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● **Cover picture**: A "rainbow" cichlid. Pic by Max Gibbs, The Coldfish Bowl, Oxford.

Reader's quote: Allan Ford of West Sussex

A HELPING HAND

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COLDWATER

A TANK FOR £250

General Tropical Tank - Steve Windsor

STEVE WINDSOR is the editor of *Practical Fishkeeping*. He freely admits to being a sucker for the equipment and gadgetry of the hobby, and specialises in quickly testing items to destruction – sometimes even deliberately. Surrounded by tropical tanks in the office, he keeps only an eccentric mix of "temperate" fish in a tank at home, and many of the ideas from that tank are adapted for this article.

Hardy White Clouds - Tanichthys albonubes. Pic: Jane Burton, Bruce Coleman Ltd.

Editor STEVE WINDSOR opens the batting on this £250 tank feature.

With £250 to blow on a set-up, what would I really want?

The answers are, I suppose, the largest possible tank and therefore the most stable environment for my fish; ease of maintenance; an attractive living picture; and the chance to experiment with the latest equipment.

I'm not, I suppose, too bothered about superb cabinets and hoods, though the set-up must be safe with children around. I am prepared - delighted even - to indulge in a little D-I-Y (having just built a cabinet and hood for my 36" x 18" x 18" and got the taste for it...).

I don't want vast numbers of rare and special tropicals in the tank (on this occasion) but do want to indulge my taste for shoals of fish, which is what nature intended in most cases but rarely happens.

And of course, as I'm the Editor and set up the rules for these features, I can cheat a little bit over costs.....

The tank

Mention a low cost tank and all the issues of new or salvaged glass, glass thickness, and quality of build come to the fore.

But all I'm asking for is an all-glass tank four feet long, and around 18" x 18" so that I can watch my shoals patrolling its full length.

What's a realistic price for a tank like this? Between £40 and £60, plus of course that often forgotten cost in petrol to fetch it or choose it.

A sizeable chunk of the costs goes straight away. The first saving comes by painting the back of the tank with whatever you've got to hand. Black is the usual choice, but a stippled grey/black/green or brown/green/black dabbed on with a sponge gives an interesting effect.

What you're aiming for are the receding depths of the river concealing its greater mysteries, while your fish flirt unawares in the foreground...

Zebra Danio (Brachydanio rerio.) Pic: Hans Reinhard: Bruce Coleman Ltd.

Above: Black Widow Tetras (Gymnocorymbus ternetzi). Pic. Jane Burton, Bruce Coleman Ltd.
Left: Red Eyed Tetra, Moenkhausia oligolepis. Pic. Max Gibbs, The Goldfish Bowl, Oxford.

shoal music

Filtration

Water management is the major part of fishkeeping - but I do have this fantasy about keeping it to the minimum and this partly explains the filtration system I am suggesting, based on a fairly standard undergravel.

By utilising a pair of 'Aquarian' internal filters, and their compatible undergravel system, I can set up a reverse flow filter. Water is sucked through and around charcoal-impregnated filter sponges into the undergravel plate and up through the gravel. This method should ensure that only limited mulm builds-up under the plate.

The ideas here are **a)** Minimal substrate cleaning as the dirt should be caught in the "pre-filter" **b)** Water purification by the charcoal.

I can happily dispose of the foam cartridges at regular intervals without losing vital bacteria as there will be sufficient in the gravel. Indeed I can easily replace them with a stocking bag full of charcoal which can be regularly changed.

Heating

There should be two heaters - not heaterstats - in this tank, ideally governed by an external thermostat so that if one overheats they are switched off, and if one fails the other will probably maintain a safe heat. Again this system is aimed at limiting disasters if the tank is given less attention than some others.

The probe of the thermostat, if any should be held in place with two airline sucker clips from Algarde, preferably siliconed in place to ensure that it can't slip free.

Having said all this, if your home is centrally-heated, one heater, perhaps not even rated for so large a tank, should suffice, and in practice it will rarely be on, when your home heating is. Two heating mats would be equally good (and probably less likely to fail on balance).

The Hood

I don't know what you're going to stand the tank on, but I will tell you how to produce a good-looking low cost hood. First make a square frame of wood - I used 1.5" x 1". You'll need four pieces 4', 4', and 18" and 18" - or if you can cut nice mitred corners adjust the lengths accordingly.

This should sit on top of the glass and support the outer frame which is made from inverted lengths of skirting board (available at DIY stores) cut to size. This instantly gives you an attractive "moulded" hood.

You may need to fill or plane off a slot at the thick or what is now the top edge. Leave a ¼" gap all around the top when attaching the board - an 18" x 72" x 18" piece of ¼" plywood fits into this. A handle aids removal.

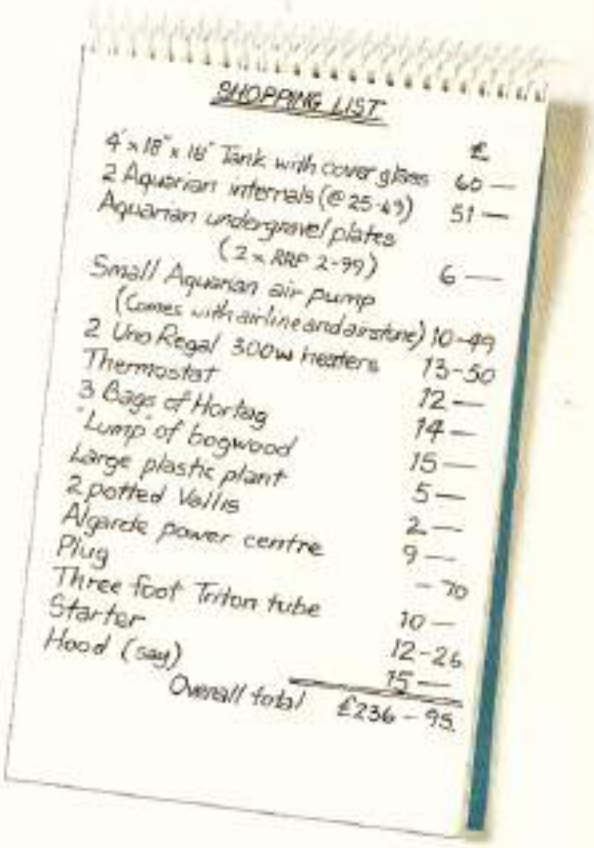
The inside of the lid is painted white or silver to reflect the aquarium light(s) which are clipped to the frame. The whole hood is then varnished with several coats of "tinted" varnish (at least one inside) or to save money your choice of left-over paint. See the diagram over the page for full details.

than a shoal of small stuff.

A three or four inch plec is likely to survive where the individual White Clouds might die. Water conditions can be corrected at the first sign of any trouble with far less chance of an annoying, expensive and let's face it, cruel loss in the tank. Once the tank is more mature I would gradually build up the stocking over several months aiming for shoals of fish, rather than odd pairs and trios. Never less than six fish (actually seven as our local shop offers buy six, get one free) of any species.

So probably a total stock of a dozen or more White Clouds, a dozen Zebra Danios, five female and one male American Flags (females have a dot on the dorsal fin), six Black Widows and Six Red Eyes, with perhaps six Rosy or Auratus barbs (though I have my doubts about the later having once come across three three-inch specimens that tried to eat Corydoras for breakfast) and the pair of sluggard cats.

The living picture formed relies on the large barbs to catch the eye, and move it on to the smaller Tetras. The small shoal fish shimmer in the background. Closer attention is rewarded by the discovery of the stately Cichlid-like behaviour of the American Flags as they flit in the background rocks and wood, and the hidden catfish. It works as a three dimensional picture show, offering serene beauty, movement, and mystery. ■

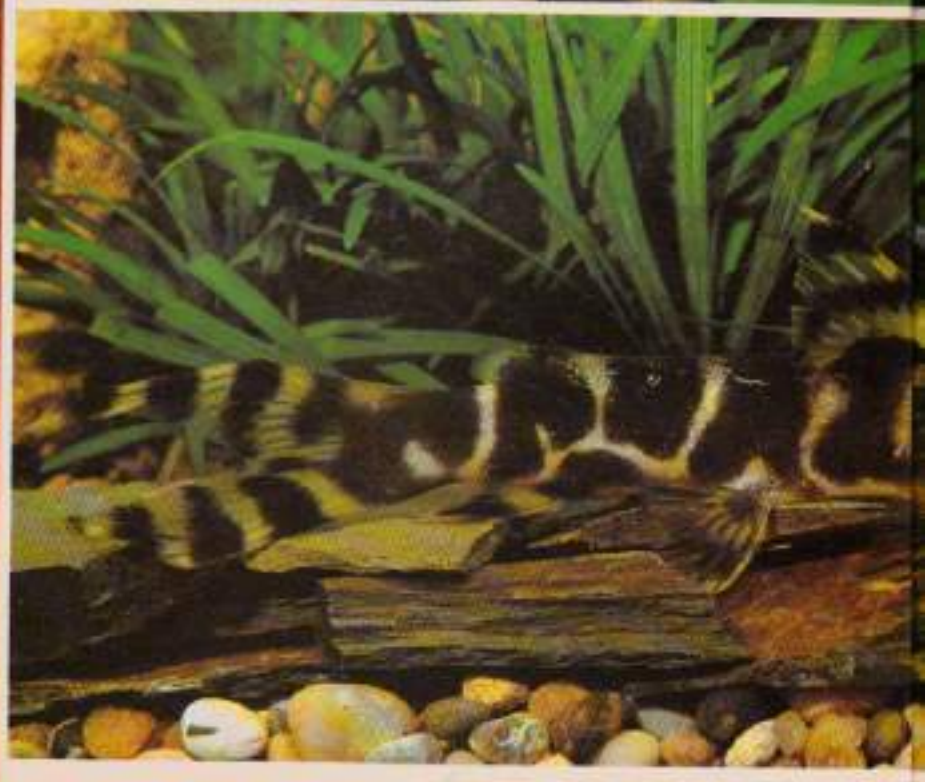


TROPICAL TANK: £236.95

A TANK FOR £250

Catfish Tank - Ian Lucas

IAN LUCAS has recently moved from working as a freelance journalist for *PFK* to a full time position on our sister title *Fishkeeping Answers*. He hails from Leicester where his house is less a living space, more a giant fishhouse, and his breeding successes in the hobby are many and varied, embracing snails and Severum, taking in Angels on the way.



Christmas CATS

IAN LUCAS couldn't resist expanding his catfish collection.....

Left: S. decorus is sometimes known as the Clown Catfish.

Below: S. brichardi - a snip at £24.95?

Pics by Max Gibbs, The Goldfish Bowl, Oxford.

When your editor asked me what kind of tank I would set up if he gave me £250 for Christmas, it was, unfortunately, only a hypothetical question. However, what better excuse for squandering my own cash on expanding my catfish collection? The idea was to see just how far £250 would go. . . .

Where to start?

Fortunately I had a space on a half-occupied two-tier stand for a 48" x 18" x 15" tank, so that was the first item on the shopping list. Before setting it in place, though, an **Ultratherm heating mat** was called for.

I fancied seeking out some *Synodontis* for the new tank, and they are rather prone to burning their scaleless skin by trying to hide under a standard heater/stat. A **Uno Stikstat** controls the mat, as I prefer its solid, proven, mechanical design to modern electronic units. I know some of the potential problems with microchip circuitry, and that high reliability comes very expensive.

For filtration I looked for a **Fluval 303.** These keep my Oscar tanks clean, so one should cope with a catfish community. I picked up one of the old models for a good price (£55), but the new style is still reasonable at £85. I used the supplied spray-bar submerged, to give a fairly gentle current without reducing the flow rate. Filter media are gravel and Fluval foam.

S. eupterus could be bought young for as little as £4.95. Pic. Max Gibbs, The Goldfish Bowl, Oxford.

Decor

I wanted to find a compromise in decorating this tank, between a tangled mass of bogwood for the fish to enjoy, and having some water left to keep them alive. Also I wanted some open swimming areas, which the *Synodontis* should be bold enough to use once they realise that there are plenty of safe retreats nearby.

Lighting will be provided by the room's light. If this subdued lighting does not encourage the *Synodontis* to show themselves, I will add a fluorescent light on a time switch. This will be set to illuminate the tank during the early part of the day, and switch off in the evening when I want to see the fish.

In the absence of a hood a good cover glass is a must. I use **Glodex glazing plastic** (from DIY stores) which is more rigid than a commercial condensation tray, and also does not discolour if used under a hood fitted with light bulbs.

What fish?

I have always liked catfish in general, but the more interesting species of *Synodontis* have been hard to get hold of in my area. Fortunately, while this project was under discussion, Dean at Leicester Aquatics started using a new supplier of unusual fish, and received a number of interesting species including several *Synodontis*. I managed to limit myself (for the moment!) to one each of *S. flavitaeniatus*, *S. decorus* and *S. brichardi* to keep my existing *S. eupterus* company. ▶

I am confident that these different-looking species of *Synodontis* will get on together, whereas two of the same or similar species may not. Perhaps the next major project will be breeding, after growing on several of one species!

The upper levels of the water will be inhabited by three Tinfoil Barbs which I need to move from their present home. If I did not already have these, I would probably stock a few Congo Tetras to liven up the surface layers, which would also be more in keeping with the African origins of *Synodontis*.

Other inhabitants of the new tank will be a pleco who is outgrowing his community tank, and some young home-bred *Leiocassis siamensis* - sometimes called the false Bumble-bee Cat.

Even cheaper?

The four *Synodontis* could have been accommodated in a 36" tank, accompanied by a few Congo Tetras rather than the Tinfoils. The other catfish would also have to be left out, and there would be little scope for adding more fish later, but if you bear this in mind, you could create a comparable scene in a 36" tank for quite a bit less outlay.

More expensive still

I had not even finished writing this before I got carried away and bought myself another early Christmas present - a *Synodontis angelicus*. I had resisted the larger one at £24.95, but a smaller one arrived, and at £18.95 it was irresistible. ■

FISH:	
Synodontis brichardi	£ 24.95
S. flavitaeniatus	£ 14.95
S. decorus	£ 26.95
Fish total	**£ 66.85**
FINAL TOTAL	**£239.79**

Fish already owned:
- **Tinfoils** (paid £1.95 x 3 - some time ago)
- ***Synodontis eupterus*** £4.95 as a baby
- **Pleo**
- ***Leiocassis siamensis*** home-bred and free

SHOPPING LIST

	£
Aquarium 48"x 18"x 15"	45 —
Ultratherm 48" x 15"	19 – 95
Drip tray Glodex (offcut)	5 —
Uno Slikstat	12 – 99
Fluval 303 - (I paid £55 for old stock rrp.)	89 – 80
Bogwood - 3 good pieces	30 —
Gravel	5 —
Overall total	£ 172 – 99

CATFISH TANK: £239.79

A TANK FOR £250

Cichlid Tank - Mary Bailey

MARY BAILEY has been a *PFK* regular for many years. Safely ensconced with her fishhouse in a Devon village, she is now a full time fishkeeping journalist and translator. She is passionate about cichlids, with innumerable breeding successes, and is a leading light in the BCA.

A shoal of adult Uaru was Mary's dream... Pic: Max Gibbs, The Goldfish Bowl, Oxford

The fish come first

Years of "budget fishkeeping" had left MARY BAILEY with few special needs for equipment, but plenty of dreams about fish. But then her eye lit on a tank of juvenile Uaru....

When the Editor asked me to write this article I happily agreed. But then I began to wonder just what I was going to write. I have never been one for spending a fortune on equipment, so a dream tank was not something that had ever really passed through my mind.

Usually I spend money on fish rather than equipment, as I could never afford all the trimmings for 20-plus tanks!

I certainly still dream about cichlids I would like to own, and I wondered briefly if I could blue the lot on fish. However, the £250 budget wouldn't stretch to a trip to Brazil for *Crenicichla* species "Xingu III", to Cameroon for *Pungu maclareni*, or to Lake Fwa in Angola.

I began to wonder if my fellow-victims were having similar traumas.

Tanks for the memories

I supposed it would have to be a large tank. Readers may be surprised to learn that I have never owned anything larger than a 48" x 18" x 18", though at one point many years ago a 72" x 18" x 18" (angle iron, with a divided front like the windscreen in very old Morris Minors) nearly came to live with me.

I have had lots of tanks almost from the beginning, and have probably worked out most of my fantasies regarding sizes from 15" x 10" x 10" up to 48" x 18" x 18" - the only problem has been that I always want to keep more species than I have room for.

The fishhouse (an early dream) went up in 1977, and most of my pennies went on the building, so the staging was designed around a 48" tank size.

And although I have occasionally considered a larger tank in the house (I have a 48" x 15" x 15"), accomodating it would involve so much disruption that I have never bitten the bullet.

Which species?

I was beginning to get desperate. Drastic measures were called for. I sat down at the keyboard blowing my mind with Puccini. If all else fails this usually works and thus my eye fell upon my indoor tank, beneath the window, and currently occupied by six *Uaru amphiacanthoides*.

Slowly a "What if" crept into my mind. My existing plan was to grow them on to about 4", at which size, on previous experience, a pair should form and spawn. The pair would remain in the house, and the rest go out to the fishhouse.

But what if I had a 72" x 24" x 24"? I could then have a shoal of adult Uaru, and that is a dream I wouldn't mind realising.

These fish have had a special place in my heart ever since I first kept them some years ago, and they are naturally a shoaling fish.

It would be a dream come true to be able to observe my favourite species in a more natural situation. A little piece of the mainstream Amazon in my living room.

So, I had my basic theme. But I really cannot remember the last time I went out and bought something new from a retailer - other than test kits and silicon sealant.

Buying the tank

I tend to snap up good second-hand equipment if I have the opportunity, and obtain new items by approaching stand-holders at the big shows 5 minutes before packing-up time on Sunday.

But your Editor had specified that I should use shop prices, not even mail order.

Obviously the tank would be the most expensive item, and there was no way that I would be able to afford a "Brand Name" tank of the size required and have enough left to fit it out. So I phoned around various contacts to see what it would cost me to have a tank made up by the "local chap" that most enthusiasts and many dealers tend to have tucked away somewhere.

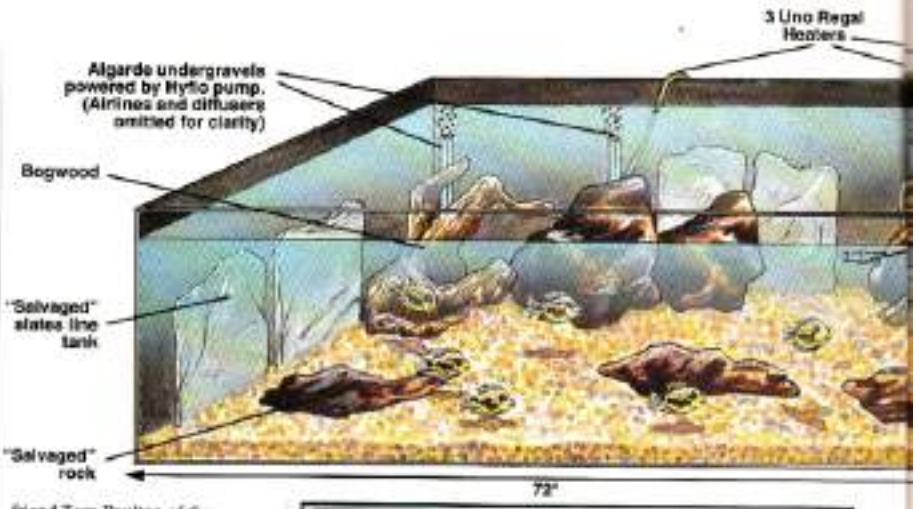
This research indicated that I should be able to obtain my tank, complete with cover glasses, for £100, though I might have managed even cheaper if I had asked someone who was a good customer of the tank-builder to order it in his own name rather than mine.

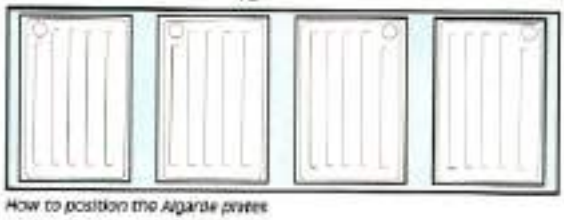
It is, therefore, worth bearing in mind that if you want a new tank, and have a friend who has just set up a new fish-house, you might do well to order through him/her...

Other equipment

That still left equipment, so I pondered which BCA member retailer would be least likely to sell me to get knotted if I telephoned with my hypothetical shopping list.

In the end I contacted my good friend Tom Poulton of the **Tropical Marine Centre**, Exeter, on the basis that I am at least a customer of his, albeit mainly for fish rather than equipment.





How to position the Algarde plates

Decor and substrate

If we add the £100 for the tank onto this then it does not take a genius to realise that there is not much left of the £250 budget, especially if we allow for odds-and-ends such as airline, non-return valves to protect the pump, a stick-on thermometer etc.

This Uaru clearly shows the marking that sometimes gives it its common name - Triangle Cichlid. *Ric. Pyk.*

I had, however, already decided that I would do hypothetically as I would in practice for an Uaru tank - collect my own gravel and rocks from the wild state. I have only ever once paid out good cash for rocks, in an emergency when I lived in Reading (good for free lime-rich gravel, but no local rocks at all) and it hurt dreadfully.

Here in Devon I can obtain a variety of inert rocks without abandoning my conservationist principles, simply by visiting various quarries and asking if I can pick over their rubbish piles.

Another good source of rocks is places where a new road has just been blasted.

Obviously a basic knowledge of local geology is helpful, and I do urge all who wish to follow my example to PLEASE avoid denuding the countryside of lichen and moss-covered rocks which will leave scars and deprive various creepy-crawlies of their homes.

Old roofing slates (not modern synthetics) are also extremely useful, and easily-available free from demolition sites.

In point of fact, for my Uaru tank, I would probably simply potter out to the garden, where I have piles of our local rock, which seems to be a metamorphosed sandstone, and has proved inert during years of use. This is a nice reddish-brown in colour, and would blend in well with the bog-wood which would form the rest of the decor.

As many readers will be aware, Uaru are Amazonian fish, and they prefer the soft acid water of their natural habitat, especially if you are going to breed them. So I did need gravel which was totally hardness-free.

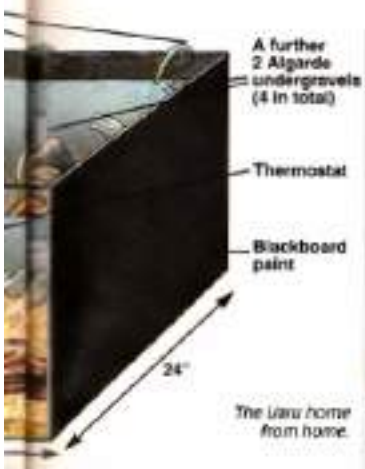
Over the years I have found various types of hardness-free gravel available commercially, but in general these have been very pale in colour, consisting largely of quartz.

I don't like pale substrates, as I find they promote nervousness in fish, especially those used to dark bottoms covered in leaf-litter and other detritus. So I collect my own granite gravel here in Devon, from an area where it contains a rather nice orange feldspar, and is thus a warm colour rather than the usual light grey of garden centre granite.

It is also wonderfully irregular in grain size, which gives a very natural effect, with odd pebbles here and there. I'm afraid that no amount of arm-twisting will get me to reveal the exact locality, as I am not prepared to see a quiet stream denuded of its substrate by busloads of fishkeepers. In fact garden centre granite would do, and is very cheap.

Equipment

Returning to my shopping list, my reasons for my choice of equipment are as follows:



The Uaru home from home.

Algarde plates - these were the first decent UG plates to appear in the hobby, and I have always stuck to them, having no cause to complain after 15 years of use.

I bought some of more recent manufacture in an auction earlier this year, and these seem every bit as good as the originals. Because the Hyflo has 4 outlets, and I am trying to keep within budget, I would make do with 4 plates with a gap of a few inches between them - the overall effect should be total bottom filtration as there would be some sideways suction across the gravel in the gaps.

Hyflo Pump - Expensive, but fantastically reliable, and incredibly quiet.

My choice of heating equipment may raise a few eyebrows, ranging as it does from the advanced to the primitive. I must explain that I do not like combined heater stats; in general I find that the heater part packs up within a year, as, regrettably do modern heaters, and I would rather throw away a £5 heater than a £10 plus heater stat.

I have possibly the world's largest collection of old Springfield external stats and would cheerfully buy more if they were still available. But the "equivalents" are simply not as good, so I would splash out on the **Rocon Digistat.** I have never used one, but a close friend has, and swears by it in terms of reliability and efficiency.

To this I would wire 2 of my 3 200 watt heaters; the third would be wired up to the internal stat. This rather bizarre system is designed to protect what would be extremely valuable (in terms of £££££ and sentiment) fish from equipment failure.

Even the most reliable equipment is at the mercy of the fuse in the plug, and I would hope that if the Rocon circuit went off for this (or any other reason), the remaining 200 watts would keep the tank from lethal chilling until I spotted the problem (I am often away for days at a time).

Were the internal stat to jam on (not that I have ever had this problem with the Uno internal, but I was a Girl Guide!) then 200 watts would not be enough to cause serious (if any) overheating in such a large tank.

Lighting

Doubtless some readers will be wondering what I am going to do about a hood and lighting.

Well, I would take the revolutionary (to most people) step of not having either, at least in conventional terms. My current domestic tank has no hood, just cover glasses, and is lit (occasionally!) by sunshine streaming in the window beneath which it is positioned, and, during the evening and in poor weather, by a 40 watt tungsten lamp.

I wish all those people who have glaring substrates and multiple fluorescents/spotlights could see the quite stunning effect of a naturally-lit tank like mine; I have a wonderful play of light and shade, and the tungsten light gives a very similar effect.

All this still leaves me short of my bogwood! Re-reading the Editorial fidict I see I am allowed, if necessary, to stretch my budget to (say) £275, which would enable me to acquire two or three nice pieces. I would not buy this from a retailer, as it tends to be very expensive there, but from the Cornish Bogwood Company, who seem to invariably be present at all the major shows.

Bogwood requires some weeks if not months, of soaking to remove the bulk of the tannins it contains - one does not varnish bogwood for Uaru tanks, as they eat the varnish and then die.

In an ideal world I would have far more bogwood than even the extended budget allows, but I expect this could be remedied over the ensuing months. Suffice it to say that if I could afford it, there would be pieces of bogwood where I have shown rocks at the back! And that if the Editor won't wear the bogwood, then rocks would do anyway!

There would be no sense in trying to use plants, as Uaru are voracious consumers of vegetation; and I would follow my usual practice of painting the outside of the back and ends of the tank black - I normally use blackboard paint.

Setting up

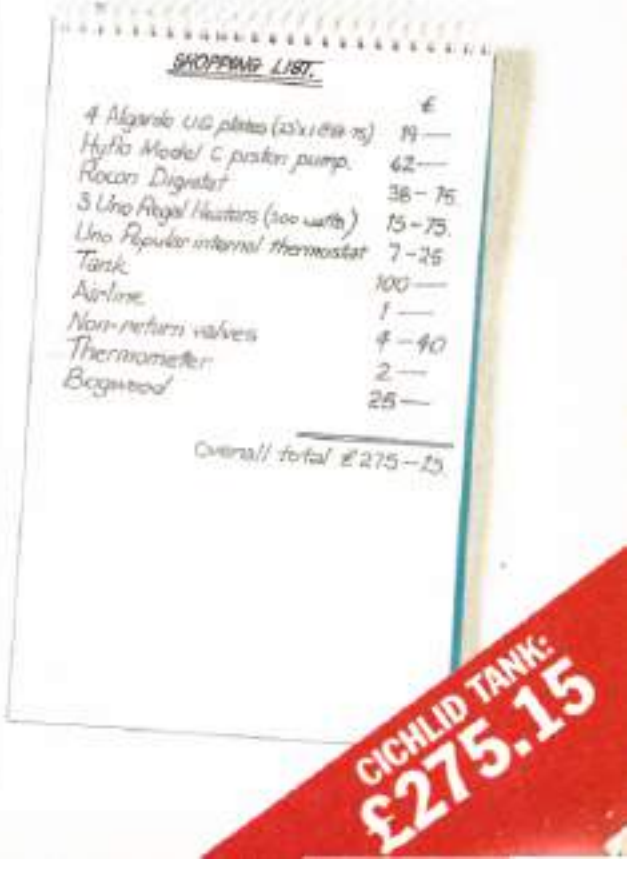
This would be a fairly straightforward affair. The UG plates would be aligned with their longer dimension running front to back, each with a single uplift at the rear, fed by one of the outlets from the Hyflo pump. Each of the 4 air supplies would need to be protected by a non-return valve to prevent siphonage in the event of power failure.

As previously mentioned, two of the 3 heaters would be wired to the Rocon Digistat, the other to the internal thermostat. As, despite years of trying, I have not managed to find a plastic heater holder sucker that actually works (and the rubber ones seem to have passed into oblivion) I would attach heaters and the internal stat to the rear glass with blobs of silicone sealant. Although Uaru are not noted for equipment bashing, they have been known to move it gently aside, or even to spawn on it if it happens to be in their chosen spot.

