PRACTICAL Fishkeeping

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PRACTICAL Fishkeeping

BRITAIN'S No.1 MAGAZINE FOR ALL FISHKEEPERS

Above: Croaking Gourami - see page 8
Below: Anemone Crab and host anemone - see page 88

ABOUT PFK

WHERE TO FIND

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

Choosing Koi - see page 116

● *Cover shows a Pearl Cichlid Geophagus brasiliensis. Pic by Max Gibbs, The Goldfish Bowl, Oxford.*

AT 41,548 (ABC) BRITAIN'S BEST SELLING FISHKEEPING MAGAZINE

MICHAEL ROBSON devotes a tank to Amazonian catfish.

Catfish Community

Otocinclus vestitus, the Dwarf Sucking Catfish, is one of the smallest sucking catfish. *All pics: Max Gibbs, The Goldfish Bowl, Oxford.*

A while back, I wrote about my experience of keeping some of the newer catfish on the market.

The majority of these new catfish have come from the Amazon, which probably has the most diverse population of fish anywhere in the world. From here you can find fish to suit all sorts of personal taste, from the tiny *Otocinclus vestitus* up to the mighty Red-Tail, *Phractocephalus hemioliopterus*. The majority of these catfish are relatively easy to keep and can be accommodated in a modest community aquarium with the minimum of fuss.

I read in an old *Practical Fishkeeping* an article on setting up a South American general community, this set me thinking and I decided to set up a South American Catfish community with a view to keeping some of the more readily-available, but hard to breed catfish and to provide them with the optimum conditions and numbers to hopefully have some breeding success.

Main picture: Peckoltia vermiculata – not the most territorial of catfish.
Above: Corydoras haraldschultzi – a good catfish for the general community or the catfish community.

A siderial Peckoltia vittata.

Case study - territorial Peckoltia

There is no serious violence within the tank. I have other varieties of Peckoltia (P. vermiculata and P.vittata) and they are in two groups of four and do not show each other a great deal of serious violence, just a little posing and posturing when their territory is encroached.

I had hoped that this would also be the case with the Emperor Peckoltia because as funds permitted I hoped to build up the numbers from two to four.

The original two Peckoltia had their own territories and hardly ventured into each other's. I kept a careful watch on them when the stock was built up. I decided to spend three nights watching the Peckoltias when they would be at their most active to gauge the aggression that - during the day - I did not see.

I was told by the retailer that he had lost a number of Emperors due to aggression in the confines of a small tank in his store. But this is easily understood, as in cramped conditions the fish's territories would drastically overlap and one fish wouldn't be able to move without encroaching upon another's territory.

He solved this problem by dispersing the fish in smaller groups when it became apparent he needed to do so.

There does not seem to be this intense aggression in my aquarium, obviously the size of the tank does give quite a lot of room for manoeuvre, but as I said earlier, as I add more Emperors, a close watch will have to be kept on them.

It could be that when introducing the other Emperors I will have to move the tank decoration around in order that the established Emperors would lose the boundaries of their territories.

The set-up

A 48" x 15" x 12" aquarium was to be home for these fish. The filtration was to be undergravel with an Eheim Powerhead at one end to provide a river-like current along the aquarium. Obviously the substrate was gravel and lime-free gravel because of the acidic conditions preferred by Amazonian fish.

The rest of the equipment added (just a heater/thermostat and airpump connected) the tank was then filled with water and left to stand.

While the tank was being prepared and the water standing, six large pieces of bogwood were being soaked in a dustbin to allow the tannic acid to leach out of the wood to a limited extent, as I intended that the wood would still leach out the acid and brown coloration into the aquarium water providing the fish with darkened water to swim around in.

The wood was added to the aquarium and a few strategically-placed plastic plants were added with a few well-rounded, safe, large pebbles. The

temperature was set at 84°F (29°C). A check was done on the pH and a proprietary acid buffer was added to bring it down to 6.5. Softening resin was added in a box filter to bring down the hardness to 8° DGH.

At either end of the aquarium I placed two terracotta dishes to contain the fish's food. I intended to feed a certain amount of high protein food and the dishes stopped the uneaten food settling in the gravel. The tank was left for a further two weeks, during which regular checks were made on the quality of the water.

The fish

The stocking level would be built up over the weeks. First of all, a few small tetras were added to help the *maturing process* (these were later removed).

The first catfish added were some Corydoras – a trio of *C. sterbai*, a trio of *C. haraldschultzi* and three *C. adolfoi*.

A week later I transferred an Emperor Peckoltia (which I have had over a year) and added a new Emperor Peckoltia which was purchased from Wholesale Tropicals of Bethnal Green.

With two in the same aquarium, a careful eye was kept on them to make sure there was no over-aggressiveness on either part, but they appeared to be alright with each other. Both had their different territories within the aquarium.

