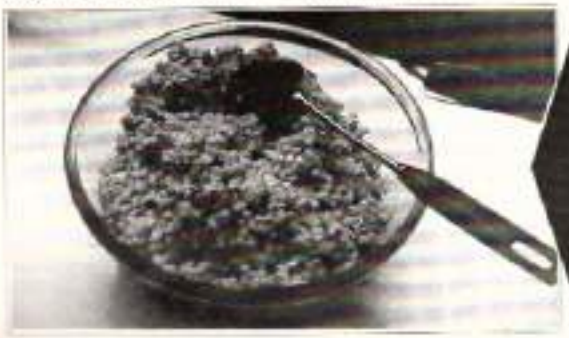
The fact is Koi have a pecking order - not based on aggression, so much as a will to be first up to the pellets.

In the warm months, it is quite in order to feed little and often: four or more times daily.

The greedier Koi will be sated after the first couple of meals, giving the more reticent fish a chance. The meals will be better digested, whereas if the fish have to gorge their food in one or two sessions, much of the nutritive value will be passed directly through the gut to cause a rise in ammonia and nitrite.

Over-feeding is a problem in the early and late season. On mild, winter days it is tempting to throw in some pellets. But at 50°F, it can take 72 hours for food to pass through the gut, and much below that temperature, digestion ceases. Koi fed on a warm winter's day will then have to pass a cold winter night, when a gutful of even low-protein pellets can turn into a pathogenic sludge causing liver and kidney failure.

Sated larger fish will leave food for smaller ones.



TIP: If you have a heated pond, or indoor holding facilities, you can maintain year-round growth with pearl barley fed once daily. Boil it till soft, and rinse it thoroughly under a tap, to remove excess starch that would haze the water. It sinks, makes little mess and puts volume on your fish.

A FEEDING CALENDAR*

November to March: No food at all.

Early March: (or when water temperature stays consistently around 44-45°F): Begin with a small feed of sinking wheatgerm pellets. If these are taken, feed a little more on day two. Nothing on day three, but watch for fish excreta. If some is present (bearing in mind it can take 72 hours for food to pass through the gut), then continue with sinking wheatgerm.

If the food is not being passed, it may pay to examine a fish to make sure the gut is not congested.

Net it out, semi-anaesthetise it with MS222 or similar, then with the Koi in the bath, gently run your fingers from pelvic fins to vent checking for congestion. The action is identical to that used when stripping brood fish for eggs or milt.

Late March/April: When the water is a consistent 50°F, move on

ted to know about...

to floating wheatgerm. This will bring Koi to the surface, enabling you to give them a visual health check (but not of the underside where ulcers may occur).

April/May: Increase the protein content of the food, but do not yet feed a 'high-protein' brand. Also try a dodge used by the Japanese - feed lettuce and, if you can get hold of it, Chinese Leaves, which is a colour-enhancer, besides providing Vitamins A, C and K and vital roughage. Dice up the leaves and feed only as much as the fish will consume in ten minutes.

TIP: When Koi start taking their first protein food, feed them some pellets treated with oxolinic acid in a concentration of 5gm per kilogram. A ten-day course will protect against ulcers and bacterial disease that might otherwise strike when the fish are coming out of dormancy and are at their weakest.

However, this antibiotic is available only on veterinary prescription: some dealers can obtain it on your behalf.

May onwards (when water is at 55°F or above): Move on to high-protein floating Koi pellets, but not above 44% protein.

Otherwise, while growth will accelerate, body shape may be adversely affected. A fish may also 'burn itself out' and shorten its lifespan. The right food blends animal and vegetable protein.

As summer moves on, continue to augment the basic Koi diet with treat foods. Fresh or frozen prawns and cockles are good - even prawns in their shells, which are crushed by the throat teeth and provide roughage.

Earthworms are a high-protein source, but be careful of contamination by sprays or pesticides.

***Assuming unheated ponds, and normal temperatures for the time of year.**

Which brand?

The recent introduction of a 'sell by' date on pet food should solve one dilemma.

The Japanese emphasise the quality of their wares, and rubbish the UK product, while the UK counters by saying that by the time Japanese food is shipped here it can become oxidised. That is, the fat content becomes rancid, which can lead to fish deaths.

There are two ways to counter oxidation: vacuum-packing, and the addition of anti-oxidants.

Some Koi-keepers will feed only* vacuum-packed food from Japan, while others prefer to buy the cheaper UK product in smaller amounts and use it up quickly.

Food fads, facts and fancies

■ One Japanese high-protein food is impregnated with 'Re-fresh' powder, (in fact a very fine-particled clay, Montmorillonite.)

This powder could be added direct to the pond - fish root around in it, and take it into the digestive system, which it cleanses. With impregnated pellets the fish benefit but you don't get clouded water.

■ Colour-feeding is a hot topic. Pink flamingos stay pink when fed shrimp meat which is high in carotene. Carotene enhances the reds on Koi, but can turn the whites pink, too. Spirulina, an algae, lacks this side-effect and is high in protein, too.

The ingredients

The following is a quick run-down of the necessary elements in prepared Koi foods.

Proteins: These are made up of amino acids, and are the building blocks of growth and repair. Fish need high-protein foods in warm weather, when they are at their most active, and to recover from the exhaustion of spawning. Young fish, arguably, need more protein as a percentage of their diet than do older, mature Koi. But fish never stop growing from the day they hatch to their death, even if the growth rate slows dramatically once they attain sexual maturity.

Fats: Another source of energy, and important for healthy cell membrane structure. Typical sources of fat are fish and soya oils and wheatgerm.

Carbohydrates: Fish are rather less good at assimilating this energy source than humans. Before prepared Koi food became readily available, sweetcorn and processed peas might be fed to excess, resulting in rotund Koi that were prone to liver and heart failure.

Vitamins: Both fat and water-soluble vitamins are essential to fish health. But it is an excess, rather than a shortage of these which is likely to cause trouble. If you feed your Koi good, proprietary-branded food you can effectively stop worrying - they will be getting all they need.

Minerals: Minerals (or trace elements) can be absorbed by fish, either from their food or from the surrounding water.