Heaters and uplifts would be positioned behind rocks and bogwood as far as possible. The odd large rock would be positioned nearer the front for effect, but in general plenty of swimming space would be left. All rocks would need to be bedded on the filter plates to prevent undermining, as Uaru are prodigious diggers when spawning.

Inevitably there would be areas of the back glass left exposed, and I would use roofing slates to mask these to a height of 10" or more, to prevent flash reflections when taking photographs. Likewise the end glasses, as angled shots at the ends of the tank can also give rise to flash reflections.

And finally the fish. Well, I already have them so that's academic. But I should say that if I had to buy them, I would do as I did with the ones I have - buy from a breeder. And one final thought - if I ever come across any *Cremichichla* species "Xingu III" they would fit very well into my tank, with the Uaru, and then I would really have a dream come true! ■



A TANK FOR £250

Oddball Tank - Andy Parkes

ANDY PARKES is a relative newcomer to the pages of *PFK*. He now lives in Salisbury, Wilts., and works in the aquatic trade. His passion for, and expertise with oddballs has made his features very popular, and he is known as a thorough and punctual answerer of readers' queries.

Where Arrow leave tyre-tr among the gi

ANDY PARKES sets-up a tank full of oddballs

Just to cheer me up, our friendly editor decided to throw a little more chaos into my life at this busy time of the year.

In between a full time job, writing articles, trying to write a book and moving house, I was asked to write a special for this Christmas edition based on the assembly of a 'dream' tank.

Okay, I admit I was honoured to be asked, and so I started thinking about what I was going to cover. The category allocated was 'Oddballs'.

Right, so which of these oddballs could be dealt with? One thing that I do try to do before writing an article, is to find out the availability of the particular fish.

I can't see the point in getting people interested in something, and then you are unable to get hold of them (I'm sure there's a joke in there somewhere.)

For practical reasons, the subjects of these articles are not normally kept at the average stockists, but they are available, so some research into the lists was called for.

Preparation

First check out the shopping list on the fourth page of this feature. You might like to know that the water alone in this aquarium is going to weigh 400lb (182kg), without the rocks, gravel and all the glass, so don't position it on the coffee table.

The aquarium must be placed on polystyrene base mats, covering the whole area of the base to spread any pressure points that will lead to disaster.

Wash the gravel. Even if it is supposed to be pre-washed, a

Young Arowana should not have a yolk sac – and be seen feeding before purchase. Pic: Max Gibbs, The Goldfish Bowl, Oxford.

anas acks affes

s or £250.

thorough clean is essential before it is placed in the tank.

The next job is to position the internal electrical appliances, with one **Fluval** in each corner, the Spray-bar fitted to the Fluval 3 and positioned at the top back of the aquarium, just under the covers. Before fitting the Fluval 2, this should be opened and the sponge removed.

In place of this, wrap **Underworld** Poly-filter around the tube and replace. The reason for this will be explained later.

One heater should be situated on the back panel near to the spray-bar, the other on the side panel nearest the Fluval 3.

The cork can now be split into two full length pieces by scoring along the inside with a Stanley knife and pressing firmly down. These two pieces will be wedged firmly under the strengthening struts, hiding the two filters and providing a natural decoration, but first they should be drilled to allow water flow through them. The piece to cover the Fluval 3 need only be drilled at the bottom, ten quarter inch holes being sufficient, but ten at the top and bottom of the piece for the Fluval 2.

If necessary, the cork can be trimmed with a small saw to fit, but make sure that it is still a tight fit to prevent floatation. Once trimmed and ready to be positioned, ensure that they are thoroughly cleaned by pouring boiling water over them and allowing to soak, scrubbing between the folds.

Just add water...

Having got to this stage, with all the equipment wired carefully into the cable tidy, the tank can slowly be filled with water. I prefer to use cold water only, but boiled water from the cold-water tap can also be used to help bring the temperature up.

This should never be done in one go, especially with a new aquarium, but in four or five stages allowing at least half an hour settling time after each stage.

Don't forget to add the Aquasafe at this stage, to remove the chlorines and chloramines that our water boards are pumping into the tapwater at the moment.

Switch on

Assuming all is well so far, the filters and heaters can now be switched on and left to clear the inevitable cloudiness while the temperature settles to around 25°C, at the Fluval 3 end, a couple of degrees lower at the other.

Once this has been achieved, the mains plug should be removed again before proceeding with the lighting. It may have sounded odd to only have an 18" tube for a four-foot tank, but this is another attempt to try to establish a more natural environment. In tropical rivers, there are always areas of bright sunlight and areas of shade under the overhanging trees, these areas being cooler and slower moving. Therefore, the light is situated above the more powerful Fluval 3, where both heaters are sited. The Triton tubes are more expensive, but they provide a great deal of light for their size, they last a long time and they do not fade with age.

Planting

With everything running safely now, it is time for another trip to the shop to get your plants. I have opted for a selection of Amazon Swords, Giant Vallis, Fountain plants, Twisted Vallis and Cryptocorynes. The Crypts will fare better at the dimmer end of the tank. Giant Vallis should be placed at the back corners, and will spread across the surface of the water as it grows, providing added shade and security for the inhabitants.

Tanks

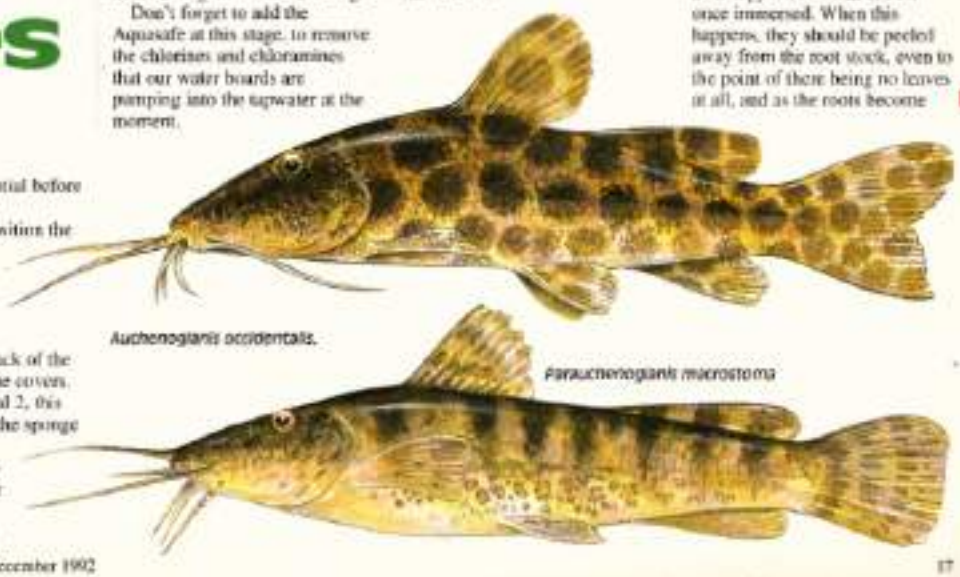
Within this price range, a six-foot tank is cut, so let's start by getting the biggest tank possible ready.

It should be pointed out that a bigger tank may well be possible, but then the maintenance is going to suffer, and that is the major importance when dealing with larger fish which are usually messy feeders.

All prices have to be based upon the manufacturers recommended prices, so this has also narrowed it down somewhat, but no expense has been spared to provide everything necessary for establishing and maintaining the fish's comfort.

Before you know what you are going to keep, you can go and order your aquarium, together with the rest of the equipment. (See shopping list over page).

With the Amazon Swords, there are a lot of very good, very large plants becoming available at the moment. These appear to die off after a few weeks in the water, but this is not actually the case. These plants, and many others, are not normally grown entirely submerged, but with just the roots in the water. The leaves in these 'dry' conditions are relatively hard, to allow for their own support, and will die off once immersed. When this happens, they should be peeled away from the root stock, even to the point of there being no leaves at all, and as the roots become



Auchenoglanis occidentalis.

Parauchenoglanis macrostoma

Pic. Max Gibbs, The Goldfish Bowl, Oxford.

Tyre Tracks

The last of the fish for this tank has got to be one of my old favourites, the Tyre-track eel (*Mastacembelus armatus*).

This is a Southern Asian fish which can reach lengths well over 24" (60cm), with a base colour of gold/brown, it then looks as if a tyre has run along the length of the body leaving dark brown tread markings all along the eel.

These fish are best bought when young, as the larger wild-caught ones very rarely adapt to life in an aquarium, refusing food no matter what persuasion is used. For the smaller specimen, they should first be fed on live tubifex and bloodworm (which has been washed in Nyxazin or similar). Once feeding well, they will usually take frozen bloodworm without any trouble, and will come to the surface if they should see an earthworm.

A range of the frozen foods can be tried once the size increases, but each one will probably have its own preference. As always, try to keep as big a variety as possible on the menu.

Water conditions will fall into the compatibility range of all the fish so far, and you should have no problems keeping any one of these attractive eels, the only requirement being that it is provided with some small tubing to hide in. It should also be ensured that the cover glasses are always securely replaced. These are escape artists extraordinaire.

established, longer, paler leaves will begin to grow in their place.

Finally, having scrubbed and soaked the Cuttlewood, this can be placed just off-centre to break up the open area left, with Fountain plants around it and elsewhere in the foreground.

Stocking

By now, you may be desperate to see some life in the aquarium. Unfortunately, you obviously can't go and buy all the fish and throw them straight in, nor can you go and buy fully-grown specimens to fill the tank on this sort of budget.

Although this aquarium will hold a fair number of young fish, problems will rapidly arise when they grow, so we will only be dealing with three or four fish.

Most 'Oddballs' are secretive species, but I wanted something that would be seen so there had to be a midwater swimmer in the selection. For this, I have gone for the Silver Arrowana (*Osteoglossum bicirrhosum*) and for the bottom, a choice from the Giraffe catfish (*Auchenoglanis occidentalis*), Tyre-track eel (*Mastacembelus armatus*) or one of the more unusual plecos like a Spinosus.

Arrowana

The Arrowana has representatives in South America (*Osteoglossidae*), Africa (*Heterotis*) and Southern Asia/Australia (*Scleropages*), but for reasons of cost and availability, we will only be concerned with the South American species.

There are two species in this family, the Silver Arrowana already mentioned, and the Black Arrowana (*Osteoglossum ferreirai*). This latter specimen is possibly a little more attractive, but again, it is considerably more expensive and rarer, although care and maintenance would be the same.

Arrowanas are large fish, reportedly reaching lengths of up to three feet (90 cms), but in captivity rarely exceeding 2' (60cm) and an eighteen inch (45cm) specimen would be very respectable for even the biggest of aquariums.

This fish has a long, flattened body covered in large, iridescent scales that reflect the light beautifully. The eyes are large (out of proportion in younger specimens) and the upturned mouth is huge.

Another interesting characteristic is the pair of barbels on the tip of the lower jaw, tasting the water in their constant search for food.

A surface-facing mouth signifies the type of feeding that the Arrowana needs, taking all types of unsuspecting prey from below in its native waters. Young specimens will feed greedily on insects and fry, as well as its smaller brethren, while the adults will take anything from insects and larvae to fish of half its body length and small rodents. To maintain this sort of supply in the home aquarium would be near impossible, let alone impractical, so it is fortunate that the Arrowana adapts well to more readily available foods.

Right: A young Giraffe Catfish like this need not be expensive. Pic. Max Gibbs, The Goldfish Bowl, Oxford.

The Arrowana to be introduced will be a young specimen of about three or four inches (7-10 cm), which are readily available

now. However, select the specimen with care, being sure to avoid one with the yolk sac still visible, unless you have seen it feeding. Even if the yolk sac is not visible, still be sure that it is feeding before parting with your money.

These juveniles should be feeding well on daphnia, brine shrimp and bloodworm, though the bloodworm will tend to be ignored once it has sunk.

As soon as your example is settled and feeding upon these live foods, it should be encouraged onto freeze-dried and frozen foods.

These are all fairly high in protein, so once they have been accepted, growth will be pretty rapid if fed twice daily until your fish is about six inches (15cms).

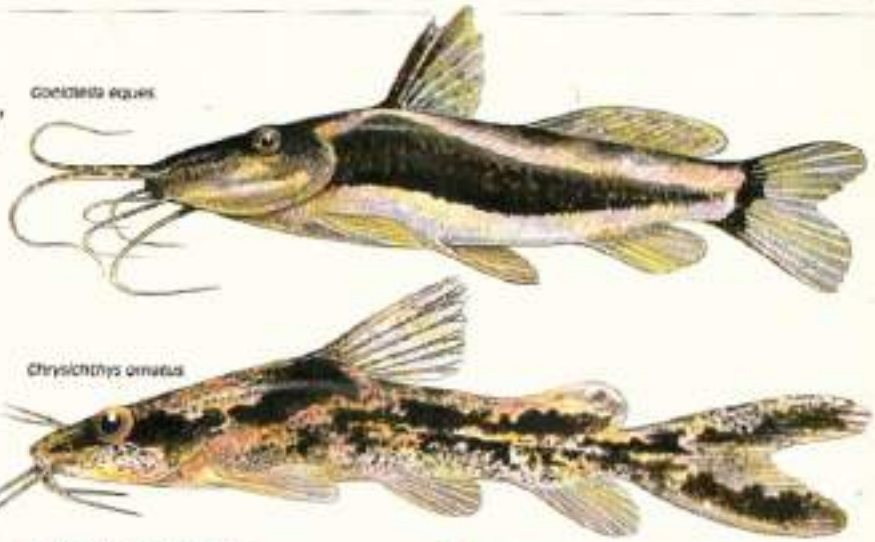
At this size, the feeding can be reduced to twice over a three day period. Be warned though, the Arrowana is an accomplished jumper so I would not recommend feeding by hand, the risk is just too great. The large scales are very easily dislodged or damaged against the cover glass, and this may lead to infection or distress at the very least.

Although this Arrowana is relatively cheap when young, I would not recommend more than the single specimen in an aquarium of this size. Apart from the possibility of cannibalism between the two, there is also a risk of quarrelling.

Temperature should be in the range 23 to 26°C, with a neutral pH and low-to-medium hardness.

Arrowanas do not like fast-flowing water, choosing the quieter backwaters and sheltered reaches in the wild, and therefore the flow has to be diverted from the two Fluvals.

Drilling the holes in the cork bark will succeed in achieving this, and the spray bar from the Fluval 3 should be placed just above the surface of the water, creating sufficient aeration without causing excessive currents.



Lower regions

So, that is the upper levels occupied; we now need something down below.

I've chosen a plec, the *Pseudacanthicus spinosus*. An attractive blue/grey body covered in jet black dots sets this plec apart from the more common species, and despite the added bonus of being a rarity, at £10.50 for a 4" (10cm) specimen, it has to be one of the best buys.

The Giraffe cat is an interesting looking fish reaching up to 36" (90cms), but not often above 18" (45cm).

The head looks out of proportion to the rest of the body, with the mouth extended well forwards and down, indicating the hoover nature of feeding. Moving along the substrate, the Giraffe cat will pick up mouth fulls of the gravel in search for food, expelling anything inedible through the operculums.

Diet should consist of all types of worms, even the largest taking tubifex and bloodworm in vast quantities, or any of the other frozen meat-based foods are relished. As a supplement, feeder shrimps will provide additional proteins and roughage. Despite the size that this fish can attain, it remains a peaceful fish.

Staying with the African bagrids, there are also a few others that will be just as good. From the same family as the Giraffe Cat, there is the African spotted catfish (*Parauchenoglanis* sp.) Very similar in appearance to the Giraffe, there are three members to this species, all of which remain a much more manageable size, reaching only about 8" (20cm). These are a little more aggressive than the Giraffe, and will take ▶

FISH:		
Arrowana (3" - 7cm)	£	5.50
Pseudacanthicus spinosus (4" - 10cm)	£	10.50
Giraffe cat (*Auchenoglanis occidentalis*) (4" - 10cm)	£	16.45
African spotted catfish (*Parauchenoglanis* sp.) (3" - 7cm)	£	2.50
Goeldiella equas (5" - 13cm)	£	15
Ornate Congo catfish (*Chrysichthys ornatus*) (6" - 16cm)	£	20
Tyre-track eel (*Mastacembelus armatus*) (5" - 13cm)	£	6
Fish total (most expensive in each group)	**£**	**44**
Equipment total	**£**	**214.79**
FINAL TOTAL	**£**	**258.79**

■ All prices quoted, other than those recommended by manufacturers, are courtesy of **Salisbury Waterworld, 7 Ivy St., Salisbury, Wilts. SP1 2AY. Tel: 0722 332167.**

I can promise you that the total came as quite a shock to me. I was convinced it would be well in excess of my budget. There was no advance planning to reach this figure and I decided at the beginning that I would not cut corners in an effort to keep within the budget.

So there you have the lot, but don't forget things like food, a bottle of **Myxazin** is well worth having and even essential if you are feeding livefoods.

You may wish to have a different choice of fish, but the set up should still be the same if you were to chose something like a couple of Siamese Tiger fish (*Datnioides microlepis*) for the upper swimming layers (see July 1992 issue of *PFK*).

If you must cut corners anywhere, you could get by with just one 300W heater, but please don't be tempted to skimp on filtration.

larger pieces of meat (or small fish) into their wide mouths.

The final African offering is the Congo river's *Chrysichthys ornatus* or Ornate Congo catfish. Again, this one remains a respectable 8" to 10" (20-25 cm), and is also a reasonably-peaceful specimen. The colouring is really quite striking, consisting of a gold to champagne background, overlaid with irregular dark brown to black blotches and speckles in between. Although this pattern differs from one specimen to the next, the general effect is pretty much the same in all. Again, the feeding should be a variety of meat based foods as for the African spotted cats.

For the last of the scavenger/predatory cats, we return to the Arowana's native regions where the *Goeldiella eques* can be found.

This fish is virtually identical in appearance to the Ornate Congo catfish mentioned above but is more readily-available and therefore more affordable. The *Goeldiella* is the only species in the genus, a member of the Pimelodidae, growing a little larger than the Ornate Congo.

Taking your choice of scavenger from the above, we are just left with the obligatory pleco among our catfish selection, and, as mentioned earlier, I have to opt for the *Pseudacanthicus spinosus*.

So, those are my options for compatibility within an aquarium of this size. It may well appear to be somewhat deserted at first, but please don't forget that these fish will grow quite large, and fast, so the lack of crowding at the start will help towards the fish's comfort, a point which we must never fail to overlook.

As promised, I will now explain my change within the Fluval 2, using a Polyfilter to replace the sponge.

The size of these fish, particularly the meat eaters, means a lot of waste will be produced.

We probably all know the details of the nitrogen cycle, where Ammonia is converted into Nitrite and finally the less-harmful Nitrate by bacteria within the filters, but these Nitrates are also dangerous when levels build up. This is particularly true for fish that do not like particularly hard water conditions.

If you were to read the box of the Polyfilter, you would probably smile and put it back on the shelf - don't. It works. I don't know how, or why, and I certainly don't understand why they are not advertised, but these things are incredible. They remove ammonia, nitrites to a small extent, nitrates, copper and God-knows what else.

It does all that carbon will do about ten times over, can visually be checked for when it is fully loaded, and will NOT release the lot back into the water even when fully charged. (Oh, and it can be used in marine systems too).

So, with all systems working, the choice of fish can be taken from the categories listed in the final table. Although individual funds may permit more fish, please do not be tempted, unless these funds extend to progressively larger tanks as required! ■

Les Holliday's £250 marine set-up is on page 72

■ **If you have any problems, queries or polite suggestions about these or any other 'oddballs', feel free to contact me through *PFK* with an SAE. All letters will be answered.**

ODDBALL TANK: £258.79

A real pleasure

It is one thing to step into the unknown, another to do it without exaggerating the claims for the product, and quite amazing to end our launch year with a turnover that exceeds our most optimistic forecasts by 250%.

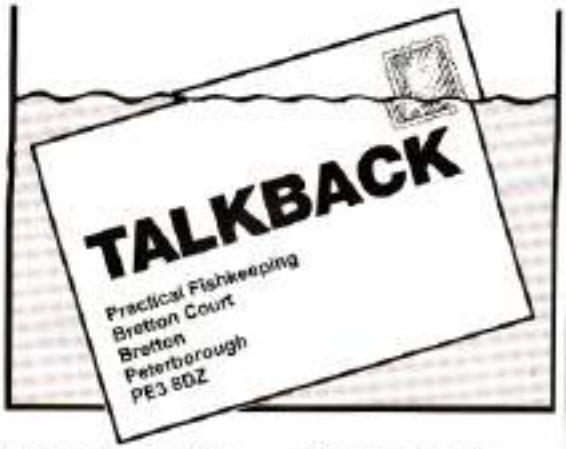
I have you and all at your magazine to thank for your support, but listening to the troubles of fishkeepers on the telephone and when meeting them over the last twelve months I am left in no doubt that there is a vast army of undetectable contaminants in our tapwater, apart from just chlorine, which consistently depress fish condition and render them less able to resist stress and infection.

Perhaps some Koi keepers still need to be convinced that they can add to the well-being of their beloved stock by removing pesticides, metals, and such humors as chloroform from their water, but those who have invested in a tapwater filter, often cheap when compared to the value of their fish, have seen results that demonstrate, without any doubt, that there is much to be gained by permitting fish to live in conditions which help rather than hinder their survival.

The CB METALS range has produced outstanding results over the year and I would like to think that it is now the yardstick among fishkeepers. Our range of reverse osmosis units has met with considerable interest and just proves that it is no good trying to adapt unsuitable systems to the fishkeeper - they need and deserve purpose-built items.

We will go on trying to provide the best and I would just like to say "thank you" from myself and my wife Eliza to the vast majority of those with whom we have had contact. A nicer and generally more caring bunch of people it would be hard to find, and to quote an old cliche in a genuine sense "it has been a real pleasure talking to you".

• **Charles Harriss, Purity on Tap Ltd, Newbury.**



Cichlid mix

Blue Convicts - easier to keep than Guppies?

I am just writing to recommend Central American Cichlids to the beginners in the hobby. I myself have struggled with mystery deaths in good water conditions with no apparent signs of disease in "normal" community set-ups, but I have now switched to "small" cichlids as a community.

I have Firemouths, Convicts, Jack Dempseys, Blue Acaras, Keyholes, Tricolours, Rainbows and two "mystery" cichlids which are the bosses of the tank.

This mixture of fish gets on fine in my tank, except when a week after buying them, the Rainbows spawned which caused chaos as they pushed everything to the other end of the tank.

These fish have provided me with a tank full of hardy, clever, colourful characters that are easy to care for.

• **A. MacDougall, Birkenhead**

***Ed's comment* - Sometimes what appears to be an unholy mixture of fish can work. But take care if the others breed.**

Nice - at a price

Our local garden centre stocks Sterlets. They are fascinating creatures, looking like miniature sharks that have, like Pinocchio, told many lies.

I enquired where they came from and was told they were imported from Holland, only in the one size, 6-7" (for economic reasons) and that they cleaned the bottom of the pond. No other information was available apart from the price - £45.

Being a pondkeeper I was very interested but was not able to purchase these fish without more information. In addition, at £45 each with at least one pair of resident herons and a curious neighbourhood cat (mine is terrified of the fish!) I can't afford to lose them.

Perhaps an article on Sterlets, with pictures, might interest more people and with the increased interest perhaps in time the price will come down to a more realistic level.

• **Elizabeth Crook, Surrey**

***Ed's comment* - No sooner said than done. Please turn to page 20 of this month's *PFK* for more information on Sterlets.**

Oscars are not boring

How interesting these Oscars are proving to be. I read with interest the letter from P. J. Bull, in the September issue and also those experiences of other fishkeepers who had Oscars.

I have suffered cut fingers while being attacked when trying to see to different things in the tank. This has also happened when I have fed the fish.

Through the glass of his tank, my Oscar tries to attack my Alsatian, my Jack Russell, two kittens and anything or anyone else who happens to pass.

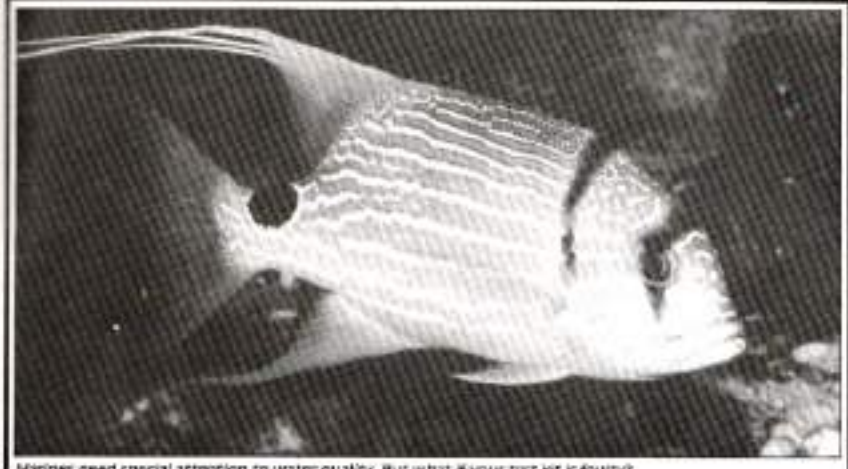
Never satisfied he (she?) moves the gravel in the tank from one end to the other every day. The tank is a large one - 56" x 15" x 36", but the Oscar has killed everything I have put in for company - even after going to great lengths to see if they'll get on.

Could I get rid of him (her?) No!

After watching the growth of this fish from 1" to 10", I'll keep it until it leaves naturally.

• **Keith Harper, Bristol**

STAR LETTER



Marines need special attention to water quality. But what if your test kit is faulty?

■ This month's Star letter carries a warning from Paul Carter of Goxhill, South Humberside. He wins a year's subscription to *PFK*.

Three months ago I purchased a Waterlife Nitrate Test kit from my local water garden centre and when I tried to use it I consistently got a zero reading. I returned it to the centre and exchanged it for another kit which also gave me a zero reading.

I contacted Waterlife Research Industries and returned the kit as requested. A laboratory examination showed that the zinc dust reducing agent was fully oxidised, showing that the kit was at least four years old.

Luckily this hasn't hurt my fish, but the reason for the purchase in the first place is that I plan to set up a marine tank in the near future and I wanted to check my local tapwater. I can see that for the marine fishkeeper, a bad test kit could be disastrous.

Waterlife Research Industries have kindly replaced the test kit, even though they were not at fault and I would like to thank them for this.

The answer of course would be for all suppliers to put a "sell-by" or "best before" date on the boxes of test kits with a specific shelf life.

Koi pond plant

A tip for Koi keepers who like greenery in their pond. A pot of Parrot's Feather suspended about 3" below the water surface gives a good area of shade for the fish. It winters well and grows very fast.

It grows on the surface, and the roots hang down into the water, hopefully absorbing nutrients.

It makes a good spawning medium, my fish spawned this spring and none of them lost a single scale. The roots, being so prolific, also give shelter to the fry.

• Winifred North, Essex.

Above: Koi ponds can look bare without some plant life

Is the price justified?

After keeping tropicals I am now venturing into marines, but I am disillusioned. I also take the *American Freshwater and Marine Aquarium*, and it amazes me that you can buy, for instance, a pump for $89.75 (about £50) which sells for £295 in Britain. There are shipping costs and so on, I know, but can anyone justify an increase of 500%?

The same goes for many other items. I am thinking of selling up even before I have started. I would welcome, through your column, comments from companies, but will be surprised if you get any.

• Disillusioned, Midlands.

***Ed's note:* Recent articles in the national press have highlighted how much cheaper items are in the USA *in general* – not just in the fishkeeping trade.**

They say an Ulsterman calls a spade a spade and knows the value of one. Thus as both Ulsterman and fishkeeper I keep my eyes open for a bargain. So much so in fact that tonight, as I filled my cat's litter tray with "Sophistical", I noticed a distinct similarity to standard aquarium ammonia remover. Basically the function is the same: they both absorb ammonia and the colour, texture and particle sizes are identical. However, "Sophistical" costs £1.89 for 5kg and the standard aquarium ammonia remover costs around £3.91 for 500g.

Is this a case of clever marketing aimed at diversifying one product to fit two market groups - the "poor" cat owner buying cheap and nasty cat litter and the "elite" fishkeeper buying state of the art filter media."

• Colin Lindsay, C. Fermanagh

***Ed's note:* But can you be sure it *is* the same....**

Good service

I would be grateful if you could publish this letter of thanks to Tritcol Ltd.

I had been trying for a year to obtain some black Amazon wood for my Discus tank, but my local dealers did not stock it. After trying every aquatic shop in the area, I decided to write directly to the manager of Tritcol and within a week I was able to collect an excellent piece of wood which they sent to a nearby store.

Many thanks to an excellent company and service.