A further two weeks later eight *Pimelodus pictus* were purchased and placed in the tank. They were just over two inches each in size. A further week later and four Bumble Bee Catfish, *Microglanis iheringi*, were added. All the fish settled down. *The P. pictus* were very active and could be seen at all times of the day, the Bumble Bees were a lot more secretive and only ventured out to grab some quick grub and late at night. The tank was not illuminated at all.

Pimelodus pictus look best in a shoal. Below: *Microglanis iheringi* – Barrigudo Bee Catfish.

The tank looked rather one-level, with most of the activity being on the substrate so I added six Silver Hatchets and six Spotted Headstanders, *Chilodus punctatus*. I still wanted to add some more catfish and would have liked some of the Driftwood Cats, Tatia, or *Auchenipteridichthys*, but could not find any, so I purchased four Whiptails, *Rhineloricaria sp.* and placed them in.

If I come across any of the aforementioned fish I shall purchase a trio and add them.

At this point I would like to stress that the tank was overstocked but the number of water changes I made helped avoid any problems. A little water (3 gallons) was syphoned off every day, and a larger amount every two weeks, using a gravel vacuum to stir up the gravel and remove the rubbish gathered therein.

The fish were fed three times daily with soaked flake, JMC Catfish Pellets, soaked, crushed Tetra Doromin, Waterlife Catfish Tablets, shredded shrimp, cucumber and scalded lettuce. The cucumber and lettuce were left in overnight for the Peckoltias and the Whiptails.

All is going rather well. The Pims dashed around all parts of the aquarium having brief but energetic skirmishes when they met each other, but no actual physical damage was suffered from these skirmishes.

All the fish have put on weight, the Pictus especially have grown about half-an-inch. The Bumble Bees can be seen at feeding time, dashing from their hidey-hole, grabbing a tasty morsel and then shooting back.

I said that I hope to breed the fish in this tank, but at the moment there does not appear to be any indication of willingness to breed on the part of any of the fish. It's early days yet and if it does happen I will up-date you with the information. ■

PRACTICAL
Fishkeeping
COMPETITION

WIN A SET OF LIMITED EDITION GOLDFISH PRINTS

Australian goldfish artist Merlin Cunliffe has offered three sets of his superb limited edition goldfish prints including Redcap Oranda, Bristol Shubunkin, Blackmoor, and Ranchu for this write-in competition. The sets are worth $Aus 56 or around £25 each. Each one is numbered and signed by the artist.

THE RULES

To win one of the three sets of prints, look at Merlin's anatomical drawing of a goldfish below. Five of the annotations have been removed.

Write the correct name for that part of the fish beside the relevant number on the form - we've filled in the first one to help you - and add your name and address.

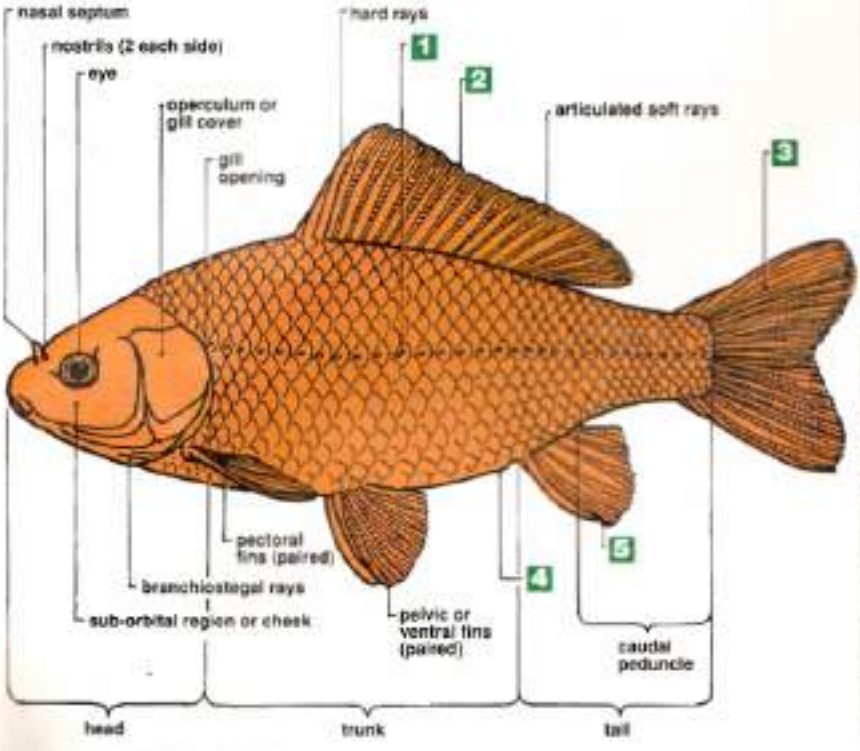
All the entries will go into a hat and the the first three correct entries drawn will win a set of four prints each.

•Address for entries is Goldfish Contest, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ. The closing date for entries is Monday September 14.

■ Merlin Cunliffe welcomes trade and private enquiries about these pictures.