■ Stick foods are currently very popular - with a lot of air in the mix they float like a Li-Lo. Koi love them, but, weight for volume, they are very expensive. Pet fish can be fed three per cent of their body weight daily, and even the most towering tub of stick food quickly goes.

Never hold stick foods overwinter. Their antioxidant protects them for three months against deterioration, but one respected manufacturer actually limits production to minimise stockpiling.

Beware of 'bargain-priced' stick foods, which could be last year's stock. ■

TIP: Flake food can be very useful if you have the type of pond in which fry survive.

Feed a pinch of crushed flake as you put in pellets for the adult fish. This will sustain them until they can take 'crumb' pellets.

On the subject of pellet size, it is better to err on the small size anyway, so that your younger Koi can get their mouths round the food; or feed a mixture of small and large grade pellets, with perhaps a handful of stick food as a treat.

Stick foods are greatly loved by Koi and can be used to bring them to the surface

NEW

FIRST ISSUE

SPRING 1992 £1.80

FROM THE MAKERS OF Practical Fishkeeping

FISHKEEPING ANSWERS

TROPICALS ■ COLDWATER ■ MARINES ■ EQUIPMENT

Trouble - free tropicals

PICK THE RIGHT FISH FOR YOUR TANK

BUYING KOI

What to look for... and avoid

Filters explained

Choose the right system for your set - up

OVER 100 TIPS INSIDE

EQUIPMENT ANSWERS

BUYERS GUIDE TO POND & AIR PUMPS

STEP BY STEP GUIDES

We show you how to get it right first time

- *Starting with marines*
- *Fish-house on a budget*
- *Building a pond*
- *Breeding tropicals*

Emergency pond plan

BARRY GOODWIN looks at the most probable causes of fish deaths in some of this year's new ponds and suggests ways to prevent it from happening to you.

Top: The excitement of a new pond will quickly wane if it turns into a disaster area overnight. Above: Algae are a sure sign of poor water. Right: Overfeeding quickly leads to water pollution.

For newcomers to Koi-keeping, the thrill of a first pond can very soon be tarnished if things go wrong and their Koi start to die. Panic may often set in, with the fishkeeper not really knowing what to do and wondering whether it's his fault, or if he has been sold sick fish. The answer may be one or both of these and only a careful rescue package can avert a total disaster.

Such a disaster may well result in the pondkeeper's first introduction to fishkeeping periodicals and specialist clubs, when they really should have read up all they need to know on the subject and taken specialist advice beforehand.

Before you do anything else, the primary cause of the ill-health must be determined. Many factors may be responsible, but 99% of these are caused by poor pond husbandry.

The root of the problem

■ To begin with, the new water you put into the pond was probably straight from the tap. It is heavily chlorinated to ensure it is fit for human consumption, but that doesn't mean it is suitable for your fish. The chlorine will irritate their skin and gills, disrupt some of their metabolic functions and subject them to a huge amount of environmental stress - and stress is the number one killer of fish.

■ You probably put too many fish in at once. Fish take in oxygen from the water and excrete ammonia and carbon dioxide through their gills. Other waste products, such as faeces and urine also break down into ammonia and these levels will build up to where they are harmful to the fish, unless you take steps to lower them via a biological filter. You should introduce fish a few at a time, over a period of several weeks.

■ Those concrete ornaments which you may have put into your pond won't help either. The cement will leach out and raise the pH of your water, making it very alkaline and further stressing the fish.

■ The stress which your fish are suffering from, will suppress their immune systems. All types of bacteria and fungus which occur naturally in the water, without damaging your fish, will begin to find their way past their defences. You'll probably notice your fish are getting tattered fins, a whitish furry coat over their bodies and the odd sore appearing. By now they will not be eating, so all the food you threw in and didn't bother to remove "in case they got hungry", will be rotting down and raising the ammonia level.

■ By this time the weakest of your fish will probably be dying. Another problem will begin to raise its ugly head, in the form of parasites. Most fish carry low levels of body and gill parasites which, under normal circumstances, their own defence systems will keep under control. Add the stress factor and these parasites will begin to multiply rapidly, debilitating the fish further and causing the spread of bacterial and fungal infections to the sites of their grazing and attachment. Many of these parasites are invisible to the naked eye.

What can you do about it?

The picture is pretty black, isn't it! So let's have a look at what you can do to remedy the situation.

You can only carry out remedial action one step at a time, so you must start by removing the primary cause of the trouble, and that is the **polluted water.**

Healthy and happy koi will only be found in perfect water conditions.

■ If you can get your fish into a temporary container, then do so and drain your pond, refilling it with tapwater treated with a suitable dechlorinator. **It is not good enough to leave your water standing for 24 hours.** Most chlorine additives will not easily air strip. As an alternative, you can invest in one of the many dechlorinating filters now available. It will be an investment you'll never regret.

■ Make sure the replacement water is at the same temperature as the pondwater - and this goes for the water in any temporary containers as well.

■ If it is not feasible to move the fish, then change 50% of the pondwater, once again replacing it with dechlorinated water at the right temperature. You should dechlorinate the water in a suitable container *before* adding it to the pond.

How do you prevent it from happening again?

Once you have cured the water pollution problem, you will have to take steps to avoid it happening again.

■ Stop feeding the fish, to cut down on the waste matter being produced.

■ Add rock salt (not table salt) to the water, at about one ounce to a gallon. Salt has the effect of reducing the excretion of urine and as a bonus, it will go some way to controlling some of the parasites that your fish may have.

■ Set up a biological filter and circulate your pondwater through it about once every two hours with a suitable pump. Never shut the filter down, or the beneficial bacteria will die and you will be back to square one. It can take up to 30 days, dependant on temperature for a biological filter to become established. Test your water with an ammonia test kit every couple of days and change as much water as often as is necessary to maintain safe levels. When safe levels are attained consistently you may reduce the frequency of testing to once a week.

■ While the filter is maturing, take a look at your remaining fish and assess their condition. It is improbable that any of them will be healing up yet if they have ulcers and it is certainly too early to do any pond treatment, as this will only slow up the filter maturation process. You could treat the fish with "dips" out of the pond, but all you can hope to do at this point is to control the spread of secondary infections, such as ulcers and fungus and bacterial infections. Remember that this will stress the fish further. If they are still eating, try obtaining a medicated flake from your local vet. The parasites will have to be left until later, when your filter can stand the pond treatment required.