• Gareth Davies, Mid Glamorgan, South Wales

Products of unknown origin

I am surprised at just how many products show no manufacturer's address. This causes great headaches for even experienced fishkeepers like myself, who require further information on the use of these products.

I purchased a "Nitra King" Nitrate remover for £50. The instructions comprised of two A5 sheets of paper, half of which were diagrams. It was purchased to combat blue-green algae and it has worked perfectly. But there are no recommendations given as to how often it should be used, which type of salt it requires to recharge it or any recommendations as to often to recharge it. No address is given on either the product or the instructions and so I am left in the dark.

The other product is a water softening resin. The label states: "After three days remove and discard", although the bottom line says: "This resin may be recharged with the correct equipment". This is, I feel, useless information. With the high cost of the resin, who would want to discard it? I did manage to find the address of the company through an advert, but after writing to them I have had no reply and so I am unable to recharge the 2lb of resin that I have used.

So why don't manufacturers put full instructions in their leaflets and - more annoyingly - why don't they put their full address on products or packaging, so that purchasers could at least write for more information?

• B .G. Latter, Kent.

The best size of gravel for goldfish is the 3mm size, which is too small to become trapped in their mouths.

Moor distressed

I am fourteen years old and I have been keeping fancy Goldfish for about a year now.

The other day I noticed that my Moor was very red inside her mouth. I went out and bought a remedy, thinking it was an infection, but when I got home I realised that she actually had a piece of red coloured gravel stuck inside her mouth, so that she couldn't close it properly.

I rang my dealer who told me there was nothing I could do about it. The position of the piece of gravel would have made it virtually impossible for the fish to dislodge it. In the end I decided to try and do something about it. Holding her very gently under the water, I took a pair of tweezers and carefully managed to get hold of the piece of gravel and remove it.

I was very nervous and worried I might damage the fish, but I didn't and she has suffered no ill effects.

I think it is important to stress to readers that sometimes there is something you can do to help fish in distress.

• Rosie Phillips, Gloucester.

Green ponds should not be a problem now, but come next summer, you may be clutching at straws.

Biggest, or the best?

In the September issue of *PFK*, Mrs. Biggar asked if any readers knew where the largest public aquarium in Europe is.

While I cannot say for certain that the aquarium located at the Oceanographic Institute, Monaco boasts this title, it does contain some stunning displays of tropical freshwater and marine fish and is well worth a visit.

Fellow *PFK* readers may want to be aware of this, should they be fortunate enough to find themselves in, or near, the principality.

• Haydn Jones, W. Sussex.

Straw and algae

Some old, mouldy bales of straw, when dumped in a farm pond have, on occasion, cleared the pond of an algal bloom, without apparently affecting other aquatic life. It is not clear why: a pH change would affect other creatures and a few bales of straw are unlikely to affect the natural buffering action of the large amount of silt and decaying plant material already present.

A far more likely candidate would be the presence of some sort of fungal toxin, produced by mould growing in the straw. If you get the right mould then algae in your pond could well be history. I would not like to think what the wrong type would do to, say, the bacteria in your filter!

• John Ransom, London

The East Asian Mix

East Asia offers probably the largest choice of fish and plants open to the fishkeeper. Continuing our new series we suggest some possible mixes.

An East Asian tank is one of the easiest to create. This is because of the wide range of both plants and fish that are freely available (and very popular) in the hobby, which originate from these areas. The plant selection below is a regional one, but you could create a more "local" set-up with fish and plants specifically from Borneo or Sumatra, for example, if you prefer.

For a regional set-up such as this, the water should be well-filtered, clear and bright. All the plants listed here should be provided with plenty of illumination. The pH should ideally be between 6-6.8, but all the fish and plants listed here will tolerate a pH of up to 7.5. The temperature is best at around 73-79°F, although it does get higher than this in East Asian lakes and rivers.

Water Wisteria. Pic. by Max Gibbs: The Goldfish Bowl, Oxford

Substrate can consist of fine gravel, aquarium sand or powdered lava. When decorating the tank use a mixture of smooth, rounded pebbles and plants and try to include some bamboo shoots (*Arundinaria*). These will give the effect of the dense reeds which grow in many areas of East Asia. Give them a really good soak in aquarium disinfectant before you add them to kill off any fungi which may be present.

Plants

Balansae's Cryptocoryne
(Cryptocoryne balansae)
An attractive background plant which reaches 18" in height. The leaves are covered in indentations.

Ciliated Cryptocoryne
(Cryptocoryne ciliata)
One of the easiest Cryptocorynes to grow. It can reach up to 18" in the aquarium.

Dwarf Cryptocoryne
(Cryptocoryne nevillii)
An attractive foreground plant which is sometimes a little slow to establish. It grows to about 4". This species, in common with most Cryptocorynes, resents disturbance once planted.

Water Lettuce
(Pistia stratiotes)
A very impressive floating plant which can reach up to 8" in diameter. Its roots provide refuge for fish and fry. Angle the condensation tray so that the water doesn't drip onto the leaves and spoil them.

Giant Hygrophila
(Nomaphila stricta)
This background species looks most effective when planted in groups of three or four. It grows to about 16" and prefers a rich substrate.

Water Wisteria
(Hygrophila difformis)
A very popular aquarium plant which is easy to grow, undemanding and very attractive. It's a good choice for the background and corners, growing to 15" or more.

Bamboo Plant
(Blyxa japonica)
A bushy foreground plant, reaching 5-6" in height. It tends to die off after a year unless the side shoots are removed. You can plant the side shoots separately to form new plants.

Pitao River, China. Pic. by Dr. John Mackinnon: Bruce Coleman Ltd.

The impressive foliage of Water Lettuce will spoil if they are splashed. This plant may reach 4" in diameter. Pic. by Michael Viard, Bruce Coleman Ltd.

Many of the most popular fish in the hobby originate from East Asia. Pic. shows a Blue Gourami by C. Spencer.

Fish

There's a huge choice of fish for your East Asian tank, including many of the old aquarium favourites. What you decide to stock it with will depend on your personal taste and the size of your tank. A few popular examples of East Asian fish include Gouramis, Striped Barbs, Checker Barbs, Tiger Barbs, Danios, Harlequins, Glass catfish, Pangasius catfish, Flying Foxes, Clown Loach and the Red Tailed Black Shark. ■

The long roots of Water Lettuce provide shelter for fish and fry. Pic. by Max Gibbs, The Goldfish Bowl, Oxford.

Tropical *Answers*

■ Nervous - but breeding

I have a breeding pair of Severums in a four foot tank. Although they have bred successfully once, they are still nervous. Are there any fish I could use to bring them out of hiding and provide colour in the top half of the tank?
Carmen Layton, Bradford

It would be folly to add any new fish to a tank containing a breeding pair of cichlids - even peaceful ones, like Severums. They would be attacked in short order and possibly even killed.

You could partition off part of the tank for the other fish but this would detract from the overall appearance and may not necessarily work.

I think you just have to accept that you have fairly shy fish - but they obviously like their home, as they are breeding. You may have too bright a light and a reduction in this, or the addition of floating plants, might help.

Otherwise, I would be inclined to leave them alone. If you fiddle too much you will undoubtedly upset them and they may turn on each other. **MB**

■ Born with eyes

Please could you give me some information on Blind Cave Fish?
D. Turton, E. Yorks.

The Blind Cave Fish, *Astyanax mexicanus*, lives in the dark underground caves from Texas to Panama where they rely on the pressure sensitive lateral line to navigate. The fish reaches a length of 5cm and is highly popular in community tanks. Due to its unusual appearance and peaceful disposition.

The underground caves make the water slightly hard and alkaline - so this is preferred. Maintain the water at a temperature of 18-24°C and feed the fish on flake, tubifex, insects and earthworms. Although the fish are blind, they are always first to the food.

They have been bred in captivity. The male is smaller than the female. The eggs sink to the aquarium floor and take around three days to hatch, depending on water temperature. The fry are born with large black eyes, but these steadily reduce in size over a period of weeks until they are covered with a carbaginous sheath. **PD**

How do we raise our Piranhas?

Q **Our Piranhas have recently bred and we have a few fry left (some were eaten by a Plec, which was in turn eaten by the Piranhas).**

We are feeding the young on small daphnia and they are growing well. Do you have any advice?

•Paul and Lorraine Bell, Worksop

A It is quite rare for Piranhas to breed in captivity and most spawnings have taken place in public aquariums.

To have any chance of raising the fry to a reasonable size, you will have to transfer them to a separate aquarium. Feed them on brine shrimp, tubifex and later on shredded fish.

Once the fry reach a length of 2cm they will take it upon themselves to begin reducing numbers, by eating one another. This problem can be dealt with by splitting the fry up into groups of similarly sized fish. **PD**

Above: The problem with breeding Piranhas is not only finding a mate and a female, but stopping them from eating one another when you do. Pic. by Hans Reinhard, Bruce Coleman Ltd.

Tanganyikans in small tanks

Q **I plan to set up a tank for Tanganyikan cichlids. The tank measures 24" x 12" x 15" and is filtered by a Fluval 2 internal filter. Please could you recommend some suitable species and stocking levels?**

•A. Pelling, Sussex

A There are a lot of Tanganyikan cichlids you can keep in your tank, but I am afraid it is only large enough for you to keep a pair of a single species. If you try and have any type of community there will not be enough space to go round. You might just be able to squeeze in a rock dweller and a shell dweller, but you certainly could not have more than one rock-dweller.

Don't be tempted to mix similar species of Tanganyikan cichlids - especially julidochromis, as they will squabble violently. Pic. shows J. regani. by Mike Gibbs, The Goldfish Bowl, Oxford.

Suitable rock-dwellers include *Julidochromis*, small *Neolamprologus* (*brichardi*, *buescheri*, *leleupi* etc.), *Altolamprologus* - these may be a little difficult for the beginner - and *Telmatochromis bifrenatus* or *vittatus*. Suitable shell-dwellers include *Lamprologus ocellatus*, *Neolamprologus multifasciatus* and *brevis*.

If you don't want to breed them you could probably house several individuals of different species but there will still be territorial needs and you may run the risk of hybrids, though these are not as common as in some other groups of cichlids. Don't mix similar species - especially not Julies - as they will squabble violently. **MB**

Heading for trouble

Q **Please could you give me some advice on my male *Geophagus steindachneri*?**

He lives in a 24" x 12" x 18" tank on his own. To date he has had five separate females and beaten up all of them, including one he had spawned with previously.

Could you suggest another fish I could add? Space is limited and the only other tank I have is a 21" cube and I can't put him in there because it contains two small *G. surupari*, a pair of *G. brasiliensis*, a pair each of *Crenicara filamentosa*, *Cichlasoma sajica* and Butterfly Rams, and an Ancistrus.

• Janet Ling, London

Geophagus surupari may reach a length of up to 8"

A I think all your problems can be attributed to the fact that your tank is far too small for a *Geophagus steindachneri*. In nature, males form what is termed a "lek", ie. they have adjoining territories and show off to one another and attempt to seduce any passing females. Any females which are not ripe will either stay away or beat a hasty retreat. Ripe females will stop and spawn with one or more males of their choice.

The display territory must be at least as large as the floor area of your tank - and so yours undoubtedly supposes that any female who visits him is ready to spawn. Your female(s) have no choice in the matter, as there is nowhere else for them to go. So you have a frustrated male who cannot understand why he is apparently being given the "come-on" and who not surprisingly reacts with hostility when spawning is not forthcoming. To keep this species without this type of hassle you need at least a 42" tank.

In addition, I'm sorry to say, you are destined for even worse trouble in your 21" cube. *G. surupari* attains 7-8". *G. brasiliensis* can make nearly 12" in males. "*C.*" *sajica* reaches 4" or so and is probably the largest species you could keep successfully in that tank and then if you have just a pair of them and nothing else. I should also point out that *sajica* are hard water fish and the others come from soft, acid water. The *Geophagus* will tolerate London tap, but the *Crenicara filamentosa* and the Rams are doomed unless you give them the right conditions. **MB**

Polypterus are one of the most primitive of all fish. This is P. ornatipinnis.

Nocturnal predator

Q **I recently saw a fish in my local shop that I have just got to have. It's called Polypterus and it's about 12" long, blue grey in colour with a white underside and pectorals that look like table tennis bats. It's very snake-like.**

Please could you give me some information on this fish?

• D. Sprague, Eminster

A *Polypterus palmus* is a nocturnal predatory fish, best kept in a species only aquarium. They can be kept singularly or in small groups, but ensure the aquarium has plenty of hiding places, for these fish can be aggressive towards one another.

They require slightly hard water of 8-10°dH, with a temperature of 22-28°C. High oxygen levels are not important, for the fish has an air bladder with which it can breathe air. This air bladder does not allow the fish to remain out of water for any length of time. These fish are long lived and will reach a length of around 30cm.

A varied diet of earthworms, aquatic insects, shrimps, small fish and tablet foods will keep it in good health. **PD**

How much does it cost?

Q **Is there a way of calculating the cost of electricity used by by fish tanks, ie. lights, heaterstat, airpump and so on?**

• L. F. Lainton, Stafford

A Electricity costs about 6 ½p per Kilowatt every hour. The average fishkeeper has 150W of heaters, 14W of lighting and 12W of pumps which totals 176W, costing 1.14p per hour. However heaters only operate part of the time, so it is generous to say 1p per hour.

This comes to £20 per quarter.

Resiting the aquarium to a warm living room will cut this cost by anything up to 50% because the heater will only operate briefly and it is that which is the main user of power. Lagging the back and sides with polystyrene (ceiling tiles) can cut costs even further.

Even a large aquarium with all possible accessories will cost only around £5 a week to run. **DF**

Lumpy chin

I have a pair of juvenile Oscars in a four foot tank. Recently the larger of the two has developed a white nodule on its chin. This has grown rapidly and is now 2-3mm in diameter. The Oscar is untroubled by it and the other fish are not affected. Could it be a nodular disease? If so, do you know of any effective treatment?

David Keen, Essex

If the nodule develops into something resembling a small cauliflower then it could be lymphocystis, which is thought to be caused by a virus and is somewhat akin to warts. There is no chemical treatment, but it might be operable. It is slightly contagious, but other fish are rarely infected. There is no danger to the fish unless the nodule affects it mechanically - for example, a cyst on the lip can impede feeding.

I would wait a few weeks to see if it grows or slouts up of its own accord and if it is still there, go to the vet. If there is any inflammation then go to the vet immediately. If it bursts then net the fish out and apply a tiny dab of TCP or Gentian Violet to disinfect the wound and it will probably heal up all by itself.

The one thing you should not do is waste money and risk your fish's health by treating the tank with chemicals - there is no point unless you know what you are treating. **MB**

Territorial Sharks

Please could you give me some information on the Red Tailed Black Shark? I have a two foot planted tank containing Swordtails, Danios, Corydoras, tetras and a Sucking Loach.

I understand that Sharks and Sucking Loaches are inclined to be territorial, so if I add a Red Tailed Black Shark will they be liable to fight?

David Laidler, Tyne & Wear

The Red Tailed Black Shark comes from Thailand. It can reach up to 12 cm in length. It would be compatible with the fish in your tank. They are happiest at a temperature of 23-27°C and a pH of 6.5-7. Feed a diet of insects, worms, plant matter, flake food and freeze dried food. Some greenstuffs in the form of lettuce or algae is very important.

These sharks are territorial, as are Sucking Loaches. But the territoriality is usually restricted to their own kind and both species can be kept together. **PD**

■ Longer holidays

I am planning to go on holiday for six weeks.

I can rely on one of my neighbours to come in once a week to check on things and feed the fish, but he is not a fishkeeper and I'd like to make things as easy for him as possible.

At the moment I change part of the water and rinse out the foam insert in the filter about every ten days, but I also feed the fish daily, as cleaning is necessary.

D. Hopkins, Anglesey

Tropical fish can live without food for six weeks, but that is the limit, so it's best a neighbour comes in to feed them occasionally. The danger with non-fishkeepers is that they have a tendency to overfeed the fish, causing a water quality problem.

The answer is to have the neighbour only feed and visit once a week. It also helps to leave one dose of flake in a twist of polyfilt, ready for that feeding.

If there are no plants, leave the light off – otherwise use a timer.

Replace the foam in the filter with something chunky that allows the water to flow through without blocking - Siporax, ceramic pieces or large sized gravel will work well. **DF**

■ Tapwater to blame

About six months ago I set up a 48" x 15" x 12" tank for African cichlids. It was stocked with *Pseudotropheus zebra* and *auratus* and four *Lamprologus brichardi*. This gave a total of twenty fish, each about 1½" long. Six months on, few of the fish have grown and fatalities have begun to occur.

Five fish have died, mostly after getting extremely thin. On each occasion the fish ends up lying on the tank floor breathing heavily until it dies.

Hardness is high and the pH is 8. Ammonia and nitrite are at nil. My nitrate is above 50ppm and water changes do little to relieve it, as my tapwater is between 25 and 50ppm. Would this be the cause of the problem? Will I need to invest in a Nitrogen filter?

Robin Lewis, Bedsa

I think your nitrate levels are to blame. I have not tried the Nitrogen myself but they are said to be very good. An alternative is reverse osmosis, but that also generally demineralises the water which is not always a very good idea – especially for Rifts. **MB**

Too soft...

Q **I have a problem with fish dying for no apparent reason. Over the past month I have lost two female Siamese Fighters, two Neons, a Gourami and a Kuhli Loach.**

The tank is three feet long and has both undergravel and internal power filtration. The temperature is 76-78°F and the pH is 6.4. I change 10-15% of the water every week. Nitrate levels are low.

My dealer says the water is too soft and the pH should be at 7. Is this correct?

• J. Feary, Chippington

A Your dealer was correct. The water is far too acid for the fish you are keeping. A pH of 7 is neutral, which means the water is neither acid nor alkaline and many fish will adapt to this - both those which prefer acid or alkaline conditions. You have two options open. You can either raise the pH level using a buffer or, if you do not wish to go to the expense and trouble involved in this, why not choose fish which prefer acidic water. There are many species to choose from. Your dealer should be able to point you in the right direction. **PD**

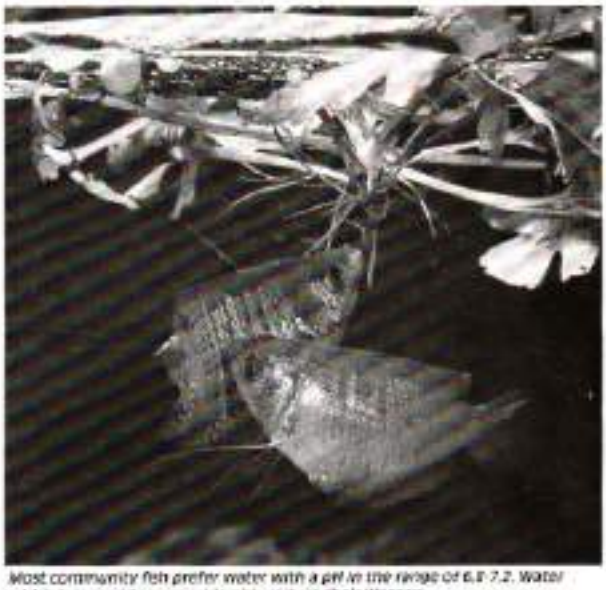
...and too hard?

Q **I am setting up a 48" x 12" x 22" tank to simulate the Amazon basin. Decor will be bogwood and natural plants. I intend to use an external power filter.**

I would like to keep one or two pairs of Discus and Clown Loach. What else can I add to establish an Amazon community?

My mains water is a problem. The pH is 8-8.4 with 17.5°DH. Should I use rainwater?

• D. Prouse, Bristol



Most community fish prefer water with a pH in the range of 6.8-7.2. Water which is too acid can considerably reduce their lifespan.

A For a start your aquarium water is much too alkaline not only for an Amazon aquarium, but also to keep Discus in. These require soft, acid water with a pH of 6.5. To achieve the acidity, filter the water through aquarium peat or add peat blocks below the gravel. Peat, being a natural detoniser will also have some effect in softening the water.

If you wish to establish an Amazonian aquarium, I should leave out the Clown Loach, because they originate from Sumatra and Borneo. Discus are best kept in a species only aquarium. **PD**

The Electric Catfish - handy for those long winter power cuts.

Not very sociable

Q **I have found information on the African Lungfish very limited, so any information would be appreciated. My Lungfish is 45cm long. What would make a suitable companion? I would quite like to add a Bowfin or an Ornate Birchir if either of these is compatible.**

I also have an Electric Catfish which is 18cm long. Is there anything I can keep with it?

• Greig Weston, Midlothian

A There are four African Lungfish: *Protopterus annectens* (West African), *P. amphibius* (East African), *P. aethiopicus* (Congo) and *P. dolloi*. All belong to the order Dipnoi whose fossils date back some 350 million years. There are only six surviving species, the other two originating from South America and Australia, of quite a large family and they form the link between the fish and the early reptiles.

Of these four, the West African species is the most commonly offered for sale. Generally available at 30cm, this fish can reach a length of over one metre. They are quick growing and an adult will require a large aquarium of at least 2m x 1m x 1m.

They are aggressive fish and will try to eat anything you attempt to keep with them, so they are best kept on their own. They prefer a temperature of 24-27°C. Feed on a varied diet of fish, earthworms, small mammals and insects.

The Electric Catfish, *Malapterurus electricus* can reach a length of almost three feet and discharge electric shocks ranging from short pulses to 250V. These catfish are best kept on their own or with very hardy and robust Tilapia cichlids. **PD**

Tank will be too small

Q **Please could you tell me the water requirements of my two Banded Severums? I will be keeping them in a 36" x 12" x 15" tank with small shoal of Serpae Tetras and a Plec. The tank is run by an undergravel and an internal filter and will be furnished with rocks, bogwood and real and plastic plants.**
•A. D. Lewis, East Sussex

A The natural water conditions of the Severum, *(Heros severus)*, are very soft and acid, with a pH of 6, but aquarium strains will do very well in neutral to moderately alkaline conditions. You may need to get the pH right for breeding and in that situation 5pH is not too low. The temperature should be around 80°F.

You should bear in mind that a full-grown Severum can measure 8" or more, so your tank will not be large enough for two in the long term. Your decor is fine, though there may be some nibbling of plants.

There's a good possibility that your Severums will eat your tetras if the size differential is large enough!

There is a BCA information pamphlet on this species, price 50p (cheque/PO) + SAE from **BCA (PFK), 7 Delamere Avenue, Sale, Cheshire.** **MB**

Good food - and it's free

Q **Please could you tell me if I should do anything else other than wash earthworms before feeding them to my fish? Would the soil in their bodies pass on germs?**
•N. Bryan, Cleveland

Earthworms - the best food money can't buy.

A Earthworms are one of the best foods you can feed to your fish, for they are a complete animal with all the essential amino acids to sustain life and dietary requirements.

When removed from the ground, wash them to remove any soil or rubbish and then either soak them in water or clean the gut by gently squeezing the body from one end to the other. In all the years I have been keeping fish I have yet to suffer any form of disease or problems associated with feeding worms. **PD**

Corydoras - the right conditions

Q **Please could you give me some advice on what the best conditions are for Corydoras? I run a 36" x 15" x 12" tank, with undergravel filtration. Is it possible to have sand as a substrate without affecting the efficiency of the filter?**
•M. E. Blagg, Notts.

A The use of sand directly over a sub gravel filter is not recommended. You would be better off with part of the tank being filtered by undergravel and the other part having a sand base. Corydoras are tolerant of a wide pH range so long as the filter is well-maintained and the tank is not neglected. Regular water changes and a varied diet with the inclusion of some livefoods will keep your Corydoras in good health. The sand area will need stirring up every time you do a water change, so that it doesn't get compacted and sour the tank. The use of plants is recommended as they help to settle the catfish down and provide spawning sites. Try Java Moss, Java Fern and Indian Fern. **GS**

If you want to keep Pimelodus pictus with small fish, you might find you can get away with it in a densely planted tank, so long as the Pims are getting plenty of other food to eat.

Getting the light right

Q **I recently set up a 36" x 18" x 15" tropical community tank. It has peat blocks and a 2" covering of fine gravel with external filtration. Lighting consists of two 30" tubes - one Triton and one Aquastar. The tank is heavily planted with around 200 plants. I can't seem to get the lighting right - some plants are browning on the lower level - others are going brown all over. Do you have any ideas?**

My fish stock includes a mixture of tetras, barbs, rasboras and recently two Pictus catfish. These are growing very quickly and I have read that they may attack small fish, such as Neons. Should I remove them?

A Although your aquarium has the correct lighting to promote good plant growth, I suspect your problem arises from not having enough light for such a densely planted aquarium. The browning on the lower plants is either algae or the plants are dying. If the latter is the case, it is probably due to them not receiving enough light. I suggest you add another Triton tube and include an aquarium plant fertiliser. You may have to consider doing some pruning.

Pimelodus pictus will take smaller fish, such as Neons, but in a densely planted aquarium and if kept well fed, they are less likely to take the smaller inhabitants. However, if you find you do start to lose fish mysteriously, then find a new home for the Pictus. **PD**

Aggressive Severum

I recently began to stock a 4'6" tank, commencing with a 5½" Plec, a 2" Weather Loach and a 3" Gold Severum, followed by two small Corydoras and a handsome 2½" Red Oscar. I deliberately left the Oscar until last because I presumed he might "take over" once installed. That was yesterday. Early this morning he was dead; fins and eyes gone and some of his flesh missing. Does this point to the Severum?

The Severum had previously outgrown his siblings very rapidly and had shown no hint of aggression except for eating three Halfbeaks which were temporarily transferred to his tank. I believe I got the Severums at the end of last year. The Oscar joined them in a pretty well-populated four foot tank in early May and appeared to ignore and be ignored by everybody.

Should I assume it would be unsafe to add the two smaller Gold Severums to the 4'6" tank, or some not-much-bigger Green Severums? A tiny Clown Plec, Corydoras and several Tiger Barbs all appear unharmed and unintimidated.
Brenda Burdett, W. Lothian

I would imagine the bits of Oscar were removed after his death, rather than being the cause. It could well have been the Severum that did the killing, resenting an intruder. The usual cause of death is due to internal injuries caused by butting, or exhaustion resulting from being chased. I would not normally expect this from a Severum - but then I have never heard of a Severum eating Halfbeaks. I can't think of anything else that would have killed the Oscar, unless he suffered damage during the transfer and died of internal injuries - it can happen.

If you do add the other Severums, make it all at once and first thing on a day when you will be there to supervise things. In the event of trouble, remove the villain, let the other fish settle for a few days and then put him back. If he is the cause of the trouble, then it sounds very much like territoriality, not food-seeking; a territorial cichlid will rarely attack much smaller fish, especially non-cichlids, but will go for sensory contestants, viz other cichlids and especially conspecifics. **MB**

Change the substrate

I have a 48" x 12" x 18" Malawi cichlid community. The set up is run on a Fluval 4 internal power filter.

Nitrite is nil and nitrate is very low. The pH is 7.6-8. I carry out a 25% water change every two weeks.

My Mbuna keep flicking on the sand, heater, pump and sides of the tank - not constantly, but quite often.

My dealer suggested I treat them for gill flukes, so I did this on two occasions but it made no difference. By this time I noticed that one of the electrus and an ezesperatus had a fungal growth on the whole body. I separated them but they died the next day. I treated the main tank for fungus.

All the fish are eating and growing and they look perfectly healthy - but they are still flicking just as much as before. What do you suggest?
Michael Gibson, Staffs

Mbuna do scratch quite a bit, but regular flicking is a sign that all is not well.

You mention "sand" and therefore I assume you have a substrate of coral sand. I have noted that flicking is very common where such a substrate is used and I think it may be from mechanical irritation of the gills by tiny bits of coral suspended in the water. This doesn't seem to happen when coral sand is mixed with gravel (I use about 25% coral to 75% gravel), probably because the coral slips into the interstices of the gravel and stays there.

If you watch your fish you may notice that rapid movements sometimes "blow" the fine sand up from the bottom - likewise the filter may have this effect.

I doubt that parasites or other organisms are at fault. The fungal growth may have been due to the water quality being affected by the chemicals, or it could have set in where damage had occurred as a result of the flicking.

In your position, I would refresh my substrate, as perpetual gill irritation can hardly be good for the fish - though you will have to accept that some permanent damage may already have occurred. Better late than never, though. **MB**

Joining tanks

In the November issue of *PFK*, Dr. David Ford answered a reader's letter which concerned joining two small tanks to make one larger one. Although the answer he gave was perfectly correct, neither his reply or our accompanying diagram made absolutely clear the importance of glass thickness from a safety point of view. We contacted Dr. Ford, who sent us the following reply:

"With reference to my reply to Mr. Hollis' letter in the November issue, the artist showed a glass strip being used to join two aquariums together to make one large tank. It correctly stated at least 1" of strip glass was required, but did not say what thickness. This must be plate glass (6mm or more), because the glass thickness must reflect the overall tank size.

The same standard applies to the glass of the two tanks. The glass thickness may be correct for say, a 24" tank, but two 24" tanks become a 48" tank and the glass thickness must be suitable for this size of aquarium.