The limited edition goldfish prints can be sought from him at $Aus 50 for surface mail and $Aus 56 by economy airmail.

Payment by Bank Draft or International Money Order, to: **Cunliffe and Goldfish, Wills Rd., Dixon's Crook, Victoria 3775, Australia. Tel: (059) 65 2236**



ENTRY FORM

The missing annotations are:

1 Lateral line

2 .....

3 .....

4 .....

5 .....

Name: .....

Address: .....

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Would you be willing to receive details of any further promotions? YES/NO

Let your fish croak

ANDREW SMITH our Anabantoid expert finds bright colours pale into insignificance when your fish can talk to each other....

The Croaking Gourami could be accused of being rather a colourless drab specimen. But it makes up for its lack of colour with interest value for the fishkeeper on the lookout for something different.

Three species

There are three species in the genus of Trichopsis known as Croaking Gouramis. They are *T. vittatus*, *T. schalleri* and *T. pumilus*, and all are bubble nesters and have the strange vocal characteristics that will be described later. Of the three, *T. vittatus* is the largest and the most readily available to the hobbyist, and best suited to the community tank.

A criticism levelled at these fish is that they are not too attractive - but I feel an active male and female pair in the well-planted tank under optimum light have their own beauty.

Aquarium Care

The Croaking Gourami is an undemanding fish and will tolerate quite poor water conditions as long as the pH and hardness don't reach extremes.

Keep just one male in a small tank as territorial disputes will otherwise occur. In larger tanks the fish will establish their own territories, and little more than the odd display will be seen. The famed croaking is more likely to be heard in such tanks, as it's at its most audible when males meet and display as a threat to other intruding males - or during the mating season as the male pursues the female.

Females also croak but with a slightly softer tone.

The Croak

The Croaking Gourami's noise is produced by the musculature of the pectoral fins passing over other parts of the fish's skeleton - and is audible because the labyrinth organ acts as a kind of sound chamber. The croak is produced by rapid fanning of the pectoral fins - a typical action when two male fish meet or during the mating period.

The sound itself is difficult to describe - some call it a grunt or a rattle, but however you describe it, once heard the noise is unforgetable.

Spawning

Once a pair are in good condition, they will probably begin to go through the spawning ritual even in the community tank.

At this stage the males will show the same aggressive tendencies that go with most of the bubble-nesting anabantoids.

The area surrounding the nesting site, and eventually the eggs, and the resultant fry will be off-limits to other fish and even the female. (She compromises then by further guard duties on the area directly around the nesting site - keeping far enough away to avoid the male).

Breeding seems to be initiated by the female who approaches the male by swimming towards him with her dorsal and anal fins clamped to her body and her caudal fin swaying from side to side. She also displays her undersides to him.

Even if the male is not ready to spawn and chases him away, she swims in this fashion while being pursued, and returns to her chosen mate as soon as possible.

Once the two fish have accepted each other, a pseudo-spawning will take place where no eggs will be produced. The male now commences nest-building.

The Nest

The nest is constructed with the usual mucus-coated air bubbles that the male spits out singularly (other anabantoids may blow several bubbles simultaneously).

Plant pieces are not actively used in the construction of the nest, but they may be employed as an anchor, or in the case of broad leaf plants that reach the surface, as a site for the whole nest.

Once the nest is complete, the female once again approaches in the manner described, and the male curves his body around her. The embrace lasts for only a few seconds as the eggs are expelled immediately and fertilised by the male.

The eggs of this species are shed in a packet - that is several stuck together - and sink. The male does not let them drop far - he catches them as they literally shoot out of the female. The male busies himself with placing the eggs in the nest, and when this is complete, the ritual can begin again. A pair will produce up to 200 eggs (though there are reports of 500 or more).

The male directly guards the brood and the female may be tolerated in the area near the nest if in a large tank. If this is not possible she is best removed.

The Croaking Gourami Trichopsis vittatus
All pics: Max Ebbs
The Gourmi Blue Zebra

The fry hatch in around 30 hours and are like black slivers of wood as they hang tail down in the bubbles of the nest. Should one of the fry slip from the nest the male will catch it in his mouth and spit it back into the nest.

The fry free swim in three to four days and are able to take freshly-hatched brine shrimp as their first food. With regular partial water changes, and plenty of food, they will grow quite quickly and will need thinning out as many will grow at different rates and need more space. At 1" long they seem to relish larger live food and the odd treat of live tubifex goes down well.

Don't let the Croaking Gourami's dull appearance put you off - they are an ideal community fish and often overlooked. ■

Natural history

Found in: Indo-china, Malaysia, Thailand, Vietnam and Indonesia. Different varieties have been found in different areas.

Description: Due to the above, this can be difficult. But the base colour of this fish is light brown with two, three, or four darker brown longitudinal stripes on the flanks, though the number of these varies in different areas. The dorsal and anal fins of both male and female are a light burgundy to purple at the base, darkening at the outside, and they appear to be covered in small iridescent blue spots that are particularly striking under the right light. So is the eye which is bright blue too.