■ Measure your pH level. Very high or very low readings should be investigated, as they will have a direct bearing on the toxicity of any pollutants you are trying to rid your system of.

■ When your filter begins to ▶

DIARY DATES

SUNDAY, APRIL 5

■ **Halifax Aquarist Society** are holding their spring auction at **Ferens Cottage Community Centre, Cousin Lane, Ovenden, Halifax.** Booking in from 12 noon; auction starts 1.15pm. Contact **David Shields on 0422 360116.**

■ **Larkhall & District Aquarist Society** are holding an open show in the **Larkhall Community Centre, Montgomery Street, Larkhall.** Contact **Ewen McCowat on 0698 886334.**

■ **Halton Aquarist Society** are holding their annual open show and auction at **Ditton Community Centre, Dundalk Road, Widnes.** Contact **Ted Derrick on 051 423 3895.**

■ **Scottish Section B.K.K.S.** is holding a meeting at **Aboyne, nr. Aberdeen.** Contact **Graham Burwood on 0339 881518.**

■ **Preston & District Aquarist Society** are having an auction at **Lancashire Polytechnic, Students Union, Fylde Road, Preston.** Contact **H. E. Viros on 0772 824378.**

SUNDAY, APRIL 12

■ **Bishop Auckland & Wear Valley Aquarist Society** are holding an open show at **The Spectrum Leisure Complex, Willington, Co. Durham.** Contact **F. J. Corrigan, 8 Clifton Green, Sunnybrow, Crook, Co. Durham. Tel: 0388 745674.**

■ **The British Cichlid Association** is holding its annual spring auction at the **Balwell Youth & Community Centre, Coventry Road, Bulwell, Nottingham.** Contact **Lynn Fern, 5 Winding Shot, Hemel Hempstead, Herts. HP1 3QQ.**

TUESDAY, APRIL 21

■ **South Park Aquatic (Study) Society** are having a meeting on the subject of Fish Photography at 8pm at **Wimbledon Community Centre, 28 St. George's Road, Wimbledon, SW19.**

SATURDAY, APRIL 25

■ **Ilford and District Aquarist and Pondkeepers Society** are holding their Annual Aquatic Convention, which is being sponsored by "Aquarian", at **Woodford High School for girls, High Road, Woodford Green, Essex.** Admission £1. For further information tel **0708 748566.**

Stuart Herbert

Stuart Herbert (21) a respected cichlid expert at Britain's Aquatic Superstore died recently after a lengthy battle with illness.

Our pledge to our readers

Some readers of Practical Fishkeeping probably believe that we are tightly in league with the manufacturers and retailers who advertise in this magazine. They may even believe that he who pays the piper calls the tune, and that PFK editorial is slanted towards one or another manufacturer.

The fact is that the editorial staff of PFK are only concerned with one person - you the reader.

•Our **product guides**, for instance, are intended mainly to inform the reader about the range of products on the market. We canvass the widest number of manufacturers possible, and are always aware that many retail outlets can only afford to display a limited range to their customers, so we give contact addresses and phone numbers as a matter of course.

With the vast number of products these guides attract, we are not able to to give each item a hard edged review.

•On the other hand, the products we review on our **What's New** pages are unsolicited. They come to us because the manufacturer or retailer wishes to take advantage of exposure in what is simply the best and biggest fishkeeping magazine in the UK. Often we are offered an exclusive review of the latest products. We then

The Editor says

test them thoroughly - but often only for a short period as we wish to get the latest fishkeeping news - including the latest products - straight to our readers.

Most modern equipment is remarkably good, but generally we go on testing review items, whether their Star Rating is good or bad, long after the review has appeared. Sometimes we find problems of durability; on other occasions manufacturers listen to our ideas and actively make changes in their products.

What we have failed to do is get back to you the reader, with our findings. A look at this month's **What's New** pages will show you that we've acknowledged the error of our ways and now include review updates on products (plus a new product news section).

Our pledge to you is that we owe no allegiance to any manufacturer (though we reserve the right to let their best brains entertain and inform you on these pages).

Regardless of advertising, competition or gift sponsorship, even personal friendships, we shall continue to be firm but fair in our reviewing.

And if we overstep the mark - or even if we don't - we offer the manufacturer the right to reply - letting you, the reader, judge. In the end, it's only your opinion that really matters.

•And talking about that - some readers may have encountered a research questionnaire in some copies of PFK recently. Thanks to all the readers who replied, and thanks for the nice things that you very often said.

You loved the **Projects** pages, but where, you asked were the reader's tips we used to publish, and articles on reader's tanks? Well, as I hope you've already discovered, we have five pages of project tips from our readers this month (ten pages in all).

You wanted more humour - perhaps we sometimes forget that fishkeeping is fun - so we recruited **Old Fishfinger** and started our **Newswatch** column to monitor the strange and humorous.

You also said that you liked our colour pages. This magazine contains more colour (and more pages) than any previous edition. From May there will be even more.

•I think we can even help those kind people whose biggest complaint was that PFK comes out only once a month. They - and you - should look out for our new magazine - *Fishkeeping Answers* which hit the shelves on March 14. If you missed it, there may just be the odd copy left.

Rush out and get one - or at least be sure not to miss the next edition out soon.

Steve Windsor

STEVE WINDSOR

Editor on the air

PFK Editor **Steve Windsor** (far right) joined **Dr Neville Garrington** (second left) of Interpet and **John Cooke** (left) of Shirley Aquatics to answer live phone-in pond questions on BBC Radio WM's Sunday morning **Ed Doolan** (centre) show. About 90% of the questions related to water quality and to the spring problem of carp pox - though there were some lively discussions about the deviant mating behaviour of frogs.

Win Ascension Island fish stamps

We have 25 sets of Ascension Islands Stamps to be won, worth over £6 a set.

The 15 stamps feature nine fish sometimes found in marine tanks, and five of the big ocean-going fish that surround the Islands, plus the Bottlenose Dolphin.

Fishkeepers' species include the stunning Grouper *Epinephelus adscensionis*, a hungry-looking Moray Eel, the Resplendent Angelfish, the Spotted Scorpionfish, the Hardback Soldierfish.