This is especially important at the moment, because the BBC's *Watchdog* programme on TV is objecting to the lack of glass thickness standards for aquariums. The trade are preparing standards to be issued by the OFI. When issued, these standards must be applied to joined or repaired aquariums."
Dr. David Ford

Apologies to any readers who may have been misled by the original reply.

Oscars are notorious for their habit of becoming "stuck" on one type of food and starving them out of it can be painful for both the fish and the keeper.

Starve them out

Q **Two months ago I obtained a pair of Oscars and apart from two weeks of sulks everything seemed to be fine. However, they will only eat earthworms, which is fine in the summer, but I would be much happier if they would take a little trout, prawns and beefheart. I have tried leaving them without food but after about a week I give in to their begging.**

I have noticed little holes in their heads. There doesn't seem to be any inflammation or mucus and they seem healthy. Is it hole in the head?
•G. Whiting, Avon

A I am afraid you must be strong as regards starving your Oscars out. It is for their benefit in the long term. Mind you, if you can't do it the weather will automatically do it for you, unless you plan to take a pneumatic drill into the garden with you in December. It may take several weeks before you win - but you will, I am sure, eventually be victorious.

The little holes are openings to the sensory pores and if you look you will see two lines of them on the sides, the lateral lines. These enable the fish to sense vibrations - a sort of sonar. They are unlikely to be hole in the head, unless they enlarge and fill with whitish matter. **MB**

Getting into the nooks and crannies

Q **I would like to invest in a gravel cleaner that removes detritus without syphoning off water, as I would like to be able to clean the gravel in between regular changes. It must be practical enough to reach between rocks and plants.**
•E. Swierczynski, Watford

A Cleaning the gravel of a heavily planted aquarium can be a problem. However, a healthy aquarium with lush plant growth will use the organic matter on the gravel as a plant fertiliser. This means the aquarium will not need cleaning as often as a less densely planted one.

When cleaning is required, a good "hoover" to use is the air powered model marketed by Algarde, which costs around £2 or so. This model has a narrow suction face which can get into the smallest of gaps. The detritus is deposited in a bag and the water re-circulated, so no topping up is required. **PD**

Swordtails are best kept to a ratio of one male to three or four females. Pic. by Max Gibbs, The Goldfish Bowl, Oxford.

How many Swords?

Q **I am a beginner to the hobby and I would like to keep livebearers. I am especially keen on Swordtails. Please could you tell me how many I should keep and if they will be all right with Guppies, Platies and Corydoras? I have a 30" x 15" x 12" tank.**

Also, how many fish will my tank hold?

• Pat Fairweather, Norwich

A Swordtails will be fine with your selection of fish, although I suggest you only keep one male and three or four females. In a tank your size, two males may fight. In addition, due to the fact that, like all livebearers, they are very sexually active, it allows the females the chance to get a rest if there is more than one for him to press his attentions on.

To work out the amount of fish your tank will hold, multiply the length by the breadth and divide the result by ten. This will give you the maximum amount of fish in inches. A tank your size will hold 45" of fish.

A couple of Terrors

Q **I have bought a pair(?) of Green Terrors (*Aequidens rivulatus*) which are in a 36" x 12" x 18" tank with undergravel filtration. One is 3"; the other slightly smaller. How do I sex them and will they breed? Any other information would be welcome.**

• Darren Pink

Despite their name, Green Terrors are quite placid compared to some cichlids. This is a male. Pic. by Pete Trevett.

A *Aequidens rivulatus* got its common name back in the days when medium-sized fish were few and far between and by the standards then it was a Terror of an aquarium fish. Compared with some we keep now it is quite peaceful!

It is a South American fish, but not from the areas where the water is soft and acid. It comes from the Pacific coast where the conditions are more neutral. Temperature should be 78-80°F. Tank decor can consist of rocks and bogwood - plants will be dug up unless planted between rocks or stones.

The species will take the usual foods but bear in mind it is a robust fish and needs an appropriate diet - earthworms, beef heart, mussels, prawns and bits of chicken are ideal.

Males can attain a length of 9", females are smaller. Adult males have a humped forehead and longer fin extensions, but there is no obvious way of sexing smaller individuals. If you have two males then the first sign will probably be the continuous conflict. There could well be some of this between a male and female as they pair, but if they do not settle down then you can assume they are both males.

They will probably resent any other fish so it's a good idea to let them have the tank to themselves. Keep a divider handy just in case it is needed.

Bear in mind that when they are full grown, your tank will be barely large enough. A four footer would be better.

MB

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■ **Answering general queries and specialising in "oddballs and tankbusters" is PAUL DOHOVAN.**

■ **Plant problems are the realm of BERTI GESTING of Aquatic World.**

■ **Cichlid fans deal with MARY BAILEY, treasurer to the British Cichlid Association.**

■ **Discus queries go to STEVE DUDLEY of Euro-Discus.**

■ **For all your technical questions, you can write to Dr DAVID FORD of the 'Aquarian' Advisory Service.**

■ **If your problem concerns Catfish, send it to GINA SANDFORD of the Catfish Association of Great Britain.**

Just tick the appropriate box below and attach the coupon to the front of your letter. Send with SAE to: Tropical Answers, Practical Fishkeeping, Bretton Court, Bretton, Peterborough, PE3 8DZ.

We regret that letters sent without an SAE will not receive a reply.

TROPICAL ANSWERS

- ☐ **General queries; Paul Donovan**
- ☐ **Technical; David Ford**
- ☐ **Plants; Berti Gesting**
- ☐ **Catfish; Gina Sandford**
- ☐ **Discus; Steve Dudley**
- ☐ **Cichlids; Mary Bailey**

Just CHAMPION

The Aquachamp competition has been run by 'Aquarian' and Practical Fishkeeping magazine for many years. All British aquatic clubs are eligible to receive the questions and answers with prizes for the highest points obtained. The top scoring six club members are invited to take part in the grand final at the FBAS Supreme Festival of Fishkeeping at Pontins, Weston-super-Mare each November.

Fifty of the hundred questions set by Dr. DAVID FORD of the 'Aquarian' Advisory Service in the 1992 round are shown below, with an explanation of the answers expected. How would you have done in the quiz? No-one achieved 100% but some fishkeepers answered over 90% correctly! They start simple but gradually become more difficult....

1. **Where was the first public aquarium?**
2. **What are Koi?**
3. **Aquaria are named by the type of water they contain - can you name the three most popular?**
4. **Name one other type of aquarium by its water content.**
5. **What is a terrarium?**
6. **Is a shark a true fish?**
7. **Is a Killer Whale a true fish?**
8. **How do you spell the "English" name of *Serrasalmus natterori*?**
9. **What are fish's fins made of?**
10. **What is the common name for baby fish?**
11. **What is another name for the ventral fin?**
12. **What is the numerical difference between Centigrade and Celsius?**
13. **What wattage is a traditional 24" fluorescent tube for aquaria?**
14. **Where is the caudal fin?**
15. **How many litres in an imperial gallon?**
16. **What are the Hognose, Emerald and Britiskis fish?**
17. **From which country did the Neon Tetra originate?**
18. **Which Lake in South America is home to the Green Discus?**
19. **Is the Red Tailed Catfish a carnivore?**
20. **Which of the following is not a mouthbrooder: Shark Catfish, Severum, Egyptian Mouthbrooder?**
21. **In which pH range is ammonia more deadly to fish, acid (pH1 to 7) or alkaline (pH7 to 14)?**
22. **What is the name of all the fish found in estuarine waters?**
23. **What is the scientific name for the Firemouth Cichlid?**
24. **The air-breathing fish of Afro-Asia are called...?**
25. **What is common to the Scorpion, Lionfish and Liver Catfish?**
26. **Where does a pelagic fish swim?**
27. **In which country can you find Darters, Channel Catfish and Sunfish?**
28. **Some Cichlids and Catfish can spawn with more than one group of females...what type of polygamy is this called?**
29. **Several species of fish including *Hypostomus regani* and *Chromidotilapia guentheri* are named after scientists at which museum?**
30. **Dr Gery wrote what famous fish book?**
31. **What is the name of the magazine published by the FBAS?**

From where does the Neon Tetra originate? See question 17.

Red Tailed Catfish. See question 13.

Severums. See question 20

Corydoras metae. See question 38.

Anemone. See question 40.

32 **What group of fish live in coastal waters of Australia New Guinea?**

33 **What is a holotype?**

34 **Which family of fish includes *Otocinclus*, *Hypostomus* and *Peckoltia*?**

35 **What are the Nannostomus better known as?**

36 **Pakistan, Wrought Iron and Hawaiian are from what group of fish?**

37 **Which of the following do not show parental care: Bullhead Catfish, Tiger Barb, Whiptail Catfish and Brichard's Ciehlid?**

38 **What are the following Corydoras named after: *C. coppenamensis*, *C. metae* and *C. napoensis*?**

39 **Is white spot a bacterial infection?**

40 **If anemones are not plants why do they need bright lights?**

41 **The wild Molly originates from what type of water?**

42 **What does MKA stand for?**

43 **Why do Shrimpfish stand on their tails?**

44 **Shark skin is abrasively rough due to special scales called...?**

45 **Bony fish have overlapping scales called...?**

46 **Why is the disappearance of crocodiles bad news for fish?**

47 **From which country does the wild White Cloud Mountain Minnow originate?**

48 **How do you distinguish between Brochis and Corydoras catfish?**

49 **What is the maximum number of pages in one issue of *Practical Fishkeeping* - so far?**

50 **What is the Post Office Box number of the 'Aquarian' Advisory Service?**

That is just 50 of the 100 questions put to members of aquatic societies all around the country over the last year. If you want to take part in the quiz in 1993, look out for announcements in the magazine.

Firemouth cichlid. See question 28.

TURN TO PAGE 104 FOR ANSWERS

WHICH HERBS?

Generally my fish are too healthy to require treatment, but in the last few years I have been able to buy fish as they arrive in the country (usually via the large fish shows).

Recognising that some form of help is required by these fish as they are invariably suffering from stress, damaged fins and shock brought about by different water conditions, and not wanting to use anything alien to their systems, I felt that herbs would be gentler and less likely to result in any problems with breeding the fish later.

Accordingly I looked up the various symptoms and cases of several diseases. Herbal remedies tend to treat the symptoms, even if the actual cause is not known. From the herbs recommended, I then selected those that grow in or near water or in damp areas.

The following is a list of the most useful herbs I have found, along with their properties and uses. From this it is possible to work out a recipe for some common ailments.

The amounts given are for a 48" x 15" x 15" tank:

- **Parsley** - Use half a teaspoon of dried or fresh. Use the greenest leaves available. It's useful for allergies, edema, kidney and bladder problems, liver complaints, prostate and thyroid trouble. Its function in helping to remove toxins from the bloodstream is useful in most illnesses.
- **Mint** - Half a teaspoon of dried or fresh green mint leaves is helpful for nausea, stomach upsets and encourages appetite. It's also a mild antiseptic.
- **Fennel** - Half a teaspoon of dried fennel or if fresh use the green tops and a piece of the stalk. This is a cleansing agent of the digestive tract and it also aids digestion. It's a very mild antiseptic.
- **Elderflowers** - These can either be collected as flowers from the hedgerow in the summer (a couple of leaves crushed and rubbed on the skin helps to keep mosquitoes away from humans) or use half a teaspoon of dried flowers which can be bought as a tea. They are good for inflammation of the bowel, breathing difficulties, heart problems, high blood pressure, reducing mucus and it also has a calming effect on the body, especially during nausea.
- **Pumpkin seeds** - I usually use dried, selecting six of the greenest, but fresh can be used. Don't worry about removing all of the flesh from the seeds as it will do no harm. They are good for parasites and prostate trouble. Pumpkin seeds contain zinc which is necessary to help both internal and external skin heal itself after damage, either by parasites or bacteria - or even general wounds. Do not use zinc as a pure chemical with fish; locked up in the seed it is slowly used and is not present in an overwhelming amount.
- **Garlic** - Always use fresh, preferably the top, where the shoot will emerge. It deals with abscesses, amoebic dysentry, rashes, poor digestion, dizziness, infection, fevers, heart problems, parasites and thyroid disorders. It is a mild, but effective antibiotic, but use it very sparingly. A piece the size of a match head is a good guide as to the amount required for a 48" x 15" x 15" tank.
- **Walnut** - Always use fresh. It's good for cysts, rashes, fevers, infections, parasites, skin problems and regrowth of fins. Use one eighth of a walnut - about the size of a pea.

All of the above should be available from any good health food shop - fresh herbs are often found at supermarkets these days. If you have too many pumpkin seeds they are delicious in stews or roasted on top of cheese on toast.

Fennel can be bought as tea bags and one of these can be used instead of half a teaspoon and the bag left hanging in the tank for one day after using it to make the remedy. Don't worry if the fish decide to eat it - they know if they need it.

The ki

CHRIS COBLEY follows-up last month's fascinating interview with a look at the reasons why he prefers herbs to treat his fish.

Last month's PFK introduced you to some of my ideas for using herbs in the treatment of ill-health in fish.

For over twenty years, I have tried to keep fish in as near to natural conditions as possible. Give me a six foot tank and I'm more likely to put a shoal of small 25mm Tetras into it, along with a few Dwarf Cichlids and Corydoras, than use it for one or two larger fish.

Natural conditions

It is nearly impossible to recreate all that is found in the environment that affects our fish, within the confines of our shallow aquariums. It is always important to find out as much as possible about the normal living conditions of a particular species. Not only will the fish be happier, more colourful and likely to breed, but it will be healthier and less disease-prone if kept in its natural state.

The weather, geography, altitude, geology and the vegetation of both the surrounding land and wet environment have all attributed to an animal's evolution over thousands of years. In addition, an animal that is born and survives to adulthood will have become genetically suited to the surroundings and conditions under which this takes place.

The variety of life in a particular habitat is due to the number of opportunities available for different plant and animal life

Some ragged wild Angels responded well to herbal treatment.

indest cure

Mint is a mild antiseptic.

to develop. All life is interdependent on the natural environment, from the smallest bacteria to the largest animal or plant – even man.

Herbs and fish

It was my own experiences with herbal treatments, due to being ill over the past few years, that convinced me that there was more than just a placebo effect at work.

Fish which respond to herbal treatment are not doing so because they *think* they should get better.

I suppose that I really put two and two together when reading a (non aquatic) book on the rain forest, which mentioned that the Rio Negro in Brazil was dark, due to a weak tea effect as the water percolated first through the vegetation and then through the sandy subsoil (as opposed to clay subsoils elsewhere in the Amazon basin).

I first realised that herbs could reproduce this effect – and later wondered if a lack of them could be responsible for some of the diseases that seem particular to fish of this area.

Even in clear water systems, plants are available in one form or another. Either the herbs naturally present were suppressing the disease organism or were helping the fish to suppress the symptoms of the disease.

"Fish which respond to herbal treatment are not doing so because they *think* they should get better."

However, using any form of medication should be a last resort and it is only in the last four or five years that I have used herbal remedies (for eighteen years before that I used no treatments) as a lot of minor problems will heal themselves, provided that the tank is healthy and the water quality is good.

Aquatic plants

I also feel that it is important to have plants growing in the aquarium and/or algae, depending on what is found in the fish's natural habitat. They are a important part of the ecology, taking up excess nitrates from the water, providing a source of fresh vitamins and, I'm sure in some cases they are a natural source of medication.

Fish which feel the need can always nibble at a plant that will help them, in the same way that cows and even dogs know which herbs to eat when they are ill.

Dosing

Don't be tempted to overdose the fish – it's better to use less when treating with herbal remedies. One treatment is usually enough. Remember you are putting organic matter into your tank, but you will not be upseting the bacteria living in your filter.

Not feeding for a couple of days beforehand clears their systems and helps to make sure your fish eat the remedy, so that it has a greater effect and avoids the problem of rotting herbs polluting the water. Wait at least two weeks before dosing again.

Garlic, walnuts and pumpkin seeds all have their uses.

Some of the herbs listed are found in most countries – often taken by mankind as they migrated all over the world, showing that man considered them as important.

Others are found only in cooler climates. But if fish respond to these common herbs, what other plants are to be found in their environment that they usually respond to?

As I've used a book intended for humans to find out which herbs to use (*Helping yourself with natural remedies* by Terry Willard), it follows that some of the plants they would naturally respond to, would be useful to treat disorders in mankind. This is one of the reasons we destroy the rain forests at our peril. ▶

How fish may feed on herbs

Next time you watch a wildlife film, look out for animals feeding as a result of other animal's activities. I remember seeing a programme where the underwater shots of hippopotami showed numerous fish feeding on their leftovers.

Hippos are large vegetarians and must munch away at many different herbs, along with the other plants they eat growing along the river bank.

Windfalls: In the Amazon area there are large numbers of fish that feed off seeds falling from trees; their teeth and jawbones would allow them to crack even brazil nuts (something to think about while you struggle with your nut-crackers this Christmas). This feeding helps to prepare nuts for germination as well as any fruit seeds. Possibly as many as 200 fish and tree species are interdependent on each other.

Floods: Fish in the Amazon have seasonal opportunities to avail themselves of plant material. The rise in water level is due to the melting of snow and ice in the Andes – it rains all year round over the rain forest, half of the moisture being recycled, due to evaporation from the surface of the water and moisture given off by plants (transporation), with a increase in rainfall in late February, March and April and the more than normal rainy season (Monsoon).

This means that the fish have material washed down to them as well as having a greater area of the varzeas (Amazonian flood plains) in which to forage, introducing both food and herbs not otherwise available to aquatic life, in a form that can be used by them.

It is not surprising that many fish breed at this time, although cooler, fresh water is part of the trigger. It is quite possible that trace minerals and access to plants not available the rest of the year are essential for the fertilisation, hatching and development of fry in some species of fish that have proved difficult to breed in the past.

A planted tank may make for healthier fish.

Case histories

As an example of how to decide which herbs to use, here are two case histories:

■ I bought some wild Angels (*P. scalare*) in 1988 with ragged and shortened fins, either from the attentions of fish in the wild, or rough handling in transit.

They were placed in a mature planted tank on their own with a dense cloud of daphnia (as security and food), along with twenty tadpoles. These serve two purposes. The first is to show the Angels that flake is food and the other is to take the place of dither fish.

After three days slight fungus was observed on the damaged fins, along with a few white spots. Normally this could be kept under close observation and could clear up of its own accord in optimum conditions, but as these fish had already been through so much, I decided to treat them with herbs.

I opted for parsley to help them get over the difference in water and to remove any toxins produced by the parasitic attack, mint as an antiseptic and to encourage them to feed, fennel to help clear out the digestive tract in case of internal parasites (a very mild aid to pumpkin seeds) and as a mild antiseptic, elderflowers to reduce the fish's stress, pumpkin seeds to deal with the parasites and to help the skin heal, and garlic - again to deal with the parasites, but also as an antibiotic in case of secondary infection.

I added walnut to help with the regrowth of their fins, plus four teaspoonfuls of pineapple juice to help their systems clear any toxins (as they are fish from acid waters, the acidity of the juice also helps them).

The next day the fungus had dropped off and there were less white spots. Four days later there was no sign of either the spots or fungus and the fins had started to regrow. I left the daphnia in the tank for three weeks, to eat any parasites and to be eaten, if the Angels wanted to and by then, the fish were eating flake and pellets. The Angels later paired and spawned about a year later.

■ I observed a small yellow patch in the centre of one fish in a shoal of Neon Tetras some weeks after they had passed through quarantine. I had recently read that in America, research had suggested that Neon Tetra Disease could be due to a virus of the liver. This tied in with the position and colour of the spot when it first appeared.

Parsley was used for the liver problem and to help clear the system of toxins (causing the yellow colour and a fading of the normal colour), mint to encourage appetite, fennel to clear any toxins in the digestive tract, elderflower to calm the fish down and garlic as an antibiotic in case the fish suffered a secondary infection due to its weakened state.

Parsley should purify the bloodstream.

In addition my book advised fasting, drinking only fruit juices for liver complaints. Well, it's difficult to stop a fish eating completely in a mature planted tank, but normal feeding was stopped and small pieces of orange (no peel; tease out individual cells) were added to the tank.

All the fish (including Angels, and Lemon Tetras) went crazy for the small orange pieces. In addition, I added one teaspoonful of lemon juice and two of pineapple juice to the remedy (as for a four foot tank).

By the next day the yellow colour was fading and within two days it had gone. The fish affected continued to grow as well as the others in the shoal. But after six weeks the colour came back in the same region.

After repeating the treatment, the colour again disappeared. Thereafter, I did not wait for the reappearance of symptoms, but treated the tank every five to six weeks.

Fennel can be used in fresh or even tea bag form.

Making the remedies

When mixing, grind everything together, including the juice. Grind the seeds and nuts first to make sure they are properly ground. ■

■ Finally, if you make a bit too much of the basic tonic recipe given last month, you could always add it to the gravy for Christmas dinner - it won't do you any harm, and it might help you get over that extra drink or two.....

Practical Fishkeeping's A to Z OF FISH HEALTH

JERZY GAWOR'S A to Z reaches H and two treatable conditions – Hexamita and Hyperplasia.

It's important to understand the effect that water hardness can have on your fish, especially when keeping sensitive soft water species such as Discus. Pic. by Michael Edwards.

H

Hardness

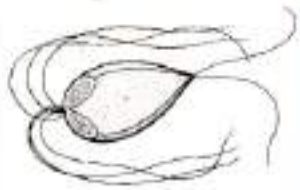
The hardness of water is a measure of the total dissolved inorganic chemicals (salts) - principally those of calcium and magnesium.

Other 'salts' involving metallic ions such as iron, zinc, copper, manganese, sodium, potassium, strontium although present in very small quantities, make up the total hardness levels. These salts are present mostly as carbonates, bicarbonates and hydroxides.

Levels of hardness vary considerably from one geographical area to another and are very much dependent on the type of water flows. Thus water which flows mostly over calcareous, sedimentary rocks will be more likely to have a high total hardness (up to 350 ppm) while water flowing through peaty, organic subsoil will invariably be soft (as low as 50 ppm total hardness) and acid in quality.

KEY FACTS

- **Ensure hardness levels are suitable for fish species that you are keeping, although most will tolerate a total hardness of between 100-250 ppm.**
- **Although a fairly wide tolerance level is exhibited by most freshwater fish it is better to adjust water hardness levels to suit the species. This is especially important for fish like Discus, Catfish, or Rift Lake Cichlids.**
- **Excessive variation of hardness levels can cause stress, damage to gills and fin tissues, poor colour, loss of breeding abilities and a low resistance to disease.**
- **Adjustment can be conducted with the aid of deionised water, or rainwater (soft) mixed in proportion to tap water (generally hard). Peat products can be used to further soften and acidify water specifically for Discus, while the addition of chemical 'buffers' can increase the hardness levels substantially for Rift-Lake Cichlids.**
- **Never use water from a domestic water-softener for fishkeeping as the sodium ion content is invariably too high (check with supplier).**



Hexamita flagellate.

Hexamita

Also known as *Octomitus*, this protozoan parasite is responsible for "Hole in the Head" disease of many Cichlids, as well as losses of young Gouramis and Cichlid fry - notably Angelfish.

The parasite itself is oval in shape and possesses eight whiplike hairs or flagella (hence *Octo* 'eight' - *mitus*), of which two are particularly elongated and are used to propel the organism through its watery environment.

Hexamita is in fact routinely isolated from the intestinal tracts of many species of tropical and coldwater fish including trout and goldfish.

However, disease occurs only when circumstances exist that weaken and stress the fish. As is the case with almost all fish diseases, it is when situations of poor water quality, inefficient filtration/aeration and overcrowding exist that conditions serve to weaken the immune defence of the host fish, allowing rapid multiplication of the parasite.

Typical symptoms of Hexamitiasis, apart from the severe lesions and skin ulcers that typify Hole in the Head disease of Discus and other species, are emaciation, and darkening of the body colour especially in the abdominal region. The fish become shy, listless, and often stop feeding once the disease has progressed.

Confirmation of this disease can be made in the laboratory with the aid of a compound microscope. If you have access to such an instrument and you suspect Hexamita infection, then careful examination of your specimen should provide the evidence you require to confirm or refute your suspicions.

The procedure is to remove some of the gut contents from 'affected' fish and place them on a microscope slide. If the specimen happens to be a dead fish then it must be autopsied as soon as possible.

In this case you should remove

KEY FACTS

● Once your suspicions have been confirmed you should not waste time. Begin treatment right away. The literature is full of remedies and assistance on this matter so it is always a good idea to read-up as much as you can to become familiar with this and other disease problems.

● Suggested treatment is as follows:

Metronidazole (Flagyl) available generally with a Veterinary prescription should be used as follows (see also Dimetridazole):

Treat the entire aquarium at a dose rate of 5-7 mg per 1 Litre of water. Remove all charcoal/adsorptive filter media.

Treat with full dose on day one. Treat with half dose (2-3 mg per litre) on day two and three. Partially change the water on day 4.

If you are using undergravel filters you will need to increase the dose by 50%.

Flagyl can also be fed to the affected fish (if they are still active and feeding) by mixing it with the food at a level of 1%.

● In severe cases the affected fish may be treated at a higher dose 10mg per litre in a separate hospital tank, for five days. Alternatively a short term 40 hour bath in a hospital tank at a dose of 40mg per litre.

● CQD, a product imported from Germany and available from specialist aquatic retailers, has been shown to be very effective in treating certain, but not all, cases of Hexamita infection.

● Hexa-ex, another imported product manufactured specifically for treating 'Hole in the Head' disease may still be available in the UK. (Perhaps the UK agents might clarify this point for *PFK* readers?)

● Needless to say, before you start any treatment for Hexamita and indeed any other disease, check the underlying factors which may be the stress factors listed earlier. These must be eliminated prior to any treatment if you wish to see the fish get better.

Always check water quality, aeration, filtration, overcrowding, overfeeding etc.

a portion of the intestine (and gall-bladder) and prepare a 'wet-smear' slide with a drop or two of water or saline solution. Scan the slide under the low power objective (100X). Look for the characteristic undulating movements of this parasite. Often the oval shaped body with its waving flagella can be seen quite clearly darting around among the intestinal debris obtained from your fish.

Hexamita can only be identified when moving, otherwise they cannot be distinguished from the background debris. Because Hexamita parasites are present naturally in many healthy fish, it is important to distinguish just what level of parasites, if found, constitutes a real problem.

It's important to monitor your water quality using test kits on a regular basis. You may get a bit of a shock.

Hygiene/ Husbandry

1. Conduct regular checks on your water quality using test-kits. It is often surprising to see just how close the water conditions in your aquaria or ponds have come to problems.

By using test-kits and keeping a record of the readings obtained you also build-up an invaluable data bank for future reference. Maintain a routine of regular partial water changes (eg 25% per month or 5% per week). Never change ALL the water at once, a typical procedure conducted on goldfish bowls and small tanks. Always aerate and condition the water for at least 24 hours prior to use.

2. Always feed your fish sparingly (small amounts but frequently) with the correct type and variety of foods to suit the species. Flake will not satisfy the appetite or requirements of a 10" Oscar. Never let uneaten food remain in the system. It will foul the water and cause problems.

3. Clean your filter system regularly, and that includes syphoning the gravel especially where undergravel systems are employed. Do not wait until it is clogged with fish waste and debris and therefore only working at a fraction of its efficiency. Change or clean filter media as recommended by the filter manufacturers.

4. Always match the aquarium/pond inhabitants so that 'in-fighting' between fish is avoided. Never add diseased or weak fish to your system. Treat any sick fish immediately, in isolation if possible, and keep a careful watch on other fish. Treat the entire tank/pond if in doubt.

5. Maintain cleanliness in and around your aquatic system. Wash and disinfect (use specialised products - available from Aquatic Stores) all your fishkeeping utensils e.g. nets, scrapers, magnets, fry-nets/traps, feeders. Keep all your fishkeeping products and especially medications away from young children and pets.

Hyperplasia (of the gills)

'Hyperplastic cell proliferation' - is a condition that can affect all species of fish.

In the main it affects the proper functioning of the gills. Hyperplasia is in fact initiated by the fish itself as a protective mechanism in response to hostile water conditions or parasite infestations.

When a fish encounters such situations its natural reaction is to protect the gills by rapidly producing extra living cells to coat the very fine secondary gill lamellae. An extra volume of mucus is also produced (notable on the skin and fin tissues).

As a protective response, refined through the evolutionary process, it is very effective. The gills are protected from further damage, the mucus assists in 'sloughing away' offending' parasites, and in the case of toxic water, the fish swims away.

But nobody told the fish over millions of years of evolution that one day they would be prized for their decorative/educational food value and put in overcrowded conditions (relatively speaking) in glass tanks/bowls, or ponds.

Parasites/pathogens are not sloughed away and diluted by an infinite gallonage of water, and toxic water conditions cannot be escaped. Hyperplasia in such conditions runs out of control, too many cells are produced - they 'proliferate'. These cells have no blood/nutrient/waste-disposal supply and they soon die.