Sexing: The females are fairly easily defined from the males. They are often lighter in the belly area, and their ovaries are visible just under the swim bladder when viewed with a strong back light. When adult the males are larger as are their dorsal and anal fins in that they reach beyond the base of the tail whereas the fins of the female barely reach this point, or even stop short.

Chara-assas

Some fish are good company, and some make good companions. Many of the tankbusters I keep enjoy good relationships with a variety of companion fish. But not the Tiger Fish, or Mud Characin, *Hoplias malabaricus*.

■ This is the most evil, obnoxious, bad tempered thug I have ever encountered. Snakehead and lungfish keepers, you ain't seen nothing yet.

■ Is it morbid fascination that holds your attention? Do I detect that narrowing of the eyes, a dark glimmer, a deep throated chuckle at the thought of this beast?

■ I recently saw this fish described as a predator but with a very shy nature. All I can say, with respect, is that the writer has not kept one.

You must have got the message by now, so let's get down to the details.

Native of the Amazon

The Tiger Fish originates from the Amazon, as do its distant cousins the Piranhas, and other

members of the Characin family (yes, that includes Neon Tetras).

It has been recorded at up to 50 cm in length, although 40 cm is more the norm, and this should be anticipated by potential purchasers of 10-15 cm specimens.

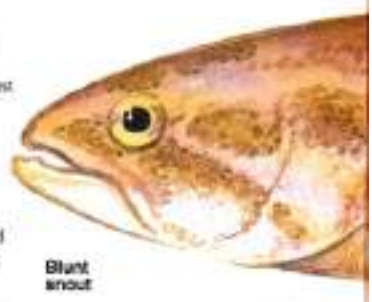
It also has an astonishing growth rate. My latest specimen has increased from 8cm in November 1991, to 30cm at the time of writing (mid-June).

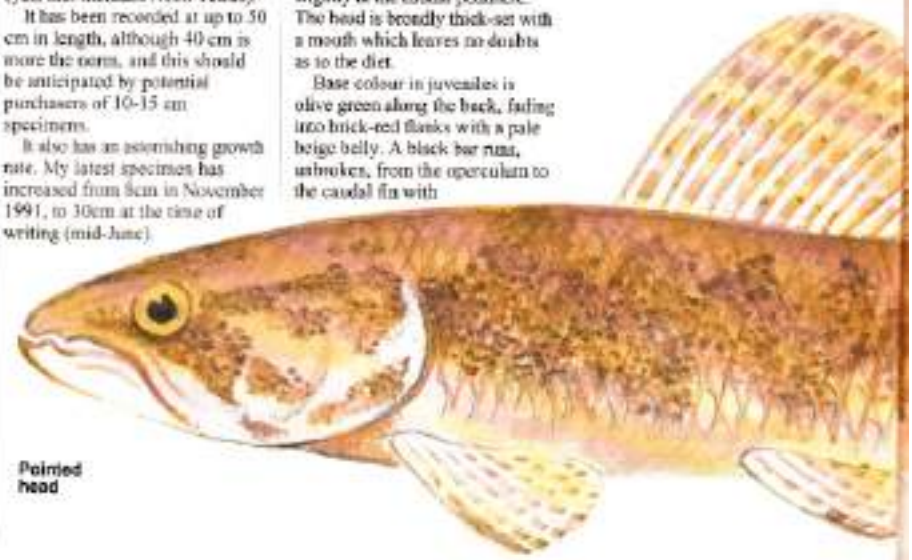
(The only competitor to this would be the snakeheads, but they have a potential size at least twice that of the *Hoplias*.)

Description of the beast

It could be described as looking like a cross between a snakehead and a goby, the body being long and cylindrical, tapering only slightly at the caudal peduncle. The head is broadly thick-set with a mouth which leaves no doubts as to the diet.

Base colour in juveniles is olive green along the back, fading into brick-red flanks with a pale beige belly. A black bar runs, unbroken, from the operculum to the caudal fin with





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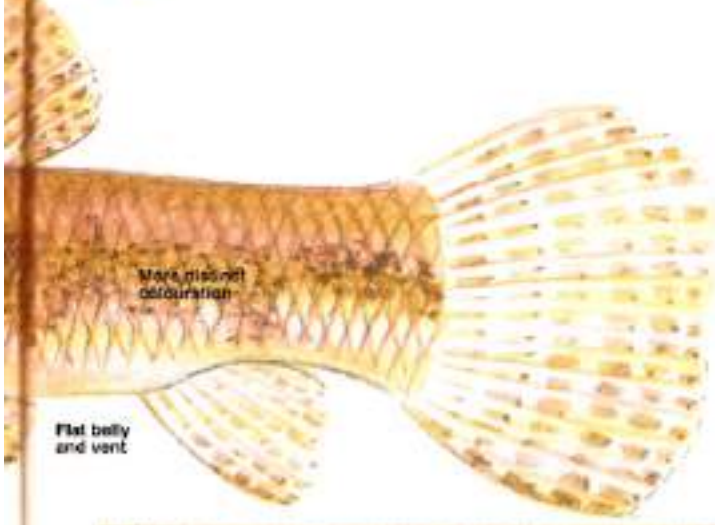
ANDY PARKES loves tankbusters - even an "obnoxious, bad-tempered thug".