●Lying several hundred miles off the coast of West Africa, Ascension Island is one of the remotest places in the world. It was discovered by the Portugese on Ascension day 1501.

The first British settlers were marines who arrived on the island in 1858 as part of an extended guard on Napoleon who was exiled on St Helena - some 700 miles away!

Today there is a still a British forces contingent on the island. British stamps have been used on the islands since 1858 when the Royal Navy had a base there.

The Islands became a dependency of St Helena in 1922, and released its first stamps with Sterling denominations in 1924. They are still produced with the assistance of the Crown Agents Stamp Bureau.

HOW TO WIN YOUR STAMPS

Answer the following three easy questions and send the answers (postcards only please) to the following address:

Practical Fishkeeping Competition
PO BOX 345,
Bristol, BS8 1BR

Please note this address is only for entries to this competition and is NOT the address for Practical Fishkeeping.

- **In which Ocean are the Ascension Islands?**
- **What currency is used on the island?**
- **What's the capital of Ascension Island?**

Entries must arrive by April 27 and the first 25 correct answers drawn will win a set of stamps each.

GOLDFISH ASSOCIATION

■ Anyone wishing to join the Association of Midlands Goldfish Keepers, should send an SAE for further details to Juanita Hunt, 8 Wensleydale Close, Barwell, Leics. LE9 8EU. Tel. 0455 845623

Male guppies can be a problem with their spawning urges, causing unwanted hybridising, and harrassing females. Now a plastics firm called POLARPILO has come up with tiny semi-permanent condoms for guppies. They come in three sizes complete with tweezers to put them on the fish.

Wearing his heart on his....

The remarkable marking on this Koi kept by Tim Porter at J.M. Hollybush Nurseries at Shawshill near Wolverhampton, has his customers blinking. It's likely that the pattern will break down as the fish grows.

ch....Newswatch....Newswa

● "A man who spent £10,000 turning his garden into a haven for fish, frogs, and newts has been told he faces prosecution if he continues to trap his neighbours' cats, and abandons them miles away," reports the *Daily Telegraph*. According to the *Telegraph*, Peter Dashwood of Shirley Warren, Southampton tried every trick he could think of to stop the cats killing his Koi and Mirror Carp before luring them into a trap with tins of herring and deporting them.

● The same paper reports a story in *Nature* that Dolphins are the hitch-hikers of the sea, taking advantage of the boats they playfully follow to glide through the water using only a tenth of the energy a human would require. The faster the boat proceeded, the less energy the dolphins needed to follow.

Apparently dolphins have used whales in a similar fashion for millions of years.

Should you be jealous of your fish's skills? If you're a keen swimmer, yes. Humans use up to eight times more energy than dolphins and 21 times more than fish when swimming.

● A yellowed *Daily Mirror* cutting reminded us of Fang the Puffer who had a £50 dental operation from Peter Scott. The Puffer's teeth had not been ground away as they would in the wild and had begun to lock his jaw. The fish was anaesthetised and a dental drill used to file down the teeth.

● Piranhas are popular in the Sun and two cuttings from that paper came from the same source. Peter Georgi of Banbury had a lump of his finger removed by his five inch pet while hand-feeding. Some 13 stitches later he said

"I always though Piranhas were timid, but apparently the larger they get, the more vicious they get." He had no plans to get rid of his fish.

Equally unfortunate was a 45 year old postman Brian Collins who had an artery severed by a seven inch specimen. Fish bites postman was too good a story to miss.

● Next time you condition your fish with a feed of earthworms, why not try a few yourself? Australian worm breeder Wayne Fauser thinks that worms are an underexploited source of protein, reports the *Guardian*. After 48 hours on a diet of dough the worms can be fried in butter and taste like "beef sliced up" apparently "You just chuck them in the frying pan and they die instantly, they're so small" says Mr Fauser.

The *Guardian* suggests calling them Ver de terre (French for earthworm) and offers the following recipe:

Wash one cup of earthworms, boil for 15 minutes, rinse, repeat boiling and pat dry. Chop 3/4 cup of blanched almonds, mix with earthworms, spread on a baking dish and toast in a hot oven. Hard boil six eggs, mash with mayonnaise, and add one cup of cocktail shrimps, 1/2 cup of finely chopped celery, 3/4 cup grated cheddar, 1/8 teaspoon of onion salt, garlic salt and cooking salt. Combine both mixtures, spread on toast and bake under grated cheese.

Food fit for an Oscar?

● Have you got a story for Newswatch? Send us your clippings, stating clearly where they come from and the date. We'll pay £3 for every one printed.

This month's contributors: C. Bates; Kate Howson, PFK staff.

Dear Newsagent

Please reserve/deliver me a copy of Practical Fishkeeping every month

Name: .....

Address: .....

.....

I certify that ..... has placed a regular order for PFK. Newsagent's signature: .....

FACTFILE

Our monthly question and answer session with a well-known fishkeeper

Name: Mary Bailey
Home town: Croydon (born in Ilkley)
Occupation: Freelance translator and literary services
Hobbies (apart from fishkeeping)? Horseriding, gardening, DIY, Natural History, Classical music, computers, cats
Years of fishkeeping experience? 10
Favourite type of fishkeeping? Cichlids
Best book on fishkeeping? Barbas Aquarium handbook
Favourite species? Uaru amphiacanthoides
Least favourite species and why? I don't have one, but I don't like "artificial fish" man-made forms
How many tanks do you own? Twenty-ish
What was the first tank/fish you ever had? *Melanochromis auratus* (not normally suggested for beginners)
What was the first fish you ever bred? *Astronotus ocellatus* (I think)
Worst mistake in fishkeeping? I have made several awful ones through ignorance - the worst was probably assuming Uaru not knowing that they grow if kept singly. A close second was feeding live tubifex to Mbuna fry and losing the lot.
What's the most you've ever paid for a fish? I don't think anyone's ever managed to get £20 out of me for a single fish.
What do you think is the most important current issue in fishkeeping? The possibility of EEC restrictions on what we can keep.
Biggest fishkeeping gripe: People who buy fish without finding out anything about them first.
Are there any fish you wouldn't keep - and why? I'm not really into anything non-cichlid - I'm happy to try any cichlid.
Which fishkeeper do you most admire - and why? Ad Konings - who has done so much to educate other cichlid keepers about cichlids in nature as well as in captivity.
Favourite fishkeeping myth? That cichlids are aggressive.
Biggest fishkeeping ambition? To go and collect my own and study them in the wild state.
If you were reborn as a fish, which fish would you be? A top quality Koi - for a life of luxury.
How would you like to be remembered in fishkeeping? For not looking a bit like the photo of me in PFK.