The net effect is that not only is there a cut-off of the effective gas-exchange surface area of the gills, but there is also a nutritious breeding ground for yet more parasites and especially bacteria of the *Cytophaga - Myxobacteria* family leading to gill rot/decay and ultimately fish death.

KEY FACT

● Only sensible and regular system maintenance will avoid such an extreme situation and often, if caught early, hyperplasia is actually reversible.

■ 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.

CLUB TOGETHER

We focus on the International Characin Association.

The International Characin Association was established in 1989 to promote the collection, study and breeding of characins, assist in the correct identification where possible and encourage interest in characins and related species as well as in the fishkeeping hobby as a whole.

Publications

Every member is issued with a list of officers, fellow members and a copy of the Constitution, along with a membership card and copies of the Association's publications. These include a quarterly magazine and copies of minutes from General Assemblies and AGMs. Species lists are also available, to act as a guide in identifying characins. Technical information sheets are available from time to time.

Members receive a discount of 20% on all I.C.A. produced items.

Further Information

If you'd like to join the International Characin Association or would like more information, contact **Mr. D. G. Sidebottom, 18 Harry Street, Werneth, Oldham, Lancs. OL9 7TA.** Choose from a full year or a half-year membership.

Above: Leporinus fredrici.

Right: Shoal of Neon Tetras.

Below: Congo Tetra

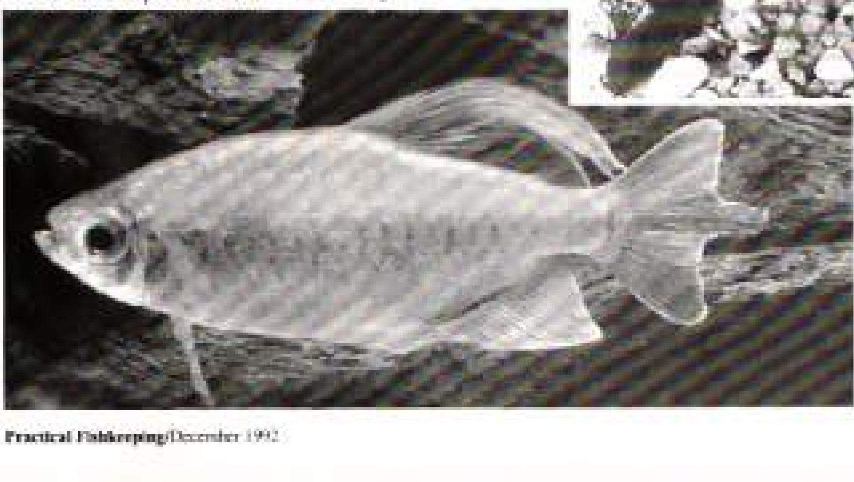
Membership charges

Membership can run for a full year or for a half year (either January 1 - June 30 or July 1 to December 31). Annual membership fees become due either prior to, or on December 31 each year.

Great Britain and Ireland
Adult: £7 per year; £4 per half
Junior: £5 per year; £3 per half
Family: £11 per year; £6 per half
Society: £16 per year; £9 per half

Europe
Adult: £9 per year; £5 per half
Junior: £7 per year; £4 per half
Family: £15 per year; £8 per half
Society: £22 per year; £12 per half

Airmail outside Europe
Adult: £11 per year; £6 per half
Junior: £9 per year; £5 per half
Family: £19 per year; £10 per half
Society: £28 per year; £15 per half



Serpae Tetra.

The most popular and best known of the rasboras is the Harlequin. The fish pictured are not fully mature and have yet to achieve the intense red colouring of the caudal and dorsal finnage.

Rasbora round-up

Overlooked and under-rated but definitely not Ras-boring – that's the view of the Goldfish Bowl's MAX GIBBS who offers photographic proof.

The family of Cyprinidae accommodates a wide range of popular aquarium fish, from the ubiquitous goldfish to the barbs, labeo "sharks", and other well-known fish. So why are the beautiful Rasboras, which are also Cyprinids, so often overlooked?

There are few aquarium fish which are so uniformly peaceful and easily-maintained as the rasboras. It has to be said that some species are notoriously difficult to acclimatise to aquarium life when collected from the wild, but once the acclimatisation process is complete they will usually become resilient and even robust.

If your supplier conditions newly arrived fish before offering them for sale you will usually avoid problems once the fish are transferred to your aquarium.

But be warned that some species react badly to a change of water chemistry, and a "home quarantine tank" in which the fish may be further conditioned and observed before releasing them into an established aquarium, is an asset. (This comment relates to ALL new fish purchases, and not just the Rasboras of course).

Harlequin Rasbora

The Harlequin *Rasbora heteromorpha* is probably the best known of the group to the hobbyist. There are many regional variations of this delightful fish, and colouring will vary according to where the stock has been collected. The range of natural habitats is widespread throughout South East Asia, but the Harlequin is ▶

The Firetail Rasbora is active and pretty but fails to excite the average hobbyist. A modest shoal can be inexpensive to buy and makes a delightful addition to the peaceful community aquarium.

Firetail Rasbora

Lively, graceful and an under-rated beauty, the Firetail Rasbora *Rasbora borapetensis* is invariably inexpensive to buy, and proves to be a hardy aquarium fish. Yet it has never been a popular species.

The name relates to the bright red patch of colour at the base of the tail which can be positively brilliant at times. The gold and black lateral line hits the eye too. At a maximum size of about 6cm it is an ideal community fish.

primarily found in parts of Malaysia, Sumatra, Thailand, and Singapore.

Most of the world's supplies are shipped out through Singapore, although the stock will probably have been collected from other sources.

Although the Harlequin will survive well on a good dried-food diet, like any other aquarium fish, it will thrive on a varied diet which includes live or frozen foods.

The Slim Harlequin from Thailand has beautiful metallic sheens surrounding the black "triangle". Adult fish display fire-like qualities of these glowing colours.

Slim Harlequin

Rasbora espei the Slim Harlequin is shipped out of Thailand to the world's fishkeepers. Some regard this lovely fish as the "poor man's harlequin", but it deserves a better billing than that.

The mature fish displays a burnished metallic glow to its body which is superb in a courting or spawning male.

The body shape is rather more streamlined than that of the Harlequin, and the dark "triangle" is much more elongated. It lacks the solid red finnage which is such an outstanding feature of the adult true Harlequin, having just a suggestion of redness by comparison.

Although preferring the same soft acid water conditions favoured by the true Harlequin, *espei* tends to be less fussy about changes in the water chemistry. (This fish is often offered as "*hengeli*" which is a smaller species from Sumatra).

Clown Rasbora

Try to see *Rasbora kalochroma* well-established in a dealer's tanks before considering a purchase.

The best of this fish is seen in mature, settled fish enjoying their surroundings. A red glow pervades the body, the dorsal, caudal and anal fins have a very full shape, and together with the streamlined body contours this results in a very agile fish.

A good varied diet and suitable water conditions are essential to make the best of this beautiful fish.

The Clown Rasbora has classic lines and mature fish in breeding colours glow with burnished red scales. Not one of the easier fish to condition to aquarium conditions.

Fire Rasbora

Another pretty Rasbora which comes exclusively from Sri Lanka, and is somewhat similar in shape to the Harlequin.

The Fire Rasbora *Rasbora vaterifloris* can also be tricky to acclimatise and unconditioned specimens should not be purchased. There are two or three colour forms of this pretty little fish, but the one most often seen is an amber-red colour. Quite often a "blue" form is encountered. Very occasionally a much darker red fish is shipped, although this form is now rarely seen in the UK market.

When "white spot" breaks out in the aquarium this species, like most other rasboras, suffers quite quickly from infestation, and rapid treatment with carefully calculated dosage is essential to save losses.

Green-Eyed Rasbora

Among the tiny species that attract attention, the Green-Eyed Rasbora *Rasbora dorsiocellata* reaches only 6cm in the wild, and tends to remain smaller than this in an aquarium.

The Green-Eyed Rasbora is distinguished by its shining, bright green eyes, but in the picture this fails to come through. The eye-spotted dorsal fin is another distinctive feature.

The lower part of the iris of the eye reflects a brilliant green colour which the author has tried many times to capture on film, without success.

(In order to achieve an accurate rendition of the subtle body colours the necessary exposure "burns out" the bright eye, giving a silver image rather than the true green.)

The dorsal fin is decorated

with a black oval over a white backing and accounts for another popular name for this species, the Hi-Spot Rasbora.

Golden Striped Rasbora

Rasbora daniconius has few devotees, often being dismissed as "too ordinary".

Yet the bright golden lateral line, emphasised by a black area below, is undeniably striking. The tail is suffused with a yellow ochre colouring, and the scale patterning on the upper body is ornamental. The eyes are typically bright reflectors of mirror-like quality.

This is a tough fish with no particular demands to be met. Although it grows to some 20cm in the wild it rarely achieves even half that size in the aquarium.

This is another rasbora which is quite easily persuaded to breed in aquarium conditions.

Redline Rasbora

One of the most elegant, pretty, smaller rasboras is the super-streamlined Redline Rasbora *Rasbora pauciperforata*.

It has a slender torpedo-shaped body with slightly elongated finnage.

A brightly glowing fire-red line runs from the upper lip, over the top of the eye, along the lateral line to the very tip of the outer edge of the caudal peduncle.

This beauty comes from Sumatra and prefers soft acid water, which will coax out its best colouration. The Redline Rasbora will acclimatise to most aquarium conditions, and a small shoal can be a stunning spectacle in the right setting.

Scissortail

Unlike the deep bodied species already mentioned, the Scissortail (*Rasbora trilineata*) has a typical elongated and streamlined "fish shape".

It is one of the most popular rasboras despite complete lack of any bright colours. The tail is distinctive, as its popular name suggests, having a black patch prominently displayed in each lobe of the forked caudal fin.

A white background to this black patch is set in otherwise clear finnage. As the fish swims the tail lobes open and close in a slight scissor action.

The body is a magnificent reflector with the belly region and the eye shining like a silver mirror while the lateral line region shines with metallic golden colours. The Scissortail is a tough fish, making few demands for any special treatment, and has the added attraction of being quite easily bred.

One of the most attractive Rasboras is the Redline Rasbora which is elegantly shaped and carries a lovely orange/red stripe throughout the entire length of its tiny body.

Black Striped Rasbora

Quite often a stray species arrives with the Redline Rasbora, but it is rarely shipped in quantities. This is the Black Striped Rasbora *Rasbora agilis*.

Similar in overall shape to the Redline Rasbora, this fish has a more elongated finnage with fine pointing, especially to the dorsal, anal, and ventral fins.

A golden yellow line replaces that of the Redline Rasbora, and follows an almost identical path from nose to tail. A black diffused area underlines this golden stripe to great effect. The emphatically super-streamlined profile of this species indicates its agility, well deserving its specific name.

Left: The Black Striped Rasbora is built for speed with elongated fins to match its slender body form. Not often shipped out in quantities, specimens are usually acquired as odd fish found in Redline Rasbora collections.

Red Scissortail

Rasbora caudimaculata the Red Scissortail can be a tricky fish to acclimatise to aquarium life, but once well established it rarely gives further problems.

This species grows quite large in the wild at up to 20cm, but it rarely achieves such proportions in the aquarium.

It has a similar shape to its smaller cousin, the Scissortail, but is otherwise quite different. The scale patterning above the lateral line is particularly pleasing, and the lateral line itself is bright silver.

The tail has distinct black tips, immediately followed by a generous warm orange area, fading into clear finnage before the caudal peduncle.

Above: The Red Scissortail have pretty marked and coloured fin, but look also at the attractive scale patterning of the upper body.

Breeding Rasboras

Breeding Rasboras can be a simple matter with certain species, notably the Scissortails and the Gold Striped Rasboras mentioned above.

With others the selection of the right pair is all-important. Once a compatible pair is found regular breeding from them becomes a relatively-simple matter.

Such species as The Harlequin and Dwarf Rasbora are in this category. Most species require very soft and slightly acid water conditions with clumps of fine-leaved plants in which to scatter their strongly adhesive eggs.

Hatching time is short with fry appearing after 24 to 30 hours, and growing rapidly when fed with rotifers.

Above: The Scissortail is very popular even though it lacks any bright colouring. Apart from the distinctive tail it has a highly reflective body. One of the easier Rasboras to breed.

The minute Dwarf Rasbora is a gem when maintained in soft acid water conditions and fed with suitably small live foods. These youngsters are beginning to show signs of the colours to come. At about 1.5cm they are a challenge to the photographer!

Dwarf Rasbora

There are two very tiny and stunningly beautiful species of rasbora. One of these is *Rasbora uropthalma* with a maximum length of 3cm. The other is the tiniest with a maximum size of just 2cm. This is the Dwarf Rasbora *Rasbora maculata*.

To see this fish at its very best is a privilege. It needs to be studied with some form of magnification to be able to appreciate its full beauty.

Soft acid water in a well-planted aquarium with strong natural front lighting is needed to allow these minute beauties to display at their best. Subtle metallic sheens and bold black spots and lines set off with red areas of finnage, combine to produce a truly pretty fish. If the Dwarf Rasbora grow to something like the size of the Scissortail it would be a traffic-stopper.

Other Rasboras

There are, of course, many more rasboras seen from time to time, and this article has concentrated on the more popular species commonly available.

I have never experienced an aggressive or bullying rasbora of any species, and they mix well in the peaceful community aquarium, swimming alongside companions from the other side of the world as easily as they integrate with their natural South East Asian cohabitants.

Although well able to acclimatise to most aquarium conditions most Rasboras will reward any efforts made to accommodate their particular requirements.

Soft, peaty "black" water, in well-planted aquariums, suitably lit, will bring out sparkling colours which would otherwise remain largely hidden. ■

PFK PROJECTS

The re-cycled bricks give the brand new pond a pre-aged look.

Budgeting for a pond

For many years reader DENISE BAILEY of Sussex longed for a pond in the garden, but with small children around the idea was shelved – until now.

We started the pond in early spring, after deciding on a semi-raised design, and after spending all winter finding the right size and shape of pre-formed pond.

One of the good features of the pond is that the soil extracted for the depth was reused for building up other areas of the pond, so there was nowaste to dispose of.

Above: Cracking the pre-filter problem – two planting baskets were combined and the feed pipe fed through to the smaller one. The whole thing was then filled with filter media.

To keep costs to the minimum the pond surrounds of double row bricks and crazy paving were bought as hardcore, the main filter was constructed from a £3 expansion tank and the water mill was constructed from scraps of plywood and painted with left-over household paint. The water wheel was constructed from an electric cable spool.

The water wheel and a fountain operate from a hoselock 1500 pump purchased for £48 - from an electrical wholesalers' - with a home-made prefilter made from two planting baskets and a piece of 1¼" plastic pipe (due to the original foam pre-filter blocking every 8 hours or so).

The new prefilter has been in operation for 4 weeks now with no alteration of flow. The two upper ponds are constructed from concrete, sealed and planted with Water Cress (purchased at Tesco), Water Hyacinths and Creeping Jenny. So far this seems to have helped, as the pond has stayed quite clear though it is in constant sunlight.

Above and right: The home-made filter unit again makes use of planting baskets, and is disguised by the water mill.

The main pond has two types of iris, Water Lily, oxygenating plants and 30 various fish, which all seem to be growing very well, especially the two Golden Orfe.

The pond has once been treated for White Spot, which occured on six newly-purchased fish, but no other chemicals have been necessary. ■

PFK PROJECTS

Do you want a p
THICK LI

ANDREW SMITH looks into the courtship and breeding behaviour of the Thick Lipped Gourami.

The Thick Lipped Gourami may lack the iridescent splendour of its similarly-coloured relative, the Dwarf Gourami (*C. lalia*), but *Colisa labiosa* does have a more subtle beauty of its own. The Thick Lipped Gourami is a bubble nest builder and displays an interesting behaviour pattern during courtship and breeding.

These gouramis are found from Rangoon (Burma), northward to Mandalay. As it is often confused with the closely related Giant Gourami (*C. fasciata*), reports of it further afield may be inaccurate.

The Latin name "*labiosa*" refers to the thick lips possessed by the males of the species.

Sexing labiosa

The two sexes can be determined even when the fish are still juveniles, and when fully grown they are almost unmistakable. The base colour of the male is light brown with blue bands on the flanks. The dorsal fin runs out to a point and is fringed with orange as is the anal fin.

The females are smaller and are more grey in colour with the brown evident on the back. The edge of the dorsal fin is not tapered and they often exhibit a dark band running along the flank from the eye to the caudal fin.

Both sexes have a "chin strap" which is made up of black and white and runs from eye to eye. When in breeding dress the male's colour darkens almost to the point of the blue bands disappearing. At this time he appears to be a rich chocolate brown and this enhances the orange edging to the dorsal and anal fins yet further. An orange strain was introduced in the early 1960's and is quite readily available.

Tank maintenance

As a community fish, the Thick Lipped Gourami poses no special problems with regard to water chemistry, tankmates or food. Whether fed on flake, frozen or live food, this fish seems to thrive.

Choose a larger tank to house these fish and have it well planted with plants that reach to the water surface. Floating plants are always a good addition to any aquarium that contains Gouramis. Smaller tanks are really only suitable for a single pair plus some typical east Asian community fish such as Rasboras (*R. borapetensis* or *R. trilineata* for example); Danios, or Loach (*Botia* spp.). Alternatively anything which isn't too boisterous or overactive can be included.

On the other hand, the larger the tank, the more pairs of Thick Lips you can have. The males do like to set up a territory, and minor skirmishes can break out between them if the tank is not large enough to allow two or three separate domains.

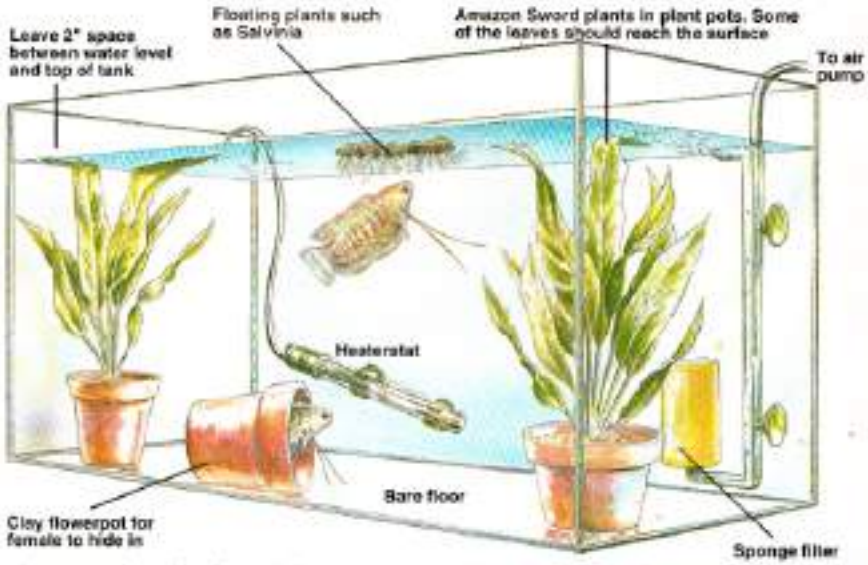
These skirmishes are rarely any more than two males approaching each other and lowering their heads until they are pointing head down in a vertical position.

Quite what the significance of this action is, I am unsure. The subordinate male retreats - or if he persists, he is chased away. Females also demonstrate a type of hierarchy that sees them side-by-side, waggling their bodies to form water currents as a show of strength. This type of behaviour rarely extends towards the other non-anabantoids in the community.

The breeding tank

These fish are quite easy to breed if you have a pair in good condition. Set up a tank of around twenty gallons plus and add some potted plants with leaves which extend to the water surface - and one or two floating plants. It is a good idea to leave the bottom of the tank bare for cleansing purposes to be described later. Place the plants at either end of the tank and put a small

pair of ps?



flowerpot in the middle away from the plant clumps so the female can hide - and it also assists with her capture when the time comes to remove her.

Filtration can be a problem as bubble-nesting gouramis need relatively calm water to build in and anabantoid fry are very small and could disappear if the filter is too powerful. An excellent method is to use one of the sponge filters which are operated by an air pump and can easily be regulated - plus the fry can graze upon the minute particles of food and organisms which colonise the sponge.

Spawning

Set the temperature to a degree or two higher than that of the maintenance tank and place the female in this set up for a time to associate herself with the layout and hiding places. The length of time you should leave the female on her own depends on her condition. If she is already ripe with eggs, then a few hours will suffice - if not, feed her well on live food for a few days until she is plump in the belly region. At this time the male can be introduced. After the initial "feeling out" process he will select a nest site and begin to build a nest. To achieve this he takes in atmospheric air at the water surface and blows out mucus coated bubbles which adhere to each other and also to plant matter. No plant matter is actively used in the construction of the nest, but it may be used indirectly to anchor the nest and stop it from floating away.

During the construction of the nest, the male is intolerant of his mate and she will be chased away and butted if she becomes too inquisitive. When the nest is complete the female approaches the male and nudges him in the flank to gain his confidence. The male responds by curling his body around the female and embracing her, turning her upside down. At this point there are no eggs to be seen and this series of "dry runs" will continue until both fish are ready to spawn.

At times the observer may fear for the female's safety, as males can be rough with their prospective mates - hence the addition of the flowerpot and plants, for cover. The extra plants at the surface allow her access to the top of the water to take air.

When both of the fish are ready to spawn, the ritual described earlier re-commences with both fish in the spawning embrace slowly sinking. Then the eggs are expelled from the female. They are lighter than water and consequently float up to the bubble nest. The embrace then breaks and the male rounds up all the eggs and stores them in the nest. When the task is completed the female approaches again for the process to be repeated.

Up to 100 eggs per spawning act are produced and 500-600 is not unusual for a complete spawning phase. The eggs are glass clear and can be difficult to recognise within the clear bubbles of the nest. The fry are on the small side, so they, too, are well camouflaged.

Raising the fry

Once the spawning is complete the female must get out of the male's way and should be removed from the breeding tank, otherwise she may be harried to the point of being killed. The male will tend the brood while continually repairing the nest with bubbles.

The fry hatch in 24-48 hours, depending on the temperature of the water and are free-swimming on the third or fourth day when their first food should be rotifers, liquid fry food or other small foods, followed by newly-hatched brine shrimp.

Aerate the water using an air stone to allow for food dispersement, and to keep the water fresh.

Carry out water changes every other day to keep pollutants to a minimum and keep a good lid on the tank so the air above the water is of a similar temperature, when the labyrinth organ develops. Be sure to allow the fry plenty of growing room. ■

The male will not tolerate any disturbance from his prospective mate while he is nest-building
Pic: Max Gibbs, The Goldfish Bowl, Oxford

Getting to k
Victoria

After keeping and breeding Malawi Cichlids for the past fifteen years NANCY SHUTTLE felt it was time for the winds of change to blow into the fish house. So when Ray Neal of Thringstone Aquatics had some Victorian Cichlids for sale Nancy decided they might be the answer.

Haplochromis were to be a new challenge. Taking a risk, I ordered five each of six Victorian species, sight unseen.

They were *Haplochromis* 'Fire', *H.* 'Flameback, *H.* 'Blueber', *H.* 'Largemouth', *Astatoreochromis alluaudi*, and *Neochromis nigricans*.

H. 'Largemouth' is now almost extinct in the lake, and it is estimated that probably 50% of other species are also now extinct due to the introduction of the predatory Nile Perch as a food fish some 40 years ago. Consequently a world-wide effort is now being made to obtain and breed Victorian Cichlids to ensure their survival.

Arrival

I had prepared a 4 foot tank, hoping to house all 30 Victorians together. Filtration was via 3 double Algarde Biofoams, substrate a thin layer of coral sand and coral gravel, and the pH was 8.0.

I built two caves at the back, and placed a flat rock at each back corner to give a choice of spawning areas.

When the boxes arrived I floated the bags and examined the fish, whose average size was 2". They were, of course, all in pale fright colours and I felt it might be difficult to distinguish the identities of the females. So to avoid future confusion, I housed four of the species in the Victorian tank - *Haplochromis* 'Fire', *H.* 'Blueber', *H.* 'Largemouth', and *Astatoreochromis alluaudi*.

The *H.* 'Flameback' and *N. nigricans* were introduced into one of my quieter Malawi tanks where they weren't likely to be harassed. It subsequently turned out that it was the sitting tenants who were in danger of harassment.

Nancy Shuttle with one of her Victorian tanks.

Settling in

All the new arrivals settled in well and showed a healthy interest in every sort of food I threw at them - flake, pellets, frozen bloodworm, cockles etc. There was a good layer of algae in the Victorian tank but I never noticed any of them feeding on it. After only a few days one of the *H.* 'Fire' developed dominant colours of bright red over the lower half of his body while the upper body, dorsal and tail had rich hues of blue and green.

He established territory over a cave roof in the middle of the tank and proceeded to carry out a reign of terror that had the other residents hugging the ends of the tank in various stages of nervous collapse.

Breeding begins

I was beginning to suspect that the other four *H.* 'Fire' were also males. At the same time I noticed that *A. alluaudi*, *H.* Blueber and *H.* Largemouth females all had tips of egg ducts visible. There was no chance of them spawning while the tyrant Fire continued his reign of terror so I took a chance and moved the five Fires to another community. It worked like a charm!

■ First the Blueber male's colours intensified to dark blue, his fins edged in deep red. He led his female into a cave where they spawned nose to tail in typical mouthbrooder fashion. The more drably-coloured female produced 36 fry after only 11 days brooding.

■ Three days later the Largemouth pair spawned, over a flat slate at the back corner. These fish are deep bodied, rather angular shaped, and have a steeply descending jawline which gives even the males the illusion of brooding. After brooding for 15 days this female spat out 40 fry.

■ A week later an *A. alluaudi* male was in full breeding colours - bright iridescent yellow. He chose a platform over a cave roof to spawn, and 13 days later his female produced 20 fry.

The second *A. alluaudi* female spawned the next month and spat out 87 fry.

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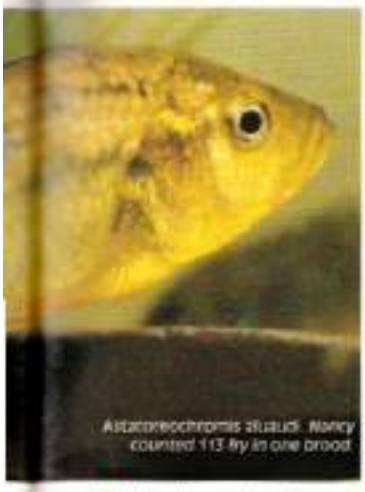


Astatoreochromis alluaudi. Nancy counted 113 fry in one brood

■ A few days ago I again removed the brood of one of these *A. alluaudi* females and counted a record 113 fry.

The other two species of Victorians also spawned in the Malawi tank.

■ The green *N. nigricans* male and his female spawned with little interference from the Malawis. The female producing 22 young after only 11 days incubation.

■ In this same tank the Flameback male was hurtling around in full breeding colours. The colour photos I have seen of this fish just do not do him justice.

His upper body, dorsal and tail are a rich orange, his lower body bright green, and his chin, chest and short triangular pelvic fins a dramatic contrast of jet black.

He spawned with two females in the next few days and they produced 82 and 64 fry.

Growing on

The fry of all these species are slightly smaller than newly-released Mbuna fry but grow quite fast, at twelve weeks reaching a saleable size of 1½". Young males at this size already show a lot of colour and are noticeably larger than females. At present, in a growing-on tank young Flameback males, at nearly 2", are almost full colour replicas of their father.

All the Victorian fry were grown on in tanks with a pH of only 7.4. I noticed that even the adults showed no ill effects at all when I moved the odd battered brother or post-spawning female to recoup in a low pH growing-on tank.

More species

I was so impressed with the variation of colours of these fish that I recently ordered and received another six different species. I also managed to obtain ten more young tank-bred *H.* Fire. In my opinion this species is even more impressive than the Flameback so I'm hoping to breed these in the future. One of these young males, hardly 2" yet, appears to cherish the same hope - he is almost fully coloured and busily chasing the females.

Of the new species, which only arrived two weeks ago, the *H.* Uganda Red-Side have spawned. This is a deep blue fish with red shading on his fins. The red fin colouration seems typical of many of these Victorians.

Another new arrival, the *H.* Emerald Fire male, dominated the back corner of a mixed Malawi tank where he spawned successfully. This fish is yet another jewel in the Victorian scene. His lower body is lime green with a rich shading of deep red across the upper half.

On my short acquaintance with Victorian Cichlids I found the males to be single-mindedly aggressive when breeding, but their harassment of tank-mates soon diminishes after spawning. They are perfectly adaptable and quite easy to keep, either in all-Victorian tanks or with Malawis. They make no special demands food-wise, and tolerate a wide pH range.

In the never-ending search for something completely different, with a wide range of colour variations, Lake Victoria should undoubtedly supply the answer. It has for me. ■

Haplochromis Fire.