Above: Female Hoplias malabaricus.

Left: Male Hoplias malabaricus.

Far left: Lurking in ambush.

Below left: The black bars on this fish are almost invisible.

Below right: The typical head-up posture is very goby-like.

black bars running at an angle from this, giving the impression of a chevron pointing towards the head. With age, these colours fade, the black becoming grey over a beige green background, but then returning at times of aggression and display, which are quite regular.

Tank care

If, despite all this, you still want one, accommodation should be your first concern, so we'll start with basics. A big tank should just about do, at a push, you'll get away with 48" x 15" x 12" (120 x 38 x 30cm), but you really need 60" x 18" x 15" (150 x 45 x 38cm) to be fair.

Water quality does not appear to be of great concern to these hardy fish, although an approximate simulation of Amazonian habitats does encourage them to exhibit better colouration.

I have successfully maintained them in hard water, with a pH of 7.8, but try to keep a neutral pH of 7.0, for best results.

Nitrite and nitrate are tolerated well, but this does not excuse sloppiness. I found out how well after a serious filter failure while away, but it did take a few days for the lethargic specimen to return to full health.

Temperature requirements are not too critical either, so long as they fall somewhere in the range of 20-28°C.

Lighting is only necessary for the viewer and the plants, so select ▶

the dimmest that will suffice.

Interior decoration also falls into my 'acceptable inhabitant' category. Being a predator, the Tiger Fish requires secluded hiding places. I use Curiowood, and a dense growth of giant Vallis along the background.

Any tall plant will do – whatever you prefer.

For filtration, I now combine undergravel with external unit, as with all heavy feeders, you need to turn over the capacity of the tank at least three times an hour.

I do not use only one type of filter, particularly undergravel, as this kind of flow-rate leads to problems with all the waste being drawn to the bottom where, inevitably, it finds its way into the nooks and crannies that a gravel cleaner just cannot reach.

The final requirement is for oxygen as Tiger Fish are not air-breathers. Oxygen is absorbed into the water by surface movement, where a gaseous exchange takes place releasing carbon dioxide and absorbing oxygen.

Movement can be created, in silence, by power filters of any description but, to be fair, an air pump will also lead to this exchange, if with a degree of noise. Which you choose, an air pump or alternative means, is a matter of personal choice.

Limited choice of companions

With the disposition of these fish, choice of companions is very limited. When my female was 15cm long, I lost a 10cm Siamese Tiger Fish (*Datnoides microlepis*). At just under 30cm, I lost a 12cm African Snakehead (*Channa striata*), and a 10cm Australian Gudgeon (*Mogurnda mogurnda*).

Don't be fooled into thinking that familiarity will lead to acceptance – it does not work like that.

Surviving companions have been a 40cm lungfish, two 30 cm gars and a couple of piecos.

This is NOT a fish I would encourage to feed from the hand – even a magnetic algae scraper gets mercilessly attacked.

Left: Do you know where a Bowfin can be found? Andy wants to know.

Above: Savage dentition – the mouth of the Hoplias

Feeding

Once installed, your Tiger Fish will clearly need to be fed. As can be surmised, this presents few, if any, problems. The natural diet ranges from small insects and crustaceans to large fish, amphibians, small rodents or anything that looks feasibly edible.

A Tiger Fish will lurk, at a head-up angle, among vegetation and roots, blending almost invisibly into the background. With the passing of a potential meal, the fish lunges forward with its mouth wide, either swallowing in one go or clinging to a larger item which, once grasped, stands little or no chance.

This is not for us fishkeepers, so it is fortunate that no persuasion is required to adapt to my typical menu, of beefheart, lancefish, mussels, feeder shrimps, worms and just about any other meat-based food. Occasionally, mine will take pellets, but I think this is purely out of annoyance that the bottom dwellers are getting something.

In addition to these foods, I have recently been feeding frozen mice, which are available from shops which supply reptiles.

Meals should be provided every other day, and with great care – Tiger Fish will gorge themselves to the point where they are unable to move, even regurgitating some to enable more successful breathing.

Breeding would need space

Sexual differences are not too complicated, for a change. The male's belly and vent area are almost flat when viewed from the side, as opposed to a rounded appearance in the female. Colour intensity is also more pronounced in the male, but this becomes insignificant as both mature.

The breeding behaviour is not too dissimilar to that of the Bowfin (*Amia calva*). The male entices a female to a suitable area in open water, where he builds a 'nest' in the substrate.