■ Next month: Photographer par-excellence MAX GIBBS

GET A FREE THERMOMETER

Want a free *PFK* stick on thermometer? To encourage you to place a regular order at your newsagent for Britain's biggest-selling fishkeeping magazine, we have hundreds to give away. To get one, just fill-in the top section of the form on the left and take it to your newsagent. Get him to sign the bottom section, and send it with an SAE to

Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ.

We'll do the rest. This offer is subject to availability.

Star ratings	
Don't bother	*
Barely acceptable	**
Average/adequate	***
Good	****
Very good	*****

WHAT'S

Coagulation, algae control a

The ESPA VS is also available with a built-in float switch for automatic operation.

Small but perfectly formed....?

The ESPA VS 160 is one of a range of three good-looking submersible drainage pumps, which are all available with the option of a float switch for automatic operation.

The VS 160 is the middle pump in the range and it's surprisingly small considering its maximum output of 167 litres per minute (that's 10,000 litres an hour), giving you a head of two metres. It has a water cooled single phase 240V 50 Hz. motor. Power consumption is 0.33 kW. As with the other pumps in the range, the VS 160 comes with five metres of supply cable to make installation that much easier. **KV**

Price: £115

● Available from Espa Pumps UK Ltd., 7 Commerce Way, Lawford, Manningtree, Essex, CO11 1EY. Tel. 0206 391291.

Star rating	
Quality	****
Practicality	****
Price	****

The Algae Buster and Magnatron units from Aegean

More magnetism - another U/V

Nick Fletcher looks at the new Eradicator from the Real McKoi in his Practical Pond column this month. Another company now convinced that magnetism has a part to play in pond management are **Aegean International Trading Company Ltd.** Their device is called the Magnatron, and is designed to minimise flow loss when fitted into the system, while supplying the necessary turbulence for maximum effect. The magnets are ceramic, and presumably rust-free.

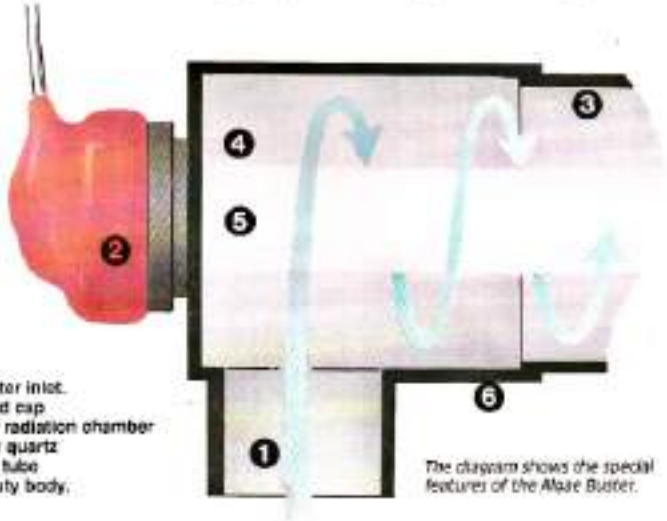
The unit should be used pre-U/V and pre-filter to take advantage of the following abilities that are claimed for the units:

Scale reduction; hardness reduction; scum reduction; emulsifies oils; reduces nutrients for blanket weed growth; improved water clarity; corrosion reduction; improved water clarity; solids coagulation; and enhanced algae control.

The units are power-free in the sense that they only require a flow-through of water to function.

The two sizes are aimed at 1500 gallons per hour and 5000 and cost £116 and £147 respectively.

How do the units actually work? By restructuring and interfering with the molecules in water, and changing the charges in the various particles. For a more technical description contact Aegean at the number given.



KEY

1. Turbulation water inlet.
2. Self-sealing end cap
3. Large capacity radiation chamber
4. Medical quality quartz
5. 5,000 hour U/V tube
6. Black heavy duty body.

The diagram shows the special features of the Algae Buster.

NEW?

The latest products, books and videos reviewed by Editor STEVE WINDSOR, pond expert NICK FLETCHER and Staff Writer KAREN YOUNGS.

...nd clarity

Algae Buster 2

The new U-V units from Aegean are claimed to be unique as their body casing and other parts are purpose designed and made. Features include endcaps that show when the unit is on; a waterproof room sealed ballast unit to meet safety standards; large radiation chamber allowing good flow; a 5,000 hour (29 weeks or 7 month pond season) tube life; and a 12 month guarantee.

A correctly chosen and sized unit with an efficient filter should clear algae within 21 days. **Prices:** 8 watt £51.50; 15 watt £65.50; 30 watt £87.50. **S.W.**

• More details from Aegean International Trading Company Ltd. at 2-4 Hale Lane, Mill Hill, London, NW7 3NX Tel: 081 959 6845 or 1387.

Star rating

MAGNATRON:	
Quality	★★★
Practicality	★★★
Price	★★★
ALGAE BUSTER:	
Quality	★★★★★
Practicality	★★★★★
Price	★★★★

NEW PRODUCT NEWS

Spraying and trickling

Manufacturers in plastics looking for a new aquatic widget are invited to contact Ivan Davies for details of his Oz Enhancer which he has designed to spread water more effectively over nitrate filter media. It's positioned under the stand plates, (with flat plate uppermost) and the outflow from the tank hits the rotating bar, sending a spray of oxygenated water all over the media. The item is Patent Pending no 9120547.8.

Ivan can be contacted at: **The Post Office, Long St., Newport, Dyfed. SA42 9TJ.**

King British re-packaged

Our picture shows the new packaging to look for when buying King British flakes.

This superb cabinet comes from Maple Reproductions, Cranham Farm, Eaton Road, St Mary's Lane, Upminster, Essex - Tel: 0708 640015. It could have been built in mahogany, yew, ash, teak, oak or chemywood style, and the company will build any size aquarium to order. The guide price on this cabinet is £570.