One of the H. Fire developed bright colours within only a few days and began a reign of terror.

Haplochromis Flameback. The fry are at 2", almost full colour replicas of their father.

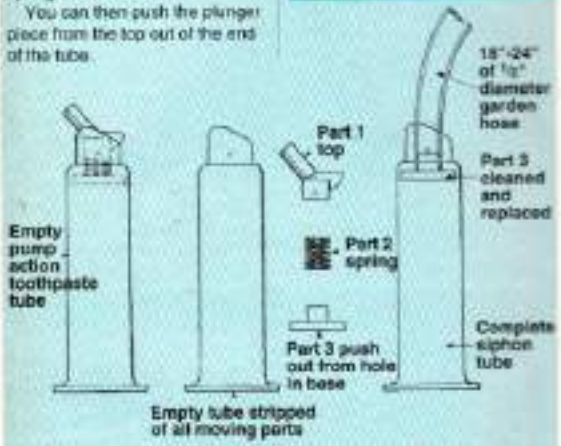
Nancy's fish room.

Simple gravel cleaner

I have seen hundreds of adverts for gravel cleaners and I recently decided to make my own. When a pump action toothpaste tube became empty in my bathroom, I decided to take it apart to see if I could put it to further use.

First I prized the thumb operation apart from the main body of the tube. (Care should be taken when doing this as under the thumb operation there is a small spring). You can do this by putting a screwdriver between the body of the tube and forcing the body away from the retaining lugs on the thumb action. When it is loose it can be removed and so can the spring underneath it.

You can then push the plunger piece from the top out of the end of the tube.



After cleaning the tube and the plunger, you can insert the plunger back into the tube with the raised shoulder uppermost. Then a piece of garden hose can be inserted in the top until it hits a moulded shoulder inside the tube. Pushing a broom handle up the tube will allow you to push the plunger up to this moulded shoulder and into the tube.

The tube can be lowered into the tank and once a syphon has been made, the tube picks up gravel and agitates it and once you apply your thumb to the end of the hose, the gravel falls back to the bottom, leaving you with clean substrate and a bucketful of dirty water. The cost is ... nothing.

David Kirby, Liverpool.

How to combat dead spots

I have two marine tanks and in the past I have experienced problems with dead spots in my undergravel filtration due to the amount of tufa rock used for decor.

I have now solved the problem. The backgrounds of my tanks consist of tufa rock and corals which have been sawn, drilled and silicone sealed onto the glass walls and back of the tank, allowing for uplifts and so on. The powerheads have been masked from view by protruding rocks, the uplifts by cutting out a groove slightly larger than required in the flat of the rock at the rear.

Different thicknesses add to realism, as do size and configurement. It is all built up "dry" cutting lumps and corners off various pieces to obtain the desired effect, with no gaps left showing the glass.

Alan Cumming, Norwich

Ed's note: **This type of set-up would also prevent the danger of rocks tumbling onto the glass or on unsuspecting fish which may dig under them.**

Bird on a wire?

I read in *Coldwater Answers* about Mr. Belsey, who was having problems protecting his pond from herons, as it was surrounded by crazy paving.

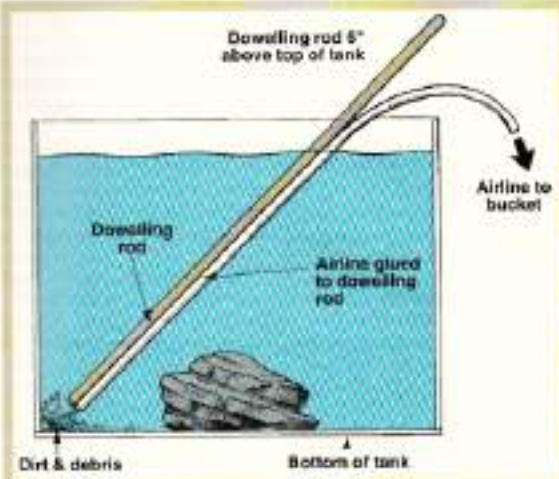
So is mine, but I have managed to solve my heron problem simply and cheaply. All you need is a spool of 1mm ordinary PVC garden wire (from any garden centre) and some of the old fashioned triangular shaped picture hooks.

Simply stretch the wire to and fro across the pond from picture hook to picture hook. The tension of the wire will secure the hooks against the crazy paving permanently.

The wire is so thin that it is almost invisible from the house and does not harm the visual effect of the pond. It can easily be removed if required and replaced in minutes.

It also has an advantage of being very labour-saving at this time of year. I loosen one of the wire strands to water level at a convenient point. All the leaves that fall into the pond congregate around the loosened wire for me to collect up in a simple once daily netting session.

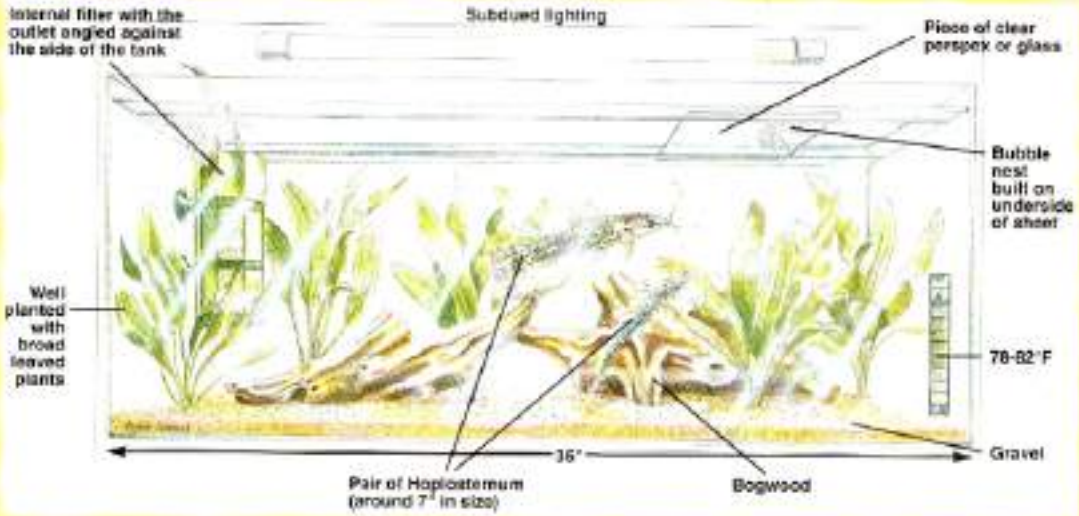
Brian Meley, Surrey



Simple vacuum cleaner

I have made quite an efficient little vacuum cleaner to syphon dirt and debris from difficult areas. It's made from a length of airline which is glued with silicone sealer to a length of thin, but strong dowelling rod, which is about 6" longer than the height of the tank. This gives you better control - and it stops you having to keep putting your hands into the tank.

A. Dougall, Dyfed



Bubble nesting cats

I have managed to breed my Port Hoplo catfish and I thought I would drop you a line explaining how I succeeded so that other readers might have a try.

The Port Hoplo, or *Hoplosternum thoracatum* is a member of the Callichthidae family of bony plated catfish. Although they come from the same family as the more familiar Corydoras, they differ in both body shape and breeding habit.

They inhabit flat areas of densely planted muddy waters in Venezuela, Brazil and Paraguay and are tolerant of low oxygen levels and high water temperatures.

Hoplosternum thoracatum reaches a length of about 18cm - the female is a little smaller than the male at 16cm. The female is grey with dark brown to black mottling and a pink to white underside. The male is more strongly marked and has larger pectoral fins, with the first ray formed into a hard, bony spine edged with fine barbs. This makes sexing relatively simple in even quite young fish. It is a peaceful community fish when kept with other species of similar size and behaviour.

Typical aquarium conditions are 78-82°F with soft, slightly acid water. The tank should be heavily planted with broad leaved plants and have plenty of hiding places, in the form of bogwood.

Lighting should be fairly subdued and filtration arranged to give as little surface disturbance as possible. I find that an internal filter with the outlet angled against the side of the tank is ideal.

Feeding consists of flake, freeze dried tubifex, bloodworm and whiteworm.

Breeding is best achieved in a three foot tank with plenty of retreats for the female to use during the preliminary courtship, during which the male can become quite violent towards her and any other tank occupants - including the unwary fishkeeper's fingers.

The male builds a large bubble nest around a floating leaf or other object on the water surface. I find that a flat piece of clear perspex or glass with the edges smoothed is the ideal material, as a check can be kept on the eggs from above without disturbing the tank in any way.

After the nest is complete and around 30cm in diameter, the male nudges the female under it and egg laying begins.

This may take several hours during which she will lay small groups of eggs, which the male fertilises and covers with more bubbles.

The eggs are adhesive and stick to the underside of the chosen spawning site. Once egg laying is complete, the female retires to a safe distance and the male takes up a guard position under the nest. All intruders are threatened - and in some cases physically removed from the nest area and any damage is repaired by the addition of extra bubbles by the male.

The eggs are pale yellow in colour and over the next four days darken to a deep brown just before they are due to hatch.

At this point it is best to remove the glass or perspex sheet with the eggs attached and transfer it to another tank containing 5-7.5 cms of water from the breeding tank.

The fry hatch on the fifth day and are about 3mm long.

No direct light should be provided at this time, as the fry are light sensitive for the first week after hatching.

They quickly use up the yolk sac and Liquifry should be provided from the moment of hatching so that food is available when required.

At the end of the first week the Liquifry can be supplemented with finely ground dry food and brine shrimp. The water level can be raised slowly by adding water from the breeding tank, and subdued lighting provided. Some pieces of bogwood and floating plants can also be added to the tank to give shade and provide hiding places for the fry.

The fry grow quickly and are around 12mm long after two weeks, showing a striking resemblance to their parents, with fully-developed barbels and markings.

From this point on, they can be weaned on to larger crushed flake and shredded bloodworm, until normal feeding is all that is required.

Although perhaps not the most exotic of fish available, the Port Hoplo is ideal for the larger community tank with the added interest of its unusual breeding habit.

Ian Cook, Aberdeen.

Hardening your water

I suffer (?) from very soft tapwater which the goldfish in my coldwater aquarium do not like.

I have solved this problem, with a little help from a Fluval 1 internal filter. I removed the foam pad and replaced it with a mat of the same size and thickness out of filter wool. This was put into the canister and the centre filled with crushed shell (from the local pet shop), and a square of plastic net (from a bird's peanut bag) was pushed on the top to keep bits out of the pump.

This has increased the hardness in the tank from 0.5dH to 10dH. It is also a small but effective water polisher and adds extra aeration. I change the filter wool mat every week and the shell every month.

S. Billington, Gwynedd.

A TANK FOR £250

Marine Tank - Les Holliday

LES HOLLIDAY lives in York. A keen diver and photographer, he runs a marine consultancy part time that takes him to many of the world's most interesting coral reefs. His all-embracing marine articles have played a major part in intsructing newcomers to the hobby, while many of his photographs show marine fish in their natural settings.

To dream the impossi dream?

A workable marine tank for £250? "Not possible" said LES HOLLIDAY - but then he went away and worked it out.....

My first reaction to a request from the PFK Editor to assemble a marine tank for the princely sum of £250 was, is he losing his senses? Or had he recently passed through a time warp and thought he was back in the 70s?

He did attempt to reassure me (perhaps of his sanity) by adding that he only had a 'basic marine system' in mind - not a miniature reef system or a 600 gallon show tank job.

Those of you who know me from my earlier scribblings in *PFK* will be well aware of my feelings in relation to our responsibilities to do our best to maintain and care for the delicate marine creatures we take from the wild.

I'm positively not the person to advise anyone on cut-price marine systems or to encourage the idea that it is possible not to


Les finds the Yellow Tang easy to keep and not aggressive in fish-only set ups...

n sible

compromise such principles by going down market. Buying a marine aquarium like any other purchase where quality counts usually comes down to 'you get what you pay for' and economising inevitably means cutting standards. It was therefore with some trepidation that I ventured out to see if it was possible to meet my own demanding standards and buy a high quality basic marine system within the modest, at today's prices, £250 budget the editor set me.

Here's one I made earlier....

I could have, of course, come up with a 'Blue Peter' type solution creating a wet and dry trickle filter from old jam jars, sellotape and the centre of a toilet roll. The aquarium tank could have been built from scratch via a visit to the local glass merchant and the whole thing topped off with a cut price supermarket security flood light.

However, my experience of do-it-yourself aquarium methods is that:-

(a) There is usually no real way to be sure that the piece of equipment devised is adequate for the purpose unless of course it is a straight copy of an existing commercial model.

(b) Not many of us have the necessary expertise or inclination to do a good job.

(c) It is far better to invest in reliable commercially designed and thoroughly field-tested equipment than rely upon inadequate Heath-Robinson-like d-i-y alternatives.

With this in mind I decided that all of the items in my dream package should be easily available, over the counter, products chosen to meet my ideals and suitable for the not-so-experienced hobbyist, the main candidate likely to be interested in buying a basic marine system.

Despite my earlier remarks, I will lapse into 'Blue Peter' mode occasionally throughout the article to recommend a little bit of 'do-it-yourself' to overcome minor shortcomings I found in some of the pieces of equipment during my field testing.

Selecting the Tank

Choosing an aquarium tank of the correct proportions, design and materials was my first basic consideration. I needed to remember that sea water is corrosive to a wide range of metals and the effects of corrosion on many of these can prove very toxic in a marine aquarium. An all-glass tank was therefore an obvious choice and how I received my first pleasant surprise but more of this later.

All-glass tanks are available in a wide range of shapes and sizes some so huge that it is easy to doubt that such a fragile framework, only held together with silicone sealant and weighing anything up to 1000 kilos (2000 lb) or more when filled and stocked, is capable of withstanding all the pressure without collapsing. Fortunately we are at the other end of the scale and a small tank should not pose such problems, imaginary or real.

It is possible to maintain a simple fish-only marine system in an aquarium measuring only 600 x 300 x 300mm (24" x 12" x 12") with a capacity of less than 68l (15 gallons).

However, if I was going to be able to maintain anything like good water quality, an essential requirement in any marine aquarium, my basic marine tank had to be a minimum size of 900 x 380 x 300mm (36" x 15" x 12") with a capacity of 104 litres (23 gallons).

If I had chosen to keep any of the more sensitive invertebrates I would not consider less than a 30 gallon capacity system. Adverse conditions can deteriorate water quality very quickly in a small aquarium and the water chemistry tends to fluctuate more destroying any stability. Maintaining stability of the water chemistry is another key requirement to be successful with a marine system.

You will pick up from these last remarks that I had decided that my basic marine aquarium should be devoted to fish only, a good choice in many ways for a basic system, especially for those inexperienced in marine aquaria keeping. As a generalisation it is fairly easy to select a number of easy to keep hardy fish while many invertebrates especially coelenterates (corals and anemones) are more difficult and demanding for the inexperienced.

I finally chose a 900 x 380 x 300mm tank from the **Marina Range of Tahiti Aquariums,** a high-quality, heavy guage all glass aquarium with some well thought out design features. One very useful feature was the lack of glass braces which are often found around the inside openings of less robustly built aquariums, as this allowed much more flexibility in fitting items such as the filter. The pleasant surprise I mentioned earlier was that the tank carried a recommended price tag of only £26 - and that's less than the price of buying the glass cut to size from the glass merchant.

Lighting

A further advantage of choosing a fish-only system is that you don't need to extend your mortgage to light the aquarium as is necessary with photosynthetic (light loving) invertebrates such as corals and anemones which require high-intensity expensive lighting systems. A simple fluorescent tube fitting in a light hood is all that is required and here again the **Tahiti Aquariums Marina range** provided a solution.

Their hoods are manufactured from non-toxic plastic and the do-it-yourself model is one of the few simple hoods available which will accept two fluorescent tube fittings.


Green Chromis are ideal in small shoals.

Marine fish have such beautiful vivid colours and it is a pity not to display these to best advantage. I therefore decided to fit two 30", 25w **Triton** tube lighting units which have me a brilliant, pleasing, colour enhancing effect and promote lush green algaes which are beneficial as a natural food source for herbivorous fish in the system.

Tank familiarity mustn't breed contempt

The Editor says...

The recent BBC TV *Watchdog* report on breaking fish tanks has sent shockwaves rushing through the aquatic industry and pet trade and produced a state of anxiety bordering on hysteria.

The Ornamental Fish Industries organisation has produced an instant and excellent leaflet on tank safety, (also available via the Pet Trades Association) and there are moves afoot to rapidly produce an OFI seal of approval sticker for tanks.

The real grist of *Watchdog*'s story is not that all fishtanks are dangerous but that there are tanks on the market made from glass that is far too thin.

WANT TO KNOW MORE?

My colleagues on *Fishkeeping Answers* have produced a practical guide to tank safety in their November issue which is on sale now. Meanwhile, Karen Youngs has investigated the insurance aspect and her findings are on this page.

The OFI leaflet on tank safety is available from:

OFI UK Ltd., Bedford Business Centre, 170 Mile Road, Bedford MK42 9TW with an SAE.

The story behind the featured tale of Michelle Shaw's tank was that she was sold a four footer in 4mm glass which stood on what appeared to be a not very sturdy stand, in an upstairs room where the floor was likely to be less stable than downstairs.

Although she was cited as an experienced tropical fishkeeper she apparently lacked the knowledge that an experienced hobbyist would have had - that 4mm glass is always too thin for this type of tank.

That said, she shouldn't have been sold the tank in the first place.

■ So what is the message, if any, to the experienced fishkeeper?

The first is that familiarity breeds contempt. I remember discussing broken tanks with perhaps the most experienced fishkeeper I know 'Aquarian' expert Dr David Ford, and he's had only one breakage in his fifty years in the hobby. The fact is that such breakages are very uncommon, and that the quoted figure of 2,000 tank-related accidents a year includes things like ruptures and hernias while trying to lift them....

Last year we cracked an ex-display tank in this office - that was an adequate 4mm three footer and we had placed it on polystyrene tiles on top of two filing cabinets which were less than even. We'd have got away with it if we had noticed that the polystyrene tiles had slipped out of alignment - but having shifted dozens of tanks around we made the final error of complacency and didn't check the underlay. The base split from side to side but fortunately the water only seeped out.

■ Now if your house, like our office, has tanks stuck on every available surface, chances are that you're taking a similar risk.

At the risk of being boring, I'll restate the things you should bear in mind.

Any tank over 18" long should be in thicker than 4mm glass. From 48" x 20" x 15" up at least one manufacturer specifies 10mm glass.

Water weighs 10lb per gallon (4.45l). Both your stand and the floor that it stands on must be capable of supporting this weight. A six foot tall PFK editor weighs 12st 4lb or 172lb. A 48" x 12" x 12" tank weighs 210lb plus the decor, equipment and stand - which is roughly equivalent to two PFK staff writers. A 48" x 18" x 18" tank will weigh 490lb (or a mind boggling 4.5 *PFK* staff writers all standing on the same spot).

Temperature, vibrations, floor movements and the air pressure from opening and closing doors can have unseen effects on your tank. Rampaging children and large pets (even Oscars) can have more obvious effects.

Chips and scratches will inevitably weaken the glass. These can come from obvious sources like a piece of grit, or less obvious ones like your engagement ring.

Tank stands should be of the highest quality. If in doubt don't buy. Likewise, some tanks don't need polystyrene bases - but if you've any doubts about yours, use one.

Would you have difficulties if your tank burst and you had to claim on insurance for the resulting damage to furniture and fittings? Some normal household policies do not include cover for fish tanks and damage arising from the water which will inevitably pour onto the floor if the glass should break.

Although such experiences are relatively rare, (providing the tank glass is of the correct thickness and the stand is strong enough to take the weight), it's important that you can rest assured in the knowledge that you are insured if such a disaster should occur. After all, the average three footer holds around twenty gallons of water, which can make an awful mess on the carpet (or on the living room ceiling if the tank happens to be upstairs).

Your best bet is to let the insurance company know that you have a fish tank before you take out a policy. Check that you are covered for the tank and any furnishings, such as carpets, which could be ruined if you have a disaster. You will not be insured for your fish. You may be able to get separate insurance but the companies we tried didn't want to know - and some of the companies normally used by vets to insure pets were prepared to cover fish.

In some cases you may have to take out additional cover for accidental damage, so make sure you know exactly what you are getting for your money. And remember that most insurance companies expect you to pay the first part of any claim - usually £25-£50.

We phoned some of the major insurance companies to see what their policies were concerning fish tanks.

Royal Insurance

You are only insured if your policy covers accidental damage, which is an optional extra. There is no set rate for this; it depends on how many bedrooms you have, the type of property (whether it's detached, semi detached, a house or a bungalow and so on) and where in the country you live. If your tank cracks or is broken under this type of policy, you can claim for your tank along with your carpets and anything else which is ruined.

With the Royal you are not covered for the first £100 of any claim, unless you pay an additional premium of 10%, which will reduce the excess to £50.

Pearl Assurance

You are covered for the tank and any damage to carpets and fittings on a normal household contents insurance, covering £15,000 or more. You don't need to have an accidental damage cover.

Norwich Union

The chap here didn't give me a lot of hope. On their normal household policy, you are only covered for escape of water from water tanks (not fish tanks), pipes or apparatus, or fixed heating and installation. An accidental damage option is available, which will cover you if you happen to break the tank yourself but this will not cover you if the tank breaks of its own accord or springs a leak.

General Accident

Here, it's especially best to check whether you are covered, as it will depend on which type of policy you have. There are several to choose from.

Co-operative Insurance Society

This could well be your best bet. Here you are covered for your tank and any furnishings which are damaged, even on the cheapest, most basic policy.

■ Details of your local branch of these companies should be in your 'phone book.

Karen Youngs

■ This whole episode is probably good news for the hobby. It will accelerate moves towards quality labelling and higher standards, and despite the sensationalising of what is in fact a minor problem, *Watchdog* emphasised the good points of fishkeeping, showed an attractive tank and made it clear that one family at least had not been put off fishkeeping by their mishap. They gave a sensible guide to what glass was necessary in various sizes of tank.

In the end, any publicity is good publicity...

STEVE WINDSOR

DIARY DATES

■ The Hounslow and District Aquarist Society meets every alternate Wednesday at St Stephen's Church Hall, Parkside Road, Hounslow. For further information contact R. Nelhams on 0784 259886.

SUNDAY NOVEMBER 22

■ The Northern Area Group of the C.A.G.B. are holding a Grand Auction at the Boy's Brigade H.Q., Bryn Road, Bryn, Nr. Wigan. Booking in 12.30-1.30pm. For further details contact R. Thompson on 0942 224659 or J. Morris on 0942 42286.

FRIDAY DECEMBER 4

■ North West Cichlid Group is holding its AGM at the British Legion Club, Liverpool Road, Skelmersdale, Lancs. For more information contact Brian Wilson on 0695 21486 or Ken Hilton on 0565 633318.

SUNDAY DECEMBER 6

■ The Scottish section of the BKKS is meeting in Bridge of Allan. New members are always welcome - contact Archie Dick on 0786 832073.

OCTOBER WINNERS

• The two winners of the October photo-in competition were **Kim McIlaney** from Dunoon in Scotland and **Gary Needs** from Weston-super-Mare.

FACTFILE

Our monthly question and answer session with a well-known fishkeeper. This month, while he is away on an expedition, we publish the factfile of our remarkable columnist Old Fishfinger

Name: Old Fishfinger
Home town: Little Snoring
Occupation: Retired fishkeeping genius
Hobbies (apart from fishkeeping)? Dwile flonking; Morris Dancing; underwater hang gliding; Lungfish racing
Years of fishkeeping experience? 90
Favourite type of fishkeeping? Club nights
Best book on fishkeeping? *The Good Pub Guide*
Favourite species? A Lungfish is my constant companion in and out of the fishhouse
Least favourite species and why? Mrs Fishfinger's Koi - they eat better than I do...
How many tanks do you own? 328
What was the first tank/fish you ever had? When I was 12 I tunnelled into the side of the local canal and inserted a glass panel. I watched the fish for several weeks before the unfortunate incident of the Great Grand Union Drought disaster.
What was the first fish you ever bred? Like many youngsters of my generation I started out by breeding sticklebacks. Unfortunately someone pulled the sink plug and I lost the lot.
Worst mistake in fishkeeping? Writing for PFK
What's the most you've ever paid for a fish? 12p
What do you think is the most important current issue in fishkeeping? The amount of money paid by PFK to correspondents
Biggest fishkeeping gripe: The Editor of PFK
Are there any fish you wouldn't keep - and why? Anything over 3' long. The door of my fishhouse is only 2' 9" wide.
Which fishkeeper do you most admire - and why? The Editor of PFK when my pay cheque arrives.
Favourite fishkeeping myth? That I don't exist
Biggest fishkeeping ambition? To breed guppies
If you were reborn as a fish, which fish would you be? A Paddlefish - they've mastered the art of keeping a constant stream of liquid flowing into their mouths.
How would you like to be remembered in fishkeeping? As a fishkeeping legend

GOLD LINE FEEDS PRIZE CROSSWORD

Here's the latest in our series of prize crosswords sponsored by Gold Line Feeds makers of Phoenix 2000 fish food.

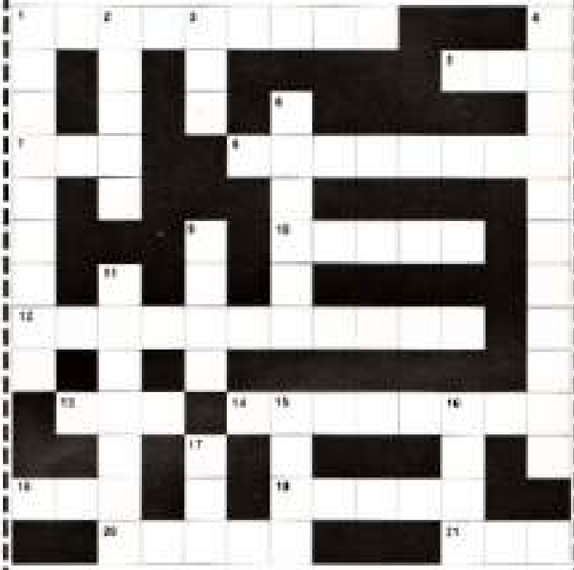
This month's prize is:

A £100 voucher from Shirley Aquatics of Solihull.

Cut out the completed crossword and send it to *PFK Crossword, Gold Line Feeds, Pinfold Farm, Welham, Retford, Nottingham DN22 0SQ* to reach them by first post on December 12.

The winner of the October crossword is David Davis of Northampton. This month's crossword compiled by Mrs J Hardcastle of Newmarket.

■ ***If you'd like to try your hand at making up a crossword for the contest you can send it to the same address. Crosswords must be on a 13 x 13 grid.***



Name ....

Address ....

....

....

ACROSS
1. (and 4 down). The number one monthly magazine (9,11)
5. A shy Japanese fish (3)
7. See 13 across
8. Is this the king of the tank? (8)
10. A circus performing fish (5)
12. A South American weapon or plant (6,5)
13. (and 7 across) Spinach doesn't cure this disease (3,3)
14. A Chinese lord? (8)
18. Native flat fish (3)
19. Large golden snail (5)
20. Green growth underwater (4)
21. Young fish

DOWN
1. A top energy water pump (9)
2. A heavenly fish (5)
3. Turn on but treat before using (3)
4. See 1 across
6. Athletic field event (6)
9. Frozen, flake, live, dried, stick (4)
11. This plant sounds like a Latin dance but comes in green, red, or yellow (7)
15. Rear fin (4)
16. The Great Barrier (4)
17. A decorative wood (3)

...Newswatch...

● **Marine fishkeeper Ian Durrell, from Wolverhampton, was flown to hospital after being stung on the finger by his pet Lionfish reports the Daily Mirror. He was expected to be allowed home in 24 hours. Meanwhile, reports The Daily Telegraph, Dr David Wynne Evans a Welsh GP says he has the solution to the agonising pain of the Weever's sting - forget morphine and pethidine and instead apply very hot water. The toxin is destroyed by heat.**

Interestingly a similar cure was recommended in PFK in June 1990 by an American correspondent Greg Fox for the stings of Lionfish. He also suggested hot wax dripped on the wound.

● A monster pike measuring about 4ft and weighing over 30lb has had a £400 bounty put on its head after chomping its way through almost half the stock of waterfowl and fish in the boating lake at Alexandra Palace, North London. Although the fish has been hooked several times, no one has succeeded in landing it. In a recent attempt to flush out the pike, sixteen specialist anglers paid a tenner apiece to attend an all night fishing match. Despite using all the latest hi-tech equipment and trying to tickle its taste buds with herring and sardine, the fish refused to put in an appearance. (The Daily Telegraph)

● **Several papers report on Goldie the goldfish which was apparently brought back from the dead when its owner gave it the kiss of life and poured whisky down its throat. Apparently she has achieved similar success before, using brandy.**

Sadly, reports the News of the World, whisky is not so good for trout - an 11lb 14oz rainbow succumbing to Bill Scragg's trout fly after it was dipped in the amber fluid.