Spawning then takes place above this nest, the female clasping her anal fin around her vent and the male's genital papilla, releasing some eggs which, within the fin, are virtually ensured fertilisation.

The adhesive eggs are then released to rest in the nest and spawning continues for up to two weeks. During this period, as many as three thousand eggs may be deposited, covering an area two metres across. That's going to need one large aquarium!

The male then guards the nest (the female taking no further interest), until, after four or five days, they hatch.

The fry drift with the current to the relative safety of plant growths. Growth is rapid, on a diet of tiny larvae, worms, and relatives.

If you're still interested, don't forget to place your order with a good dealer, and I wish you good luck in preserving your fingers. ■

As always, feel free to contact about these fish or any other tankbusters, via PFK. If you know the whereabouts of a Bowfin, mentioned above, or have one and would like to share experiences please get in touch. I last had one some five years ago, and haven't been able to get hold of one since.

PRACTICAL Fishkeeping COMPETITION

WIN A SYSTEMISED TANK FROM SEABRAY

This month's competition prize is a 48" systemised tank and cabinet in your choice of polished wood finishes. All the equipment is concealed so all you see is your fish - which should look great in the water conditions provided by the built-in filtration system.

Mechanical, chemical and biological filtration are all taken care of, including trickle filtration and protein skimming, giving ideal conditions for marine or freshwater fish.

The filter system is powered by an Eheim power filter for mechanical filtration, surface turbulence and supplying the trickle filter.

Trickle filtration ensure that filter bacteria are well supplied with vital oxygen, allowing them to break down the fish' wastes efficiently.

Even topping up to replace the water lost by evaporation is taken care of automatically. Top-up water is supplied by a special chamber, which only needs refilling approximately every ten days. This will keep the S.G. steady in a marine set-up.

Seabray Dolphin systemised aquaria combine proven fishkeeping techniques with quality equipment and materials to achieve maximum results with minimum attention.

■ If you have difficulty in locating a stockist of Seabray systemised aquaria contact:

Seabray Aquariums,
Swinbourne Road,
Burnt Mills,
Basildon,
Essex,
SS13 1EF.
Phone: 0268 59 0457

THE RULES

■ This month's competition begins on *August 14* and to enter all you have to do is study the three questions below.

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

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

■ If you answer all three questions correctly, you will be asked to leave your name and address. Please state which wood finish you would prefer, and whether you would be willing to receive details of any further promotions.

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

■ The names and addresses of all the correct entrants will go into a draw after the closing date, which is September 13. The first name drawn will win the tank.

QUESTIONS

1. What kind of fish are Seabray systemised tanks ideal for?
   a) Marines
   b) Freshwater
   c) Marines and freshwater

2. What is the advantage of trickle filtration?
   a) Efficient bacterial action
   b) Slow flow rate
   c) Removal of dissolved metals

3. How often do you need to top up the water level in a Seabray system?
   a) Every day
   b) Every ten days
   c) Never

• DIAL 0891 600 067 •

This C. heterastrum male (in non breeding dress) will spawn on a vertical surface

Large male 'Midas cichlid' - C. citrinellum

C. nicaraguense locking - male left, one prelude to mating

C. melanurum - a close relative of C. synspilum but a definite different species - seeks the sanctuary of his piece of pipe

JEFF CHALLANDS, MARTIN CHANDLER and PHILIP ROBINSON continue their series in the first of two articles on breeding Central American Cichlids.

A WORLD OF CICHLIDS WITH PRACTICAL FISHKEEPING

A spectacular male C. synspilum, one fish often imported from the wild

A Guide to Breeding of Central American Cichlids

Our ultimate aim in keeping fish is to one day breed them. No matter the species involved, from the humble Guppy to the most sophisticated species, someone, somewhere will try to breed them.

Cichlid keepers are no different in that they want to breed their fish - or they hope their fish will breed for them.

Spawning strategies

While all cichlids are egg layers, their methods of reproduction and brood care are as varied as the fish themselves.

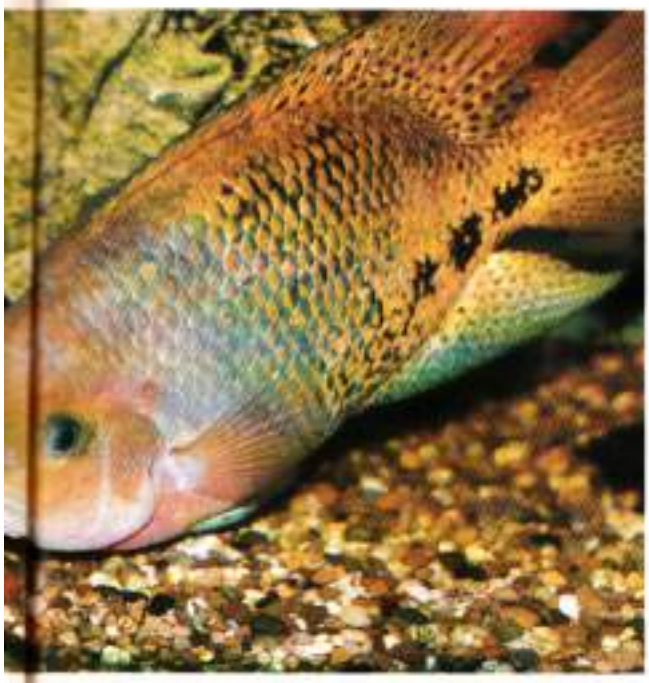
There are two basic methods of breeding among cichlids - mouthbrooding and substrate spawning. The same applies to the care of the young, but it would take an article on this subject alone to cover all the variations on these themes.