Instant pH - but still some problems

The Lovibond pH Micro Checkit is a battery-powered unit to measure pH instantly. It's a useful tool for those who keep sensitive fish, and equally handy if you have several tanks, to easily monitor for falling pH in just one of them. Falling pH is typical of mature tanks and can be an early warning of a decline in water quality.

The main reason to this unit is of an end to chemical-based pH kits in tubes for one solid investment in the unit. The fact is that what you pay for is instant accuracy - but not really convenience.

First the unit must be washed (the instructions say only the electrode but the cap is full of what is presumably crystals of the test solution used at the factory) then calibrated using the buffer tablets supplied. For this you need distilled water and presumably something to accurately measure 20ml of it.

The buffer pill is then dissolved in the water and the unit immersed for calibration. Once this is done it's rinsed in distilled water, and is ready for testing.

This is where the fun begins, because you can whip round getting various instant readings from a number of different tanks, pausing only to rinse the unit in tapwater or distilled between tests. Our readings on various tanks in the office proved fascinating and in one case eye-opening.

Unfortunately it is then suggested that you repeat the calibration each time you use the unit. Unless you have lots of tanks to check or you keep and breed Discus, Rams or can be Users, you have to question if all this fuss is any more convenient than a tube and tablet kit. One for the very keen fishkeeper then, but a very efficient and accurate bit of kit when used properly. **S.W.**

The Lovibond pH Micro Checkit has an RRP of £34.95.

• More details from The Tintometer Ltd., on 0722 327242.

Simple pH tester - but what about the re-calibrating?

Star rating

Quality	★★★★★
Practicality	★★★
Price	★★★

Ponds in a nutshell

The Interpet Bumper guide to Garden Ponds **compiled by Dick Mills at £9.95 hardback**

Old Fishlinger remembers the days of the Bumper Book for Boys better than I do, but despite the archaic title, this is a nice easily-digestible and colourful book, covering 240 colour pages with the combined wit and wisdom of Dick Mills, Chris Andrews, Barry James, and David Papworth. A very nice book, highly recommended if you don't already possess the relevant Interpet encyclopedias. (If you do you'll find a great deal of information and illustration in common.) SW

Star rating

Quality	★★★★
Practicality	★★★
Price	★★★★

Fountains of fright...

If you have a pond complete with fountain, and are troubled by herons, the latest deterrent device the **Aquaguard** by Stockport-based **Mattinson Bros Ltd** could be just what you are looking for.

The story begins on a May morning in 1991, when Brian Mattison awoke early to see a heron helping himself to a fish breakfast. Still in his pyjamas Brian switched on the fountain, and the sudden spurt of water scared the bird away.

This gave him the idea of developing a method of switching on the fountain automatically, every time the pond was approached by a predator: easily achieved by adopting a passive infra-red detector. Brian approached a major manufacturer of garden pools and, while they were interested in principle, they felt that the unit would be too pricey for the end-user.

That was when Brian decided to go it alone, sourcing the units and adapting them himself. He claims that his deterrent acts in three ways:

- **directly frightening the predator**
- **disturbing the surface of the pond, making it difficult for a bird or cat to spot the fish**
- **sending the fish themselves** down to the bottom, **out of** harm's way.

Neighbours will appreciate a further benefit - it does not rely on the 1812 overture or other audible deterrents.

The unit was featured on BBC2's Gardeners World, and Brian is fully geared up to meeting demand for the new pond season. But the obvious question is, does his invention work? I have known rooks become oblivious to both the old type of scarecrow and its modern equivalent, the automatic banger.

Some herons scarers avoid this problem too.

Perhaps herons are bright enough to eventually realise that the fountain switching on represents no danger, but even if that eventually happens, the rippling and fish-scattering effects will remain. At only £49.95 (plus £4.99 p & p) it's available in grey, black or white and well worth a second look.

● **Details from Mattinson Bros. Ltd, Wellington Street, Stockport SK1 3AH. Telephone or Fax 061-480 6505**

...can shock those Herons

And still on the heron front, Ray Talbot of the **Real McKoi**, Garboldisham in Norfolk showed me yet another weapon in the pondkeeper's armoury against heron visits. Called the 'Pond Protection Kit', it's a mini-electric fence system powered by four Duracell batteries housed within a plastic box no bigger than a pint pot.

I was a bit worried that the jolt it delivers would do something rather more permanent than give Mr Heron a deterrent shock, but apparently not.

Each kit comes with enough wire to surround a pond 10ft x 10ft, and there is a choice of supports. The first set can be supported under paving slabs, and holds six strands of wire projecting horizontally out over the edge of the pool. The second set enables you to construct a more conventional, upright barrier.

I think, if you are worried about the cat getting a dose of volts, that the former option is the better one. What I like about the system is that it doesn't shout its presence to human interlopers: what do you do when your anti-predator device is preyed upon by the local villain? NF

● **More details from the Real McKoi, 8 Back Lane, Garboldisham, Diss, Norfolk Tel: 095 381 368**

...REVIEW UPDATES...

Maelstrom Lancaster Reef Surge Simulator

Interpet PH4 Powerheads

***(PFK* November 1991)**

It was purely coincidence that led to us setting up our test Reef Surge Simulator with the new Interpet powerhead.

Some time after we conducted our tests and reviewed the products, Maelstrom Lancaster contacted us to say that some powerheads didn't seem to be up to the strain of being run on an on-off timed basis necessary for the setting up of secondary tide-like currents in the reef tank. This was no reflection on the unit itself. The powerhead's impellors were described as the achilles heel by Mike Eydmann of Maelstrom. The search was on then, for a reliable powerhead for the Simulator.

It was not of course coincidence that after the products appeared on the same page in November '91 that Maelstrom tried the Interpet Powerhead. They report that they've found them extremely durable, submitting them to the test of being switched on and off every ten seconds, over ninety days of use, with no problems thus far.

'Aquarian's new products

In January in reviewing 'Aquarian's new range of equipment we mentioned problems with the first starting of an internal filter impeller. This was traced to an improper cleaning procedure of the impeller magnet in the factory and has now been rectified.

We also mentioned problems with 'bubbling' on the heater tube. This purely cosmetic problem was traced to the powder lubricant on the glass tube reacting when heated to produce gas.