● Whalphins were reported by several papers - or in fact one Whalphin, the mother a false killer whale, the father a bottle-nose dolphin, born at a Japanese aquarium.

● **The angling press has reported a spate of trigger fish along our shores, once an uncommon capture, now more frequent possibly thanks to global warming. The Daily Star reported a Trigger landed at Tenby, West Wales. So deeply was the fish hooked that a passing "aquarium owner" Chris Batt of Chris' Silent World Aquarium rescued it from the angler and took it to a vet, Nigel Gregory, in Haverfordwest. An X-ray revealed the hook, which was removed after a general anaesthetic. A dose of antibiotics followed. The fish will be returned to the sea.**

● We end this month with a report in the Daily Star about topless bathers on the Greek island of Kos, who are having problems with the local fish. They are, apparently, nipping their nipples, making swimming pretty uncomfortable. Brings a whole new meaning to the term 'breast-stroke'.

● ***Do you have a story for Newswatch? Send us your clippings, stating clearly where they have come from and the date. We'll pay £3 for every one printed.***

This month's contributors: Lee John Coggin, Kin Man Lee, Stuart Redshayne, Kate Newsam, P. Dornell, Simon Webb.

CALL THE PFK PROBLEM PHONELINES

■ **We now offer a phoneline service to *Practical Fishkeeping* readers. We have always done our best to help readers with their problems, and over the years we've noticed the same questions coming up again and again. As we're not always available on the 'phone, and then only during the expensive office hours, we have set up four 'phonelines to answer many of your queries.**

☎ FOR TROPICAL FRESHWATER & MARINE FISHKEEPERS:

GENERAL EMERGENCIES - What to do if your fish appear stressed; if you overdose your fish; dealing with powercuts; tank leaks; aggressive fish; and unexpected births. **0336 404046**

☎ FOR TROPICAL FISHKEEPERS:

NEW TANKS AND NEW TANK SYNDROME - avoiding the problems of fresh water, new equipment and stocking new fish. Listen to this one before you set up your new tank. **0336 404047**

☎ FOR MARINE FISHKEEPERS:

NITRATE IN THE MARINE TANK - the problems, and the possible solutions to the marine fishkeepers' major bugbear. **0336 404048**

☎ FOR PONDKEEPERS:

OVERWINTERING YOUR POND - What to do when autumn comes & how to help your fish through the winter. **0336 404049**

Calls charged at 36p per minute cheap rate; 48p per minute at all other times.

Christmas presents from London Zoo

Lifewatch

London Zoo runs a "Lifewatch" scheme, in conjunction with Whipsnade Wild Animal Park, for those interested in conservation. There are five membership categories, the cheapest being a "follower" at £10 per year and this includes a subscription to "Lifewatch" magazine, an entrance ticket to London Zoo, additional money-off entrance vouchers, a car sticker and a lapel badge. There's also a special "Explorer" section for young people aged 15 and under. Specially arranged events take place throughout the year, to which "Lifewatch" members are invited. All the money raised from the scheme is used to fund the zoo's conservation projects worldwide.

For more information, contact **Lifewatch, Zoological Gardens, Regent's Park, London NW1 4RY. Tel. 071 722 3333.**

Adopt an Animal

Both London Zoo and Whipsnade Wild Animal Park run an "Adopt an Animal" scheme where you can "adopt" one of the zoo's inmates for a year, (you don't actually get to take it home). There are over one hundred different species to choose from, ranging from insects to large animals.

The adopter receives a personalised certificate, a photo of the animal, a complimentary entrance ticket to London Zoo, and a car sticker and button badge along with regular animal information. All the adopter's names are listed on a "thank-you" plaque next to the animal's enclosure.

Adoption prices start at £20 per year and vary according to the species concerned, some are more "value for money" than others". A Clownfish, marine Angelfish or a Piranha will each cost you £20, an Electric Eel £40 and a Shark £90. You can adopt an ant for £20 - which some people may consider a little extreme, considering a scorpion will sting you for the same amount. On the other hand, you can adopt a crocodile for £730.

Some of the more expensive animals can be "bought" in units of £30 - after all, not everyone can afford the £6,000 required to adopt a whole elephant. We're not sure whether you can choose which bit you get for your £30.......

For more information on the Adopt an Animal scheme, contact **London Zoo, Regent's Park, London, NW1 4RY. Tel. 071 722 3333 or Whipsnade Wild Animal Park, Dunstable, Beds. LU6 2LF. Tel. 0582 872171.**

Tank for children's hospital

Birmingham Children's Hospital has just had a new fish tank donated by the city's Aqualand Pet Centre.

Shop owner Graham Wallace was approached by one of the sisters at the hospital for a quote on the cost of a tank after they were given a sum of money as a donation. The hospital already had a tank installed, which was popular with the children, but it was now rather dilapidated and the stand wasn't very safe. In addition, the sole inhabitant - an old T-Barb - had killed everything the staff had tried to keep with it.

The tank is popular with the children at the hospital

The external power filter will be quiet and easily maintained

In the end, Graham decided to donate the tank, equipment and fish and maintain it for the hospital free of charge.

He used an external filter which he considered to be the best option, as it would be quiet, easy to maintain and would keep the water cleaner. The Siporax media was pre-matured, along with all the gravel and water, so that some of the fish could be added immediately.

At the moment the 30" x 15" x 15" aquarium contains four Gold Barbs, a couple of Platies and two Noons and is being maintained at fortnightly intervals by Aqualand Pet Centre.

Graham says that if the set-up is a success - and it certainly looks as if it's going to be - he may take on more charity tanks in the future.

CLUB NEWS

LONDON: Are you a marine fishkeeper living in the London area? Tony Evangelou would like to hear from anyone who would like to form a marine club in London. If you are interested, you can contact **Tony on 071 231 4812.**

SUFFOLK: Suffolk Aquarists and Pondkeepers Association are looking for new members. Anyone wishing to join can contact **M. Thurlow on 0473 823642.**

Fish information needed

Two queries have reached the office this month and proved insoluble.

One is the identity and background of a fish which is either a catfish or a goby, sold as *Hatophrys triphinosus*. The little fish has an eel-like body and a goby-like head covered all over in small spines and is extremely predatory. We have identified the fish as a Freshwater Lionfish or Toadfish, but have got no further.

The other is the once common *Boria cichlinoides*. Correspondent and photographer Pete Trevett can't find this fish anywhere. Our investigations suggest that its natural habitat has been hit by the building of a dam - but surely it has been commercially bred? Pete is actually prepared to import a hundred or so himself if necessary.

If you have news of either fish please write to us at **PFK, Bretton Court, Bretton, Peterborough PE3 8DZ** - and if you're seeking information on a fish, please let us know.

Dakin IN DEPTH

Marine expert NICK DAKIN explains why it's best to stick to tradition when choosing a tank for your set-up.

Many unnaturally shaped tanks can cause problems with territorial marine fish. A bow-fronted tank such as this one should be OK

Q **I'm thinking of buying a tank of a more unusual design for my marines. Before I make a final decision, can you tell me of any potential drawbacks there might be?**
• A Wilson, Liverpool

A The aquarium is probably the single most important and expensive purchase the marine fishkeeper (or any fishkeeper, for that matter) will invest in, so it makes sense to choose the best in terms of quality and function. While unusual and exotic shapes may prove attractive to the eye, are they going to be suitable to house a successful marine micro-environment? The answer is that probably all shapes are capable of supporting a successful but restricted marine community. The trick is to know the limitations of the design and stay strictly within them. There are several areas of consideration and they fall into four major categories:

Volume/surface area ratios

It is essential that the marine aquarium has enough surface area to exchange harmful carbon dioxide for oxygen. It makes sense, therefore, to assume that deep tanks with a restricted surface area are going to be at a strong disadvantage from the very start. Remember that natural coral reefs are saturated or super-saturated with dissolved oxygen and this concentration is difficult to achieve, even in the best designs.

Unnatural territories

The vast majority of marine fish available to the hobbyist are territorial to some extent and this instinct nearly always takes the form of a horizontal, rather than a vertical area. Choosing a tall, thin tank is likely to bring fish into unnaturally close contact and may lead to serious territorial disputes as the more dominant species try to establish their "piece of the reef". Additionally, even when moderately-stocked, the tank can soon take on an abnormally crowded appearance which may not appeal to everyone.

Oddly shaped tanks may not hold as much water as you may think, which is important when you consider that the stocking level for a mixed fish/invert system is 1" of fish per six gallons of water. And is there room for that protein skimmer? Pic. by Ken Simms.

The traditional rectangular tank will not distort the appearance of the fish and you won't have to keep shifting your position in order to keep the fish in view. Pic. by P. D. Hunt.

Lighting

Illumination may prove a problem if high intensities are required from fluorescent tubes to support light-loving invertebrates. Octagonal or hexagonal shapes can make effective fluorescent lighting a real headache and a series of 24", 18" and smaller tubes is not really practical. The only option may be a single mercury vapour or metal halide spotlight, with no option for extra support lighting.

Distortion

Many irregularly shaped tanks create massive display distortion that Picasso would be proud of! Livestock can appear to become split between two or more pieces of glass and while this may not initially seem to be a problem, it can become very irritating when you have to keep altering your viewing position to see your fish and other livestock in their entirety.

Other drawbacks

Capacity may also need careful consideration and you should estimate the net volume of water at the earliest opportunity. You may be surprised at just how little water is available. For example, a 24" x 24" triangular aquarium will only hold about 22 gallons nett.

It is no coincidence that most fishkeepers choose the traditional rectangular tank, as most of the potential problems outlined above just do not present themselves. By all means consider a tank of an unusual or irregular design, but be aware of the limitations and do not apply the same criteria as you would to the more conventional rectangular aquarium, especially where stocking levels are concerned. ■

Marine *Answers*

■ Water is at fault

I have a 39" x 18" x 12" marine tank which was set up 18 months ago. It houses a Yellow Tailed Clown, a Green-Lined Wrasse, a Bi-coloured Blenny, a Golden and Blue Damsel, a Hermit Crab, a Blue Starfish and lots of other inverts.

I've recently started to have a problem controlling red algae, especially on the coral sand. The tank has an undergravel filter run by two powerheads. Could there be a problem with the filtration?

If not, is there a product I can buy to control the algae?
R. Wilshire, Cumbs.

Red slime algae can be a real problem where water quality is not up to scratch. Are you using a protein skimmer and activated carbon filtration? Are you also performing regular nitrate-free water changes - around 20% every fortnight? If not, then this may well be the reason why the red slime algae has been able to get a hold.

There is no product to control this problem in a mixed invert tank.

[illegible] can prove very serious [illegible] causing any human [illegible] The Goldfish Bowl, Oxford.

Newly imported Angelfish sometimes suffer from a viral infection called Lymphocystis. This generally clears up on its own under good conditions. Pic shows a Blue Ring Angel. Pic: Max Gibbs, The Goldfish Bowl, Oxford.

What should I add?

Q **Could you please clear up a few points which I am sure confuse other readers as well as myself.**

There seem to be so many additives available for marine tanks that you would need a store room in which to keep them all. How many of these would you actually add to your tank?

In addition, I have a Blue Ring Angel which at the time of purchase had a few white-spot-like fluffy things on the edges of his fins. When I mentioned them to my dealer he said it was due to the stress of being shipped and that the fish was actually recovering. It still has these spots, although they haven't got any worse and the other fish have not been affected. They don't bother the fish in any way. Can you recommend a cure?
■Robert Dixon, Peterhead

A I tend to agree with you - it does rather seem as though you need several dozen supplements to keep a successful marine aquarium. I am sure that providing the proper maintenance is undertaken, many of them are unnecessary. Personally I would use a pH buffer, trace elements, vitamins and possibly a KH buffer.

Your Blue Ring Angel is suffering from a viral infection called Lymphocystis. This is quite common on newly imported Angelfish and in nearly all cases it cures itself with medication. Be patient and keep the water quality high and your fish should be fine.

How safe is a Lionfish?

Q **Please could you tell me if I can keep a Lionfish in my tank - and is it safe to do so, from my own point of view?**

My tank is 6' x 2' x 2' and I intend to keep a selection of Clownfish, Wrasse, Damsels, Tangs and Gobies. Please could you tell me how much heating I would need?

A Your tank will hold around 120 gallons nett, depending on the design. If kept in a reasonably warm room then you will need a 200W heater - or 300W if it is in a cold room.

Lionfish are predatory and will eat any fish they can get into their mouths (or think they can!). It would be unwise to add one to a tank full of small fish, as you have outlined. There is little danger from a Lionfish to yourself, so long as you keep your fingers clear of the venomous spines.

Swollen eyes

Q **My Emperor Angelfish keeps getting swollen eyes. I have treated the problem twice with MarinOomed, but it returns after a couple of days. Please can you help?**
• P. Schooley, Hants.

A It sounds as though your Angel is suffering from Pop-eye. This can have many causes, including bacterial, parasitic and internal disorders. The trigger is usually poor water quality due to overstocking, overfeeding, incorrect filtration and so on.

My advice would be to aim to improve water conditions and forget any medications.

Nitrates should be in single figures and water changes should be carried out at the rate of 20% each week for the time being. Make sure the protein skimmer is working properly and renew the activated carbon. Make sure you are not overstocked (1" of fish per 2 gallons of water in a fish-only tank is the absolute maximum.)

I hope your fish makes a full recovery.

LETTER OF THE MONTH

J. Simpson of Norwich raises an interesting point in this Letter of the Month. He wins an Interpet test kit.

Q **May I draw your attention to a couple of pieces of equipment? The first is an 8W UV "Steriliser" for use with freshwater/marine aquariums, witha rating of 45 gallons. The second is an 8W UV "Filter" for use in Koi ponds, rated at 500 gallons. Both cost about the same. Now are these two units not doing the same job? If I was to buy the pond version for my 90 gallon marine system, then wouldn't this be more efficient, due to the slower flow rate, compared to that of our Koi-keeping friends? Or am I missing a basic point?**

A The point you have raised is an interesting and valid one. The basic answer is yes, the UV steriliser performs a different function in the aquarium to that in a pond. In the aquarium we are interested in killing as many free swimming disease organisms in as short a time as possible, whereas in the pond it is unicelluler algae that is targeted (the cause of green water). As algae does not multiply as quickly as some marine parasites the turnover in the pond need not be very fast.

Both models are essentially the same, but the pond UV tends to have more protection against the weather.

Don't try and keep more than one Clownfish in the same tank unless they are a pair of a similar species.

Bring on the Clowns

Q **I have a 48" x 18" x 18" tank which is empty at the moment. I'd like to keep three Common Clowns, two Tomato Clowns and a Regal Tang.**

I'd also like to add a few inverts, largely anemones for the Clown fish. My filtration system is largely undergravel, powered by an Aquaclear 802, along with a protein skimmer, internal box filter containing carbon and a Fluval 2 internal power filter.

I'd like to add another fish - possibly a Coral Beauty or a Bicolor Angel.

The tank is lit by a 48" Actinic, 48" Northlight and a 42" Triton. Will this be enough, as I don't have the room for any more tubes?

A **Unfortunately you will not be able to keep all the Clownfish you list in the same tank. A pair of either Common Clowns or Tomato Clowns should settle down well. Don't be tempted to buy three or more of the same species.**

Your system sounds fine and will certainly support either a Coral Beauty or a Bicolor Angel.

You really need a little more lighting, say two Aquastars. There should be room in a 15" wide tank.

Shoalers...or not?

Q **I have often admired large shoals of Yellow Tangs, but people seem to be divided as to whether this is possible to achieve in the home aquarium. What is your opinion?**

My tank is 72" x 24" x 18" and holds 80 gallons.

A Yellow Tangs are very popular aquarium fish and many hobbyists try to keep them in shoals. Unfortunately this is more often than not a complete failure, as the weakest is bullied to death, followed by the next weakest and so on, until only one remains.

Hermit crabs will need a supply of new shells to "grow into".

New shells for old

Q **I would like to keep a Hermit Crab. Will it destroy my anemones? Where do I find the shells it needs to grow into? What do I feed it on?**

A Small Hermit Crabs will not damage inverts, but larger ones will. Feed them on small pieces of squid or cockle at regular intervals (once a week). Your local dealer shoud have some empty shells for it to grow into.

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

Marine Problem Solver

Is your dream tank turning into a nightmare? If you've tried everything and you still have problems, don't despair. JOHN CRIPPS has a few suggestions which you might not have thought of.

Some fishkeepers have two identical tanks. One will be no trouble at all while the other drives them insane with constant problems. If you are suffering from a rogue tank then this article may help in locating the problem.

At first glance two tanks standing side by side in a room may appear to be the same. While the equipment and gallonage may be, the coral sand and decoration is not. Their position in the room relevant to windows, doorways, other rooms or fireplaces will be different, as will the effects of these items on each tank.

Atmospheric pollution

Do you smoke? One evening, while enjoying a cigarette, I noticed how the draught coming under the doors collected up the tobacco smoke and drifted it towards the opposite end of the room where a tank was. Caught by the uplift of hot air from the fluorescent tubes, all the smoke was drawn into the hood and onto the water's surface, which just happened to have a protein skimmer waiting to mix it into solution.

Subsequent experimentation with fumes from cooking and coal fires produced the same results.

Needless to say I repositioned the tank. It would seem that any other harmful fumes around would be drawn in by the same means, aerosols being a prime example.

Metallic pollution

This caused the single biggest loss of stock I have ever had. It came from two separate sources within the same tank. The first indication that anything was wrong came three months after I had set the tank up and stocked it for the first time.

An adult pair of Emperor Angels and a shoal of six butterflies were placed in it. On day one the angels had gone blotchy, the butterflies off their food, so I treated the tank with copper.

On day two I repeated the copper. By now the angels had tired eyes, and the butterflies had started to die.

On day three all the butterflies were dead as was one angel, to be followed the next day by the other. Clearly something was wrong. Purely on the strength of a chance remark by my retailer, who thought the symptoms could have been caused by metal toxicity, the tank was stripped down piece by piece.

In the crushed coral substrate, I found two pieces of rusted iron looking not unlike broken shell about the size of drawing pin heads. Subsequent checks of the coral sand revealed minute particles that were attracted to the algae magnets - even though they didn't look metallic.

Puzzled, I finally twigged where they had come from: the synthetic rock - supposedly safe - that I had decorated the tank with. To prove a point I smashed a piece open and applied the magnets. The pieces couldn't get to them quick enough. The whole lot was riddled with iron.

After that I replaced everthing that may have become contaminated with metal toxins, down to the last grain of sand.

What had happened over three months was that metal had leached into the system to dangerously high levels. Adding the copper, which is another metal toxin, only hastened the death of the fish.

There could be other metals in your system like bronze, lead and aluminium that won't be attracted to a magnet and they will have to be physically screened for.

If you have a tank that always seems to be disease prone, or the fish die, often for no apparent reason, I would suggest that any decoration that is in or going in your tank be checked and double checked no matter how long it takes and how safe it is said to be.

Check your coral sand and gravel for pieces of metal before you add it to the tank. This is best done by spreading it out on a piece of paper and running an algae magnet, wrapped in a polythene bag, over the particles. The bag prevents any tiny pieces of metals from becoming embedded in the magnet, which may scratch your glass at a later date.

Above: Where you decide to site your marine tank could make all the difference between a thriving system, like this, or a disaster zone. If you're the owner of a rogue tank and you've tried everything else, it may be worth moving the set-up to another area of the room.
Left: Metal contamination is particularly lethal to marine invertebrates, but it will kill off your fish if the levels are allowed to rise unchecked. Such an incident resulted in a total wipe-out in one of the author's tanks containing a pair of Emperor Angels and a shoal of Butterflyfish. Pic. shows an Emperor Angel.

Plastic pollution

All equipment manufactured in plastic for use in the aquarium should be non-toxic. However, do it yourself equipment like homemade trickle filters and protein skimmers may have been constructed from plastic that is less than ideal. Some plastics contain "mollifiers" to make them pliable and these can dissolve into the aquarium water producing a toxic effect.

OTHER CAUSES OF TOXIDITY

Electrical

A recent letter to *PFK* pointed out the possible effects of electrical current leakage on fish in a system. Those who want to experiment with putting a volt meter across their tanks will more than likely get a reading.

This, I have found, is mainly due to lighting chokes that are only fitted with twin core flex with no earth. Due to the radio waves which this equipment gives off, an electrical current is induced into the water. Fitting these chokes with, or replacing them with those that have earths and metal jackets will reduce the voltage reading and any possible ill effects on the fish.

Denitrification filter

This filter has proved a boon to keepers of sensitive fish by keeping nitrate levels under control but its operation needs to be constantly monitored. The outlet can contain nitrite or hydrogen sulphide. Any fish that is particularly sensitive will show up their presence, no matter how small the amount, by scratching on rocks and tank uplifts.

Undergravel filteration

Any tank that has been running for several months in a typical down-flow system will eventually become clogged and packed down.

The water finding the path of least resistance will short circuit, leaving large areas of the filter unoxygenated and dead.

Within these areas all manner of harmful gaseous and bacterial reactions may be taking place that could affect the whole of the aquarium environment, giving rise to problems associated with toxicity, phosphates and hairy algae.

Once every six months it may be worth considering removing all the stock to another tank and syphoning all the coral sand out, cleaning it with mature tank water and returning it.

Position

Where a tank is sited can have an effect on its welfare. Direct sunlight, constant use of a doorway, room temperature, TV, Radio and hi-fi equipment nearby can all influence the system and the stock for good or bad. A tank may benefit from a change of position in the event of a problem where everything else has failed.

Stocking

For some reason or other, each and every system is a law unto itself. While one tank will hold 20" of fish, another identical tank will not. At some time or other we all think our systems can take that one extra fish, which in truth could be the straw breaking the camel's back.

Perhaps reducing the stock by as much as half will get rid of your problem. An overstocked tank coupled with overfeeding will give an excess of nitrite, ammonia, and nitrate build-up that no filtration in the world could control. ■

Grasping at straws

The following is a selection of other areas where the cause of a problem may be found:

- point fumes,
- dust,
- the wife's perfume or hubby's after shave,
- tapwater,
- external noise,
- constant tinkerings with the tank,
- external stimulus,
- lights flashing on and off,
- power failures,
- equipment not functioning,
- overdose of treatments,
- very large water changes,
- dirty filters (internal and external),
- contaminated hands,
- air quality,
- over-use of ozone,
- incorrect protein skimmer for size of tank,
- incompatability of fish causing stress,
- not enough filtration,
- lack of oxygen,
- insufficient aeration,
- excess of carbon dioxide,
- replacement of activated carbon overdue.

The list is almost endless but no matter how small the likelihood, every possible scenario must be explored.

On one tank I had, the fish panicked and hid every time I switched on the lighting.

The cause - they didn't like the Blue Actinic tubes that came on first before the main lighting.

Large water changes will stress your fish and they will find any slight difference in salinity or temperature more noticeable. Smaller weekly or fortnightly water changes of 10-20% are preferable to large monthly ones. And always condition the tapwater first

Just CHAMPION THE ANSWERS

1. Where was the first public aquarium?
London Zoological Society installed the first public aquaria in 1853 at London Zoo, Paris opened theirs in 1860 and Germany in 1864 at Hamburg.

2. What are Koi?
The Japanese Ornamental Carp *Cyprinus carpio* is called Nishikigoi in Japanese which means Living Jewel and is shortened to Koi in English (actually the name Koi is Chinese from a fish owned by Confucius' son in 500BC, but you aren't expected to know that too...)

3. Aquaria are named by the type of water they contain - can you name the three most popular?
Coldwater, tropical and marine. Traditionally Coldwater means a Goldfish aquarium, Tropical means a freshwater collection of fish from the tropical regions and marine means Coralfish in artificial seawater.

4. Name one other type of aquarium by its water content.
Brackish is the usual answer, but there are many others such as Amazonian softwater, Rift valley hardwater, or native 'coldwater' marines etc. The hobby is much more complex than non-fishkeepers realise.

5. What is a terrarium?
The same as an aquarium but without water.

6. Is a shark a true fish?
Yes. Sometimes people confuse whales or dolphins, which are mammals, with sharks, which are true fish.

7. Is a Killer Whale a true fish?
No, it belongs to the whale family which are mammals.

8. How do you spell the "English" name of *Serrasalmus nattereri*?
Obviously this question is read out by the Club quizmaster simply as "How do you spell Piranha?" and members write down the answer. It is surprising how many get this wrong, despite Hollywood films.

9. What are fish's fins made of?
Skin supported by gristle or horn rods. It is not scales or bone, but mainly simple skin.

10. What is the common name for baby fish?
Fry, which is defined as young fish fresh from the spawn. Small fry is a term meaning so small as to be unimportant, but any breeder can confirm this doesn't apply to fish...

11. What is another name for the ventral fin?
Anal fin, because it is sited just behind the anus.

12. What is the numerical difference between Centigrade and Celsius?
A trick question really because they are numerically identical.

13. What wattage is a traditional 24" fluorescent tube for aquaria?
20 watts, which fits the hood of a 30" tank or larger.

14. Where is the caudal fin?
Tail, because caudal is from the Latin *cauda* meaning tail.

15. How many litres in an Imperial gallon?
4.546, usually taken as 4.5l, a figure fishkeepers should know because some modern books now quote tanks in litres whereas older literature work in gallons.

16. What are the Hognose, Emerald and Britiskis fish?
Brochis. Brochis is the generic name of a group of Armoured Catfish that look like the Corydoras, although flatter in body shape. They all make ideal aquarium fish.

17. From which country did the Neon Tetra originate?
Peru. Although a South American fish it is now mass-produced in fish farms in Hong Kong and is sometimes called the Hong Kong Tetra by traders.

18. Which Lake in South America is home to the Green Discus?
Lake Tefe. Lake Tefe in Brazil was the original home of the Tefe Green Discus found by Heiko Bleher in 1986. There is also a Peruvian Green and a Columbian Green Discus but their colours are not as intense so they are not used by breeders.

19. Is the Redtailed Catfish a carnivore?
No. In the wild it is a large Catfish eats fruits and seeds, but it can digest meat and is therefore an omnivore.

20. Which of the following is not a mouthbreeder: Shark Catfish, Severum, Egyptian Mouthbreeder?
The Severum. Hence severum lays eggs in the open water on rocks and the pair look after the family when they hatch.

21. In which pH range is ammonia more deadly to fish, acid (pH1 to 7) or alkaline (pH7 to 14)?
Alkaline because this makes the poisonous ammonia available to affect the fish; in acid waters the ammonia is contained as ammonium compounds.

22. What is the name of all the fish found in estuarine waters?
Brackish. The estuary is where freshwater flows to the sea, so tides mix the waters to give the brackish environment that certain fish exploit.

23. What is the scientific name for the Firemouth Cichlid?
Cichlasoma meeki. This popular aquarium fish was named by H. Reese of Hamburg in1937 as a peaceful cichlid, though it can turn aggressive when spawning.

24. The air-breathing fish of Afro-Asia are called...?
Anabantoids from the family name Anbantoidae, a group of fish that possess a labyrinth organ where air can be breathed. The Siamese Fighter and the Gouramis are popular examples.

25. What is common to the Scorpion, Lionfish and Liver Catfish?
All have poisonous spines. Many of the Catfish have spines that can give fishkeepers a nasty wound since they inject bacteria under water. But the catfish above also inject a poison that, although not fatal, will prove painful.

26. Where does a pelagic fish swim?
Mid Ocean. The sea areas away from shore are called the Oceanic or Pelagic zone, hence fish that swim there are called Pelagic fish. The inshore fish are called Littoral after the Littoral zone. There are also Abyssal fish at great depths and Bathypelagic - those in between.

27. In which country can be found Darters, Channel Catfish and Sunfish?
The USA. Coming from a continent with a temperate climate these fish are only semi-tropical and so can be installed in both tropical and coolwater aquaria.

28. Some Cichlids and Catfish can spawn with more than one group of females...what type of polygamy is this called?
Harem or polygamy i.e. after a harem. You may not know the answer but it could be guessed.

29. Several species of fish including *Hypostomus regani* and *Chromidotilapia guentheri* are named after scientists at which museum?
British Natural History Museum. This is the place to send any unknown fish species for identification. If new they will give the fish a scientific name, which could be yours if you found it.

30. Dr Gery wrote what famous fish book?
Characoids of the World. There are over 1,200 species of Characins in Africa and America so cataloguing them was a mammoth task by Dr Jacques Gery. An English language version of his book is available from TFH Publications.

31. What is the name of the magazine published by the FBAS?
Fishworld. A quarterly magazine from the Federation of British Aquatic Societies.

32. What group of fish live in coastal waters of Australia New Guinea?
Rainbow fish. These unique fish are increasingly popular with hobbyists, there is even a national rainbow fish society. They are often used to control mosquitos.

33. What is a holotype?
This is the first scientific description of any species of fish. Subsequent descriptions may vary or even change greatly because that first specimen may not be a good example.