Central American Cichlids of the 'genus' *Cichlasoma* are all substrate spawners, - they deposit their eggs on a site, which can consist of anything they consider suitable. It may be rocks or caves, bogwood, the tank's side or base, undergravel filter plates or gravel tidy (once they have dug the gravel up), even an uplift tube or heaterstat. They will even lay their eggs on the gravel if nothing else is suitable.

We have often supplied rocks or slate, only to find the eggs laid on the side of the tank.

Pair selection

It is often thought that *Cichlasoma* pair for life, and in the home aquarium, this may appear to be so. Often a pair forms from a group, and are the only two specimens that are then kept. If they are used for breeding, a pair bond appears to have formed.



...to the Cichlids ...tral America

In nature these fish only come together to reproduce, and stay together for as long as is necessary to raise young. For the rest of the time they live in a group, or as individuals, depending on the species.

There are two ways the fishkeeper can obtain a pair. The best is to obtain juveniles from a number of sources, rear them together and let nature take its course. You will know when a pair has formed from the group as the dominant male will lay claim to an area of the tank and display to any female that is ready to spawn. The other fish will be chased away and, in a small tank, could end up being killed.

The second method is to buy a pair that have already bred. This may appear to be easier, but it is not always wisest, especially for the novice who has never kept large cichlids before. The authors usually use the first method.

By getting juveniles (or sub-adults) from a variety of sources, you reduce the chances of inbreeding related specimens, ie; brother and sister. If the fish are obtained from the same area the chances are that they all came from the same parents. If they are allowed to inbreed even further this can eventually spoil the species.

The authors endeavour to obtain specimens from as varied sources as possible.

Above- Small amounts of algae should be left on the rocks and glass on which the fry can graze.
Above right: Female C. citrinellum yawning

Some species, usually the larger, more aggressive ones, are only to be found in very small numbers. To ensure that the breeding of such fish is continued we will try to obtain new specimens whenever possible. These are bred with the original stock, or its offspring. All of the authors regularly exchange the young with each other, and with other breeders of the same species. This, again, ensures that the pool of breeding stock is continually improved with the introduction of non-related bloodlines.

Wild stock

Without doubt wild-caught fish are the best for breeding and there are now some very good specimens about. For many years we rarely saw any wild-caught *Cichlasoma*, but this is no longer the case. Two of the best-known large Cichlids that have been imported from the wild are *Cichlasoma* (*Amphilophus*) *labiatum* and *Cichlasoma* (*Theraps*) *synspilum*.

If your dealer is prepared to get you wild stock, we advise you to invest in them. You may have to pay more, but the end results will be well worth the cost.

Keep a close eye on wild fish, as they tend to be more aggressive than their tank-bred counterparts. Also wild fish can carry diseases and should be quarantined before you introduce them to your community tank.

Wild fish also tend to mature later than tank-bred ones. Wild specimens should also be bred with domesticated stock to introduce new bloodlines.

Buying adults and pairs

While we recommended obtaining a pair from a group of juveniles it is possible to introduce sexed adults to each other if these are the only fish available. This is not recommended for the beginner, as introducing mature fish to each other can, and usually does, end in disaster.

Be very careful if offered fish as a "pair" unless you have actually seen them breed and raise young, or you personally know the seller. Pairs offered for sale could even be the same sex - two females will go through the egg-laying ritual. The pair might also be bad parents and continually eat the eggs.

The breeding tank

The breeding tank should be at least 48" x 15" x 12" if you are using standard sizes. A 36" x 18" x 18" or 36" x 24" x 24" would be adequate but these are not so readily available. The larger the tank the better when you take into account the potential size of the brood - one thousand babies are regularly seen with a large pair of *managuense*.

Decoration of the aquarium should be as simple as possible, and leave plenty of free-swimming space so that the fish can display and move around without having to dodge large objects.

These cichlids have one common feature - they all love to dig. There should be at least one inch of gravel on the base of the tank, or if undergravel filters are employed, this should be a lot deeper and a gravel tidy used, as discussed in August's *PFK*.

Leaving the tank bare of decoration, while possible, can have adverse effects on large fish that like to dig. In such a ▶

situation the male can take his frustrations out on his mate, as digging is part of the natural behaviour of the fish, and it makes them feel more secure. More often than not the gravel is piled up against the front glass of the tank as though the fish are trying to keep you from prying into their nest.