We had an early problem with the supposedly new and improved diaphragm of an air pump which was used for only a few weeks. This was traced to a flaw in the manufacture of that particular diaphragm, and we have had no problems with other test pumps.

Bermuda aquaria

We criticised the Bermuda aquaria in January as difficult to filter well. Turn to this month's project pages for one sensible solution.

Thailand tour

The latest in Kingfisheries' video series covers a trip to a number of Thailand fish farms.

Potential and confirmed breeders of tropical fish really should see this one if only for the many tips they'll acquire.

Could three or four large water tanks and some carefully arranged bricks or pots produce far better results than the usual tanks in your fishhouse? See what can be done without filtration if you have a pollution-free source of water and can make one or two water changes a day.

A good one for club nights. SW

● **Price £9.95 plus 70p p&p from Kingfisheries Ltd., 308 Croydon Road, Beckenham.**

Star rating

Watchability	★★★
Information	★★★★★
Price	★★★★★

Find your local society...

I am writing with reference to the letter in January's *Talkback*, from P. Burnett, who requests details of a local society which he can join.

The FBAS maintain such a list, not only of our own 100+ societies, but of those belonging to other federations and associations as well. The list used to be issued around the hobby, but with the ever changing names and addresses of secretaries, this issue has ceased.

Should any of your readers wish to join their local society, I will gladly forward details, wherever possible, of their local society with a contact name, address and meeting place if they wish to write to me, enclosing an SAE.

•Adrian Dempsey, FBAS, 194 Greenhill Road, Greenhill, Herne Bay, Kent, CT6 7RS.

Has anyone had experiences of Corydoras 'cleaning' other species?

Cleaner fish

You mentioned in the Ed Says column the problem of fish jumping from tanks, and drip trays cracking after cutting to allow access for cables.

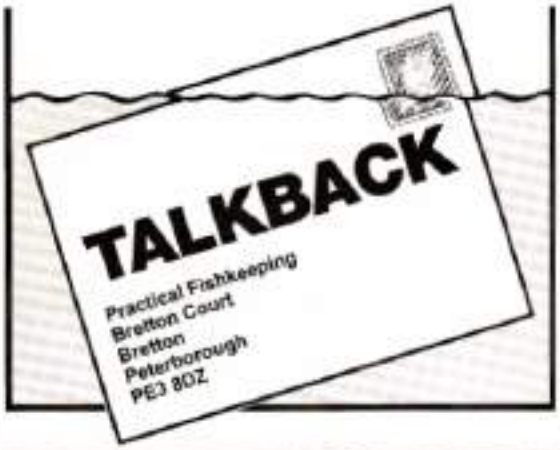
My way is to burn a hole in using a soldering iron, or by heating up a similarly shaped piece of metal on the gas oven and slowly easing it through. It's best to do this outside as the fumes are pretty horrible.

I had a Festive Cichlid which jumped out of my tank and was out for some time. When I replaced him he was quite stressed and as a result a week later became ill and had a fungal growth on him.

While he had this fungus my *Corydoras julii* cleaned him as he "laid back and relaxed". Is this normal cory behaviour?

•M. Shiner, Surrey.

Perhaps other Cory keepers can let us know? Ed.



A near disaster

When adding some filter aid to my two foot coldwater tank I unscrewed the cap and tipped the small bottle over the tank to add two or three drops. But the insert cap had stuck to the outer cap of the bottle and had come off - so instead of adding just a couple of drops, half the contents of the bottle went in. I did a 50% water change and phoned the manufacturer who told me to keep an eye on things.

I was lucky this time, but have learned my lesson. From now on I'll always put any conditioners and remedies in a separate container before I add them to the tank.

•S. Billington, Gwynedd

STAR LETTER

■ This month's Star Letter wins Jackie Hardie, from Hertfordshire, a year's subscription to PFK. It concerns a little algae problem...

The tale of the editor's heroic struggles against the all-conquering blue-green algae, struck a sympathetic note with me. I've been employing a similar battle plan in slightly different circumstances and I've scored at least one tactical victory.

The site of battle is a four foot freshwater tank housing Angels, Clown Loaches, Flying Foxes and tetras. The Flying Foxes are the Siamese variety, which are supposed to gobble up algae faster than it can grow. The tank contains real plants. Lighting is by two Florasel mercury vapour lamps which were originally set on a timer to give 11 hours of light. The tank has all the mod. cons. for plant growth, including CO2 injection and undergravel heating. At the time, the water quality was pretty good - the pH was a little below 7, with nitrite nil and nitrate less than 20ppm.

All was well algae-wise apart from a smear of brown algae on the glass, some beard algae on the bogwood and on some of the slow-growing plants and what I now know to be the tell-tale sign of a thin greasy film on the water surface, which is present long before it thickens up into slime algae. The beard algae had survived because the Flying Foxes had discovered that scavenging for algae was a poor way to live, compared with waiting around for the food for the Clown Loaches to arrive - and then nipping in smartish while the Loaches were still bumbling about.

I don't know what I did to disturb things, but it was soon obvious I had a blue-green algae problem. The stuff spreads faster than an Essex girl joke in a bar full of salesmen.

I removed as much as I could with my fingers, turned off the lights, added more plants and threw in one of those Nitrasafe bags. After I'd thrown the bag in, I read the instructions and the small print said it would only remove nitrates down to 20ppm. I trotted back to the shop and bought some X-Phosphate and X-Nitrate. I bought two Clown Plecs in the hope that they would embarrass the Foxes into nibbling a bit of algae. I didn't expect them to eat the blue-green stuff - have you smelled it? - but I have a suspicion that it gets a foothold on spots where other algae are already in residence. I didn't try algicides as I've heard too many horror stories.

I left the lights off and the CO2 went off with them. The nitrate went down to 10-15 ppm, which is less than our local tapwater. The algae disappeared in two days.

The slower growing plants were unaffected although the faster growing species went very papery and spindly - and haven't recovered fully after several weeks. I chickened out after three days and put the lights back on.

I now leave the lights on for eight hours a day. There are traces of blue-green algae on the tips of some of the plant leaves, but it doesn't seem to be spreading as yet. There is still an oily film on the surface. I feel I've won the battle but not the war. I think I'm going to splash out on reverse osmosis, which should remove all the water-borne nasties in one fell swoop - as well as providing a decent cup of tea.