34. Which family of fish includes *Otocinclus*, *Hypostomus* and *Peckoltia*?
Loricariidae. These are the armour plated catfish, the most popular is the Suckermouth *Hypostomus punctatus* with its sail-like back fin.

35. What are the *Mannoedomus* better known as?
Pencil fish. There are many of the peaceful South American fish, such as Golden Pencilfish, Two-line Pencilfish, Three-line Pencilfish, Dwarf Pencilfish, and so on.

36. Pakistan, Wrought iron and Hawaiian are from what group of fish?
Any marine fishkeeper will recognise these common names for the Butterfly fish.

37. Which of the following do not show parental care: Bullhead Catfish, Tiger Barb, Whiptail Catfish and Brichard's Cichlid?
The Tiger Barb - all the rest look after the eggs and raise the young fish.

38. What are the following Corydoras named after: *C. coppenamensis*, *C. melae* and *C. napoensis*?
They're all named after the South American rivers where the fish were first found.

39. Is white spot a bacterial infection?
No. All fishkeepers should be familiar with this most common of all parasites, because every aquarium seems to get an outbreak sometime.

40. If anemones are not plants why do they need bright lights?
Because of the plants within them. Most anemones contain algae which photosynthesise...the plant and the animal living together in what is called symbiosis.

41. The wild Molly originates from what type of water?
Brackish. This is one of the reasons many fishkeepers have problems with Mollies - they place them in soft, acid water. The fish (especially the Black Molly) need hard or slightly salty water.

42. What does MKA stand for?
Midland Koi Association. There are several Koi groups such as the British Koi-Keepers' Society (BKKS) and the Yorkshire Koi Society YKS.

43. Why do Shrimpfish stand on their tails?
They hide among Sea Urchins and stand erect like the Urchin's spines.

44. Shark skin is abrasively rough due to special scales called...?
Placoid. These are scales with several points that makes a shark's skin so rough it was once used like sandpaper.

45. Bonny fish have overlapping scales called...?
Cycloid. Unlike the placoids, these are smoothly-rounded to aid swimming (perhaps to escape Sharks...).

46. Why is the disappearance of crocodiles bad news for fish?
Crocodiles only eat the largest fish which feed on the smaller fish. If crocodiles become rare there will be more predatory fish around.

47. From which country does the wild White Cloud Mountain Minnow originate?
This popular fish is mass produced in the far-East fish farms but its original home was China, in the cool waters of the White Cloud mountain streams.

48. How do you distinguish between Brochis and Corydoras catfish?
By counting the dorsal rays. Corydoras have 6, 7 or 8 but Brochis have 10 to 17 according to species. Both groups have six barbels and body shapes are similar.

49. What is the maximum number of pages in one issue of Practical Fishkeeping - so far.
172 which is a really good read.

50. What is the Post Office Box number of the 'Aquarian' Advisory Service
PO Box 67 (Elland, W Yorks., HX2 0SJ) which is where you can write for the solutions to fishkeeping problems.

Christmas

Young fis

KIT TIP

The Earthing Device

What is it for?
It's not uncommon (especially in marine tanks) to receive minor shocks from the aquarium when you put your hands in the water. This type of shock isn't dangerous, (so long as it's not caused by faulty wiring, of course), but they can still be pretty unpleasant. The electrical currents responsible for the shocks are caused by powerheads, filters and other equipment. It's thought that the presence of electric in the water may also cause stress, leading to ill-health in fish and invertebrates.

An earthing device, as its name suggests, earths the tank water, eliminating these electrical discharges.

What extra equipment do you need?
Just the earth terminal of a cable tidy - or any other convenient earth point.

How do you use it?
Hang the probe over the side of the tank so that it is completely immersed in the water. The other end is then connected to an earth terminal.

Good features
An earthing device eliminates the unpleasant shocks you may get when you stick your hands into the aquarium water. It's safe to use in both fresh and saltwater and it can be left in the tank permanently. The small probe is unobtrusive and it takes only a few minutes to fit.

Are there any drawbacks?
Not really, unless you consider the wiring. An earthing device must be wired to an earth terminal, for obvious reasons. If you are unsure, ask your parents or an electrician to do it for you.

FISH 'N' TIPS

Provide your catfish with a quiet retreat in the form of a cave or hidey-hole. Pic. shows *Synodontis eburneus*, by Max Gibbs, The Goldfish Bowl, Oxford.

When you choose the decor for your tank, bear in mind that many catfish are nocturnal and will appreciate somewhere to hide during the day. This can take the form of a flowerpot, a piece of drainage pipe, a lump of bogwood which has some sort of "entrance" to make it accessible, or a few stones carefully positioned to make a small cave. Remember that most catfish rest during the day, when the other fish are at their most active.

Many of the popular community fish come from areas which are well planted. If you have problems growing plants - and even some of the most experienced fishkeepers do - you can use plastic ones, which really don't look bad at all. Plants give the fish somewhere to hide and provide a sense of security. Strange as it may seem, if you give your fish plants among which they can hide, you're likely to see more of them. This is because they feel more confident knowing that the cover is there, should they require it and this makes them willing to venture out further.

DID YOU KNOW?

- It is thought that all the *Vallis* plants in our tanks are female. They were all produced from runners on female plants collected from the wild. If this is correct, then they cannot be raised from seed, as any flowers they produce in the tank could not be fertilised by pollen.
- Marine Clownfish can change sex. A group consists of a breeding female and a hierarchy of males. If the female dies, the dominant male becomes a female and takes over the production of eggs. If you buy two small Clowns and exercise a little patience, you can be guaranteed of getting a pair because one of the two will eventually change into a female.
- The Guppy and the Mosquito Fish (*Gambusia affinis*) were used for mosquito control in lakes, ponds and rivers in the tropics. They were transported in plastic bags before being dropped into the mosquito infested waters by low-flying aircraft. Unfortunately, they not only ate the mosquito lavae, but the eggs of the native fish and have taken over in some areas.

Go green this Christmas

If you're an environmentally friendly 4-15 year old and you're not sure what to ask for this Christmas, how about joining the **"Lifewatch Explorer"** scheme at London Zoo or Whipsnade Wild Animal Park?

Lifewatch is an animal conservation scheme, helping rare and endangered species, like the elephant, rhino and giant panda. Its aims include breeding programmes, the return of animals to the wild, field research and much more. And it's not just animals abroad which benefit - conservation of British wildlife is included in the scheme too.

It costs just £10 a year to become a "Lifewatch Explorer". Your money gets you a membership card which will give you free entry to London Zoo or Whipsnade Wild Animal Park for the whole year, as often as you like. In addition you get three editions a year of the club's magazine, *Explorers News*, a button badge and discount at the zoo and wild animal park shops.

You can get further information from **London Zoo, Regents Park, London NW1 4RY. Tel. 071 722 3333** or **Whipsnade Wild Animal Park, Dunstable, Bedfordshire, LU6 2LF. Tel. 0582 872171.**

If you live a long way from either London Zoo or Whipsnade Wild Animal Park, you won't be able to benefit much from the free admission part of the membership. But you can still join as a **"National Explorer"** for just £5. This gets you three editions of the *Explorers News* magazine, a button badge and a complimentary ticket to either London Zoo or Whipsnade Wild Animal Park.

hkeeper

Quick tip

■ You can make great nylon bags for filter media from ladies' discarded tights. Use the leg without holes, fill with medium, and tie a knot.

OCTOBER WINNERS

The winners of the October Wordsearch competition were **James Wiskin**, aged 13, from Essex; **Paul Meinnes**, aged 18, of Kent and **Cassandra Ashton**, aged 13, from Cambridgeshire. Well done, those three!

A SACKFUL OF PRIZES TO BE WON!

Well, it's the season to be jolly and we here at *PFK* don't want to be accused of being Scrooges. So we're giving away loads of prizes in this month's competition - which means there's absolutely no excuse for not entering.

There are fifteen prizes in all - and there's no telling which one you will win, so there's some element of surprise. The list of prizes is as follows: Optima air pump, Whisper 900 air pump, Hagen Syphon Start, four way control valve, two-way control valve, stone bridge, Algarde filter plate and water treatment capsule, Interpet vacuum cleaner, UNO pool heater, two Crystal Clear turbulators, Bio Chem beads, Simawood castle and a Grecian urn and corner castle from Shorefine.

All you have to do is identify the pieces of fishkeeping equipment shown in the pictures on the left. Put your answers on the coupon, along with your name and address and send it to **Young Fishkeeper Christmas Competition, Bretton Court, Bretton, Peterborough, PE3 8DZ,** to arrive before the closing date, which is **December 14.** All the correct entries will be put into a box. The prizes will be numbered 1-15 and the first fifteen entries drawn from the box will each win the prize which corresponds to the order in which they were drawn. So the first winner will receive prize number 1, the second prize 2 and so on. You must be aged 17 or under to enter. Photocopies of the entry form will be accepted.

1. .....
2. .....
3. .....
4. .....
5. .....

Name ..... **Age** .....

Address .....

.....

.....

Floyd **by fran**

Goldfish have the remarkable ability to survive conditions which would have seen most other fish off long ago - a fact which has laid them open to much abuse. So isn't it about time we gave them the care and consideration they deserve? Dr. Joe Smartt examines the requirements of these long established favourites.

The bumps and mane on this goldfish would prevent it from winning any show prizes - but even a humble fancy deserves the best conditions

Golden opportunities

The goldfish is a remarkable fish - not least in its ability to tolerate and survive abuse.

We are all too familiar with the sad spectacle of seeing overcrowded, listless goldfish, thoroughly out of condition, if not actually diseased, being offered for sale to the unsuspecting public. All too often the change of conditions when the sale is made and the fish taken home, is all that is needed finally to send the unfortunate creature to that great big goldfish bowl in the sky.

It's nice to know that our goldfish will potentially be hardy but as actual or potential goldfish keepers we are primarily concerned with establishing conditions in which our fish will actually flourish.

Fortunately goldfish can thrive in a surprisingly-wide assortment of environmental conditions and we need to determine a practical range in which we can operate, and which will be satisfactory for our fish.

First considerations

What are the environmental needs of the goldfish? The most important aspects are water quality, temperature and space. These three aspects are to some extent interrelated in that, for example, at higher temperatures water quality may deteriorate more rapidly than at low temperatures and under conditions of crowding, the deterioration of water quality will also be accelerated.

Water quality

Most goldfish keepers would agree that most, if not all of their problems of fish losses and loss of condition can be attributed to poor water quality. This is something that cannot be taken for granted, as with the best will in the World, even the most expert goldfish keeper will suffer equipment failures etc. in his or her absence which can, during hot weather for example, lead to loss of fish or triggering off of disease.

The question of equipment failures becomes most important when goldfish are kept under an intensive system. With the use of filtration and aeration it is possible to increase the density of stocking.

This is all very well until equipment fails or filters become blocked. Unless this is noticed quickly, rapid deterioration of water conditions can occur.

High stocking rates demand management of a high order and regular attention. The experienced eye can frequently ▶

tell at a glance that all is not well in a pond or aquarium without necessarily seeing a single fish.

The clarity of the water, coupled with the presence of the merest suggestion of a greenish tinge, indicate fairly reliably that all is well. Conversely cloudy or discoloured water indicates the exact opposite.

Unfortunately even water which is perfectly clear may pose a problem. The problems relate to the supply and source of the water used.

In spite of a good rainfall in this country, water supplies are not of uniform quality. In areas supplied from large lakes such as those in the Lake District, Wales and Scotland the water is very pure and requires little treatment.

In areas supplied by river systems such as the Thames Valley, water can be taken from the river, used and returned to it several times with the result that much of its initial quality has been lost. Such recycled water may not be a health hazard to the human population but it may be highly detrimental to fish.

When chlorine was used as a disinfecting agent, a relatively short exposure to air after a water sample was drawn would render the water acceptable for use. The use of more persistent and less volatile compounds such as the chloramines has posed a serious problem for many fishkeepers.

They often receive very unsympathetic treatment from the suppliers, whose principal and only concern is to supply water which complies with medical health standards and nothing more. This means that in some areas water from the mains may have to be treated chemically to neutralize the additives before it is safe for fish. Fortunately there are many commercially available products, but when this problem first emerged the only treatment available for a time was with sodium thiosulphate. In the days of black and white photography this was readily available but can now be quite difficult to obtain.

Temperature

With a secure source of safe water, we need next to consider the most desirable temperature range. Basically the ambient conditions in the British Isles are acceptable for goldfish at most times of the year.

In ponds the extremes of climate even in exceptionally cold winters and hot summers can be withstood if the depth of water is adequate and no large quantity of rotting material is present. In such circumstances temperature itself poses no problem, but in both summer and winter actively decomposing material can not only reduce oxygen supply but also produce not only carbon dioxide but toxic gases such as hydrogen sulphide ("rotten eggs"). These are particularly dangerous in winter when ice prevents their escape.

In summer algal blooms (green water) can cause problems by reduction of oxygen content at night to dangerous levels and producing supersaturation with oxygen during the day. This can lead to oxygen gas being released in blood vessels with potentially dangerous effects on the fish.

Extremes of temperature are clearly undesirable, but the goldfish is well adapted to the seasonal cycle of temperature and changes that range from 4°-25° Celsius over the year presents no problem to the hardiest varieties, while the more delicate fancies would be well suited by a range between 10°-25°C.

Most fish would not be seriously affected by temperatures somewhat outside this range especially if only exposed to them for a short time.

Hardness and pH

Among the more important qualities of water as we receive it from our supply sources are its pH and its hardness. These are to a certain extent inter-related.

As is well known pH is a measure of acidity or alkalinity, pH 7 is the neutral point with lower values indicating acidity and higher alkalinity. The goldfish, unlike many other fish, tolerates a fair pH range. At pH values in the range 6.0 - 8.5 no problems would be caused by the pH itself. Outside this range, with increasing or decreasing pH values, the possibility and probability of problems arising increases.

At pH levels below 6 there can be problems arising from the enhanced solubility of metallic compounds such as aluminium with toxic effects on fish. Alkalinity, though tolerated rather better than acidity, increases the toxicity of ammonia and reduces the availability to fish of essential mineral elements such as iron and copper (in the case of iron a deficiency could produce anaemia).

Water hardness which is produced by the presence of bicarbonates, and sulphates of calcium and magnesium, is not usually a problem for the goldfish keeper.

Extremely soft water may not contain sufficient calcium to maintain growth of the skeleton while excessively hard water is thought not to favour the best quality of coloration and finnage. Again the happy mean is best. One of the major causes of water hardness, calcium (and magnesium) bicarbonate has the very useful property of buffering, that is preventing or reducing pH changes resulting from addition of acids or alkalis.

Aeration

When fish have lived in water they bring about changes due to the products of their metabolism. The most immediate is that they

Far left: Simple but beautiful.

Left: Calico is just one of the available patterns. Pic: Max Gibbs, The Goldfish Bowl, Oxford.

Below left: No particular pattern and no aspirations to show prizes but a well-loved pet. Pic: Pete Threett.

Below: An Oranda is still quite an easy fish to keep despite its fancy breeding. Fish from Star Fisheries, Sutton, Surrey. Tel: 081 648 8163.

take up oxygen from water to support their respiration and produce carbon dioxide.

Oxygen is much less soluble in water than carbon dioxide and in order for fish life to be sustained it must be replenished as fast as it is used up. It is also less soluble in water at higher than at lower temperatures, so that the capacity of a body of water to support fish respiration is greater in winter than in high summer.

It is also important that the level of carbon dioxide does not rise to too high a level. At appropriate stocking rates there is a natural tendency for oxygen to move from the atmosphere where the concentration is high, to the water where it is low and conversely for carbon dioxide to move from water with a higher concentration to the atmosphere where it is lower.

Higher rates of stocking can be supported using aeration which not only increases the rate at which oxygen can dissolve in water but also that at which carbon dioxide moves from the water into the atmosphere.

Filtration

At the present time there is considerable concern about concentrations of nitrogen compounds in water containing goldfish. Maintaining an effective control on their levels is the key to success. Since the end of World War II the methods of achieving this end have changed.

In the "balanced aquarium" system, the nitrogen compounds produced by the fish's metabolism were taken up by plants, and nitrate levels in the water would be kept low.

No special methods were adopted to enhance the activity of bacteria oxidizing excreted ammonia (produced from metabolism of proteins) first to nitrite and then to nitrate.

The post war development of biological filtration systems in which media were developed, and aerobic conditions maintained, very considerably enhanced rates of detoxification of ammonia and nitrite.

Nitrate, while relatively innocuous, is kept at acceptable levels by partial water changes (or by introduction of sintered glass filters which ingeniously provide conditions for both the aerobic bacteria which transform ammonia into nitrate but also dispose of nitrate producing nitrogen in the process).

Biological filtration systems not only control ammonia and nitrite levels, they also promote the degradation of organic matter and reduce the accumulation of mulm in aquaria.

A great range of filtration systems have been developed from the pioneering efforts of the late Captain L.C. Betts who essentially miniaturized sewage disposal systems which resulted in the basic undergravel filtration system of the present time, which illustrates the principles involved.

Instead of the anaerobic gravel layer of old style aquaria, this now becomes a biologically active aerobic medium supporting bacteria which decompose organic matter to carbon dioxide and water and oxidize ammonia to nitrate.

A steady flow of oxygenated water can be maintained by an air stream in the uplift attached to a filter plate. The capacity of the basic undergravel filter system is limited, but can be enhanced by use of power-heads or by circulating water systems with central filtration.

Feeding

The subject of feeding is of considerable importance and needs to be considered from two angles, the **quantity** fed and the feeding regime; and the **quality** of the food. The ideal level of feeding is generally accepted to be one in which the fish is slightly hungry and ready to forage actively for food, most, if not all of the time. Lively active ▶

Sintered glass

An ingenious combination of aerobic and anaerobic filtration is achieved by use of sintered glass. In this material very narrow fissures are present. When placed in water, the part of the fissure near the glass surface is aerobic while that which is more deep-seated becomes progressively more anaerobic.

The nitrogenous materials which have been oxidized aerobically to nitrate are then reduced anaerobically to nitrogen.

Penetration to the anaerobic areas is by diffusion, a slow process. However the surface area produced as a result of sintering glass produces very effective denitrification in practice. The use of such media usually requires an external filter.

Their use should minimise water use to making good losses through evaporation. Theoretically at least, water changes would be unnecessary. In practice they should be very infrequent.

fish, well but not overfed contrast strongly in their deportment with both overfed, fat and sluggish fish and emaciated starved fish.

The optimum feeding method is a system which supplies a constant trickle of food over the day, which would keep fish active in the search for food for most of the day, every day.

This is clearly not practicable for many to follow, and the next best thing is to feed two or three times a day.

In many circumstances feeding once a day is all that is possible. The important thing is not to overfeed, as this invariably leads to unconsumed food accumulating on the bottom, decomposing and reducing water quality. This is one of the most important sources of water quality problems.

Fish which are overfed may lay down deposits of fat in their bodies and become lethargic and unattractive.

Young growing fish need a high quality diet, not only should the protein content be high (around 40%) but it should be of good quality and be readily digestible. There should also be an adequate content of vitamins and minerals.

These needs are admirably met by feeding *Daphnia* and other live foods. Where such foods are not available, dried foods can be used. These will maintain growth but at slower rates than with live food.

The problems that can arise with dried foods, apart from the problems arising from any not consumed, is that the proteins may be appreciably less digestible than those from live foods – and that the vitamin content reduces with time. They have a very definite shelf life.

A Pearlscale from Star Fisheries, Surbiton, Surrey. Tel: 081 449 8962

High protein foods are also needed in conditioning for spawning, especially for hen fish, and after spawning to restore condition. Eggs are laid down in the autumn and a good digestible protein-rich diet, such as earthworms, should be fed at this time in order to encourage early spawning. A protein-rich diet prior to spawning for cock fish is also desirable to promote virility and success of spawning.

At other times a lower protein diet (30-35%) is desirable because protein surplus to the dietary needs can put the kidneys under strain, and in the process produce more ammonia which is also undesirable.

Healthy goldfish

The most effective means of maintaining healthy stock is by maintaining healthy water.

The greatest single source of risk in introducing parasites and diseases is the introduction of unquarantined stock. Parasites such as the protozoans producing whitespot and kindred ills, and gill and other flukes, can unknowingly be introduced very easily with new unquarantined stock.

Over recent years considerable concern has been expressed over the introduction of new diseases caused by bacteria and viruses in particular. Some fungi, bacteria and viruses are likely to be present in most ponds and aquaria; but that these do not cause problems until fish are injured or weakened in some way.

If this should happen use a commercial tonic. Don't rush to use medications before the nature of the problem is clear. It has been said, with some truth, that more fish are killed by cures than diseases.

This is because many compounds used in treating diseases have an adverse effect on the gills from which they never recover. It is perhaps ironic that the fish may die cured!

Constant care and vigilance is necessary to make sure that all is well with the fish and their environment. The warning signs of things beginning to go awry, a sudden change in the appearance of the water or in the behaviour of individual fish, particularly with regard to feeding, are important.

Suspect fish can be isolated and kept under observation for development of symptoms. Where these can be related definitely to known diseases then appropriate remedies can be used. There are times when conditions develop which cannot readily be related to known disease conditions. The question then is to decide on the basis of observation whether further action is appropriate.

If the fish gets worse, then action appropriate to the causative agent suspected is appropriate, be it fungus, bacteria, fluke, protozoan, crustacean etc.

Sometimes conditions develop which appear to be relatively benign, the fish continue to feed well are active and seem happy. In such cases no further action is necessary. ■

■ In this article an attempt has been made to extract some guiding principles which underline good goldfish keeping.

The appeal of the goldfish world-wide has been maintained because it is so beautiful, so hardy, and with a very little care, so rewarding to keep.

A red and black Oran... Pic. Max Gibbs, The Goldfish Bowl, Oxfor...

Coldwater Answers

Too many fish?

We have an large indoor coldwater tank measuring 48" x 42" x 24". It has both internal and external power filters and a UV unit. In the tank we have two Channel cats (22" and 9"), 9 Koi (from 22" down to 10"), plus two Shubunkin and Rudd (7").

We have had problems with nitrates and so we removed some of the fish (36" in all), leaving a total of 131" of fish still in the tank.

All the fish seem happy, but how many do you think a tank that size ought to hold?

J. Dimmick, Freshwater, I.O.W.

I am not surprised you are experiencing high nitrate levels. Even after 36" of fish were removed, your aquarium is still grossly overstocked.

Working on the coldwater calculation of 1" of fish to every 24" of surface area, your aquarium would support, excluding tail, 83" of fish. This means that if the calculations you give exclude the tail, another 48" of fish should be removed to bring the stocking level down to a manageable size.

There is one other point that you should take into consideration and that is, the Channel cats are going to require a very large aquarium of their own later on - they can grow to 120cm. **PD**

A combination of Grolux and warm white tubes show goldfish off to best effect. Pic. By Max Gibbs, The Goldfish Bowl, Oxford.

What's the best set-up for Goldfish?

Q I have recently been given a fish tank which is 24" x 12" x 18". Please could you give me some information to help me set up the tank for coldwater fish, such as filtration, lighting, decor and stocking?

●A. Howarth, Sheffield

A The type and amount of equipment required for a coldwater aquarium will depend very much on how complex you wish the system to be and how much you wish to spend.

A basic system could include just the tank, hood, condensation tray, gravel, plastic plants and any other decor you wish. A more complex system would consist of all this plus fluorescent lighting, internal filter - either electrical or air-powered, and living plants.

Where goldfish are kept in the latter system, lighting is best provided by a combination of Grolux and warm white tubes as this will bring out the colours of the fish. If you use living plants, however, you will need to replace the warm white tube with either Triton or Aquaglo.

As for filtration, any of the small internal power filters such as the Rena Filty will suffice, or alternatively use one of the foam filters such as the Algarde Biofoam or a small box filter.

Because goldfish will eat new plant growth, use fast-growing varieties, such as *Elodea canadensis*, *Ludwigia* and *Vallisneria*. A further practice of goldfish is their digging habits, which will soon uproot plants. Therefore, if possible, encircle the base of the plants with large rocks.

If you do not wish to keep just goldfish and want something more "exotic", try Weather Loach, Bitterling, White Cloud Mountain Minnows, Paradise fish or Sunfish.

Stocking levels are 1" of fish (excluding tail) to 24" surface area. **PD**

Starting with sunfish

Q I would like to keep Pumpkinseed fish. Please could you give me some information on them? How big do they grow and what are their requirements?

I have a 36" x 12" x 15" tank with an undergravel filter.

●G. Billington, Herts.

Pumpkinseeds grow to around 7", so they require a fairly large tank - three foot minimum. Pic. by Max Gibbs, The Goldfish Bowl, Oxford

A The Pumpkinseed, *Lepomis gibbosus*, is a Sunfish from the *Centrarchidae* family. It comes from North America.

It can reach a length of up to 7" and prefers temperatures of between 50-70°F. Provide plenty of plants in your tank. They won't be dug up if you allow them to become established before you add the fish and scatter the gravel around them with pebbles or small stones.

Feed on the usual aquarium foods with the occasional offering of live food in between.

Breeding is possible in the aquarium with the male digging a pit and guarding the eggs.

If you do not wish to keep just goldfish and want something more "exotic", try Weather Loach, Bitterling, White Cloud Mountain Minnows, Paradise fish or Sunfish.

Stocking levels are 1" of fish (excluding tail) to 24" surface area. **PD**

Sucking catfish

Q I have a coldwater aquarium stocked with a 4" Comet, a 2" Lionhead, a Golden Rudd, a small goldfish and a 2" Plec. I know that the Plec is a tropical fish but it is tolerant to the 26-27°C temperature of my tank.

My concern is that the Plec sometimes chases the Comet and the Lionhead and attempts to suck onto their sides. This doesn't appear to causing them any harm, but is it natural behaviour?
•I. D. Thomas, Kent

A Some of these sucking type catfish have this habit of trying to attach themselves onto the sides of other fish. I have a large *Gyrinocheilus aymonieri* which does exactly the same thing. Generally, if no harm is being done then all well and good. However, if the fish begin to suffer damage to the scales, which could result in an outbreak of fungus, I would advise you to remove the Plec.

Although some of these fish are persistent in this action, in my experience many grow out of it as they mature. **PD**

Outdoor aquariums

Q My garden is too small for a pond to keep fish which could easily be seen. I propose to build two large aquariums, one 12' x 3' x 6' and the other 8' x 3' x 6' - are these feasible? I would prefer to have a concrete base, sides and back to these tanks, but wonder how to seal the front viewing glass.
•F. A. Sell, Hull

A Obviously an outdoor aquarium needs to be as large as possible, simply because management of large volumes of water is easier than small amounts. Concrete is a good choice, but make sure it is fully cured to avoid chemicals leaching into the water and seal it with a polyester solid for ponds.

Fix the glass internally by overlapping the concrete surrounds, with a liberal ribbon of silicone sealer (aquarium quality) and make waterproof by smearing the silicone around all the internal joints.

Winter will be a problem because the whole body of water will cool (a pond has its base temperature protected by the earth) so a heater is needed when freezing temperatures are expected. You do not need a thermostat, so a pond or even a brewer's immersible heater is all right, connected to the mains with outdoor quality cable and plugs - via a circuit breaker for safety.

Algae is your other problem. With outdoor daylight or sunlight it will soon take over. You could try blocking all daylight except when viewing or have a trickle feed from the mains tap so that it flushes continuously or just use lots of elbow grease. Fish? Goldfish, small Koi, Bitterling, Orfe and so on. Or British fish such as Rudd, Roach and Minnows. **DF**

Fancy goldfish seem to be particularly prone to swimbladder disease

Floating fish

Q I have a 42 gallon coldwater set-up containing a Moor, common goldfish, Redcap, Ryukin, Bitterling and three Orandas.

The tank has an undergravel filter and an internal filter and has been running problem-free for about four months.

Recently, one of the Orandas started to spend long spells at the water surface. It seemed to be unable to stay underwater without bobbing back to the top. This continued until the other day, when the fish ended up floating on its back and appeared to be close to death, although it recovered. A similar thing has also happened to a smaller Oranda, but not so severely. What is causing this?
•L. Hinchcliffe, Sheffield

A The buoyancy problem your fish are suffering from is called "swimbladder" disease. This is where the bladder which controls the fish's position in the water inflates and then cannot deflate. The result, because the gas is lighter than water, is that the fish floats - often in obscure positions.

It is thought to have something to do with sudden changes in water temperature, microbial infection, or the diffusion of gas into and out of the blood stream. Generally there are three courses of action which could be taken:

1. Isolate the fish and use an antibacterial treatment.
2. Add aquarium salt to the isolation tank at the rate of 1gm/l.
3. Place the fish in an aquarium with just enough depth of water for it to swim in and increase the temperature to 5-6°C above what you would normally keep it at.

Should none of these treatments work and the fish shows signs of distress, it is probably kinder to painlessly destroy it. **PD**

Need advice on overwintering your pond? Call 0336 404049

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■ Koi and pond enquiries go to NICK FLETCHER or BERNICE BREWSTER.

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