More light on Neons

Mark Gribble (*Talkback*, January) has done well to breed Neon Tetras in his community tank.

His letter shows that fish will spawn under most conditions. I would suggest, however, that breeding 10 neons is hardly a success, as with soft water he would probably had 100+ fry.

In the same issue the article on Tetras (*Tempting Tetras*) gives the impression that Cardinals are as easy to breed as Neons. May I suggest that this is only true if natural conditions are emulated, and to do this requires a thorough understanding of the Cardinals' natural habitat - which is not a blackwater area.

The same comment about correct water conditions applies - in my experience (20 years of breeding) - to many other species as well. Given soft water even Angelfish have a high success rate, and, if brought up in a planted tank and allowed to pair naturally, will often raise their broods.

•D. Wood, Northampton.

Dave Wood was our 1991 Aquachamp and knows a thing or two about fish. Our comments on breeding Tetras were extremely general. As Dave suggests, it's often more use to read up on the natural background of the fish than to read a fishkeeper's account of breeding it. Ed.

Choosing UV units

The continuing debate about choosing and using ultraviolet (UV) pond systems has prompted me to write and highlight some points which I hope will help your readers make a more informed decision when purchasing a system.

Since every UV system uses both water and electricity during operation, it is vital to consider safety when choosing a unit. It is best to look for a UV system with electrical end cover caps manufactured to BS 6702. This standard ensures the unit is waterproof and so prevents an accidental, and potentially fatal, combination of water and electricity.

The electrical components should be double insulated for maximum safety and the outer casing made from an ultra violet stabilised material. Before buying, check that maintenance and bulb cleaning can be carried out easily and safely.

Most UV pond systems have been adopted from commercial sterilising units originally designed to produce pure drinking water. However, in the pond, the aim is to produce clean, algae-free water rather than a completely sterile, bacteria-free environment.

Off set pressure UV systems seem to be one of the most effective means of achieving a healthy, balanced pond, since they continuously bombard and kill algae by means of a low but effective dose of radiation. This type of system works by pumping pond water through a quartz tube running parallel to an ultra violet germicidal lamp. As the water is recycled through the system it is exposed to germicidal radiation, which clears algae but does not produce sterile water.

Where sterilisation is necessary, for example in quarantine or treatment tanks, it can easily be achieved by reducing the water flow through the UV system. However, keeping fish long-term in a sterile environment can affect their immune systems, leaving them unable to fight infection when removed to a pond or tank.

Research has shown that the most effective temperature for the bulb in a UV system to operate at is 77°F. If the bulb is too close to the water it becomes chilled and the temperature drops. This can cause the unit to lose up to one third of its effectiveness. Therefore it is important to select a system which is designed to prevent this reduction in temperature in order to get maximum benefit.

It is also worth pointing out that however efficient the UV system installed, it will not produce clear water unless used in conjunction with a good filter unit. Nor will UV systems clean murky water caused by silt build-up or over feeding.

It is important to be aware of the ideal conditions for using a UV system and so ensure that fish enjoy the best possible environment.

●Mary Parker, Joint Managing Director, Remanoid Ltd.

Porcupine Puffer - does it inflate as a sign of distress, or is it a type of courting ritual?

Why do Puffers puff?

I would like to pass on a theory concerning the behaviour of the Long Spined Porcupine Puffer, *Diodon holocanthus*. The accepted reason for the inflation of this fish is as a reaction against threat, and indeed, looking rather like a spiny conker with eyeballs, a fully inflated Puffer is a fearsome sight. However, my observations suggest that the reason for this behaviour is display, rather than self-defence.

I base this theory on having seen the fish both distressed and inflated, but never at the same time. The first time I saw the fish inflate, the only other occupants of the tank were three Green Chromis. Inflation seemed quite spontaneous.

Recently I moved my tank onto a new stand. I had to transfer my fish to the bucket while I drained the tank. Throughout the whole exercise the Puffer was in a state of obvious distress, but did not inflate. The fish has also been involved in other incidents of distress, such as having a fight with a Picasso Trigger.

Following on from the theory of inflation as a display, it would be interesting to know if anything has ever been observed on the breeding activity of these fish, as an even more outrageous thought occurs to me in that maybe the Puffer is one sex of the species exhibiting its mating display.

While it is not my intention to turn conventional theory on its head, it often happens that theories become accepted facts because people simply repeat them, without anyone ever questioning them.

●Dean Bisseker, Bradford.

Native marines in Lancashire

I should like to hear from anyone who has set up a coldwater marine tank in this area.

●John Nicholls, 8 Bamford St., Littleborough, Lancs OL15 8PB

Plants are the secret

I read with interest the reply to A. Aldys in the January edition of *Tropical Answers*.

Like A. Aldyss I have had my tank for only five months, containing Mollies, Guppies and Swordtails. I had problems at first with the "new tank syndrome" losing three Swordtails and a Molly.

Unfortunately A. Aldyss does not say how many of each fish there are in the tank. In my tank I have one male and two females and they are always breeding. I too have only one tank at the moment so I cannot put the females in a separate tank as suggested by you and most of the books I have read.

But I do have quite a lot of tall plants, Water Wisteria, Hygrophila and Polysperma as well as some bushy plastic plants. The fry that have been born usually hide in these plants, although I have lost more than I have saved only rearing four Swords and two Mollies.

I put this down to having lots of plants for the fry to hide in, and my practice of leaving a very dim light on during the night which is controlled by a dimmer switch. The majority of the fry are eaten but I think that this is a case of survival of the fittest in the confines of a community tank.

In conclusion most of it is commonsense (water changes etc) and luck. But most of all I put it down to having lots of plants, (plastic or real) for cover. Hopefully when I get a new tank set up, I will have more success in numbers by going by the book.

● Ian Moore, London.

Gold leaf?

I realise that prices for aquarium plants vary, but recently I purchased 18 pieces of Straight Vallis and 8 pieces of *Rotala macrandra* and was charged a staggering £9.65. Is this a record, or can anyone top that?

●P. Harris, Surrey

Livebearers breed continuously and the females spend most of their life in a state of pregnancy