Protecting the female

At least one cave should be provided for the female to retire to if the male is getting overly aggressive in his courtship.

With the more aggressive species such as *labiatus* or *biocellatus* it may prove necessary to insert a clear divider into the tank, as the male can turn on the female for no apparent reason.

In fact, when a pair of any large Cichlids are in a tank of their own care should be taken to ensure that the male does not vent his anger on his mate, if he wants to breed and she is not quite ready.

Quite often when a pair have shown all the signs of wanting to breed in the community aquarium and they are then moved into a breeding tank, they suddenly seem to go off the idea. Their new home is strange to them, and the male will want to establish his territory, move the decor, and generally prepare the tank to his satisfaction. In the meantime the female can be considered an intruder and be treated as such.

Spawning sites

As these fish are mostly open spawners, it is pointless supplying numerous caves made of rockpiles as they may be moved during the fish's excavations. Large specimens are capable of moving large stones about in their quest to alter their surroundings. Lengths of plastic pipe are useful as a cave as they are light, and easy to move.

A selection of hard surfaces should be provided in the form of flat rocks or slate. These should be laid on the gravel to form a sound base which the fish cannot undermine.

If the fish prefer to lay the eggs on a vertical surface, like the side of the tank, you can provide a large upright surface. Whatever surfaces are provided, the fish often ignore them and spawn on the side of the tank. Once the eggs have hatched all surplus rockwork can be removed, to ensure that fry do not get trapped under it.

Even species from the same group do not necessarily have the same preferences, hence the need to initially supply a choice of breeding site until you can determine what type and angle of surface they prefer.

Generally *synspilus*, *maculicauda*, *hartwegi*, and *bifasciatum* prefer to spawn on a horizontal surface, while *guttulatum* and *festivum* prefer a

vertical surface, *intermedium* often uses both types of surface, while *ferrugineum* and *nicaraguense* prefer spawning in a cave.

Water quality

Water in the breeding tank needs to be in top condition. Good filtration is required, and a 25% weekly water change is very wise. If the tank contains a build up of waste there will be a high bacteria count and this can result in even fertile eggs becoming fungussed. A pH of around 7-7.5 and a temperature of 82-84°F should also be aimed for.

Conditioning diet

Cichlids will only breed when they are ready, totally satisfied with their surroundings, and also in the peak of condition. Once the pair has been installed in the breeding tank, they will begin to alter the decor to suit themselves.

While this is taking place they should be given plenty of nourishing food and a varied diet.

With the more predatory species, like *managuense*, include meat with the diet, - earthworms, cooked chicken, prawns, grated beef heart, or even minced fry from other spawnings. While most large Cichlids can be fed on any of these foods, some, like the *Theraps* species, should have a diet that includes vegetable matter such as scalded cabbage and lettuce, or cooked peas. Also feed the usual fish foods - pellets, large flake, live foods, etc.

Fish watching

Constant observation will give you an indication of what the fish are going to do. In the community tank you can observe the pecking order being established when sub-adults begin to assert themselves. Who is to be the 'boss', territorial disputes, the right to breed, and pair formation, can all be witnessed, and this can often prevent a disaster. The same applies in the breeding tank, and by watching the fish's behaviour you will learn to recognise what is about to take place.

If a male, for example, is constantly harassing his mate, keeping her in her cave or in a corner of the tank, often with serious damage being inflicted, this shows that he is ready to breed but she is not. Often the reverse applies where the female is displaying to the male, her ovipositor is fully extended, but he is not in the mood and chases her away.

Spawning

The pair's behaviour will give you a good indication when breeding is imminent. They begin displaying to each other by holding their fins erect and tail slapping, going from side to side. You can observe a marked difference in the colours and body patterns of the fish. In *Theraps* species the changes in

colours and body pattern distinction are very noticeable indeed, whereas in others, like *managuense*, which do not display much variation in colour, the male will go very dark, jet black even, with the Jaguar pattern becoming very distinct. The female's colour will be the reverse, very light with a mottled pattern.

Jaw locking, with the pair head to head, holding each other's mouth and swinging their tails from side to side, all forms part of the overall pre-spawning display ritual.

While this is going on (and it can last several days) the pair occasionally break off their courtship ritual and return to their chosen spawning site. This is cleaned of any debris. Quite often nothing can be seen by the fishkeeper, but if the fish are not satisfied they will carry on cleaning.

During the display the appearance of the breeding tubes will become evident - another indication that spawning is about to take place. As the female's flanks become swollen as she ripens, the ovipositor will become fully extended. Soon after this she will begin to make "dry" runs over the breeding site.

At this point the male's breeding tube will be fully extended, and while the female's is thick and stubby, the male's is thin and pointed.

Then the egg-laying will begin in earnest, with the female sliding across the site with her abdomen touching the surface and depositing eggs in a straight line as she proceeds. The male will immediately follow behind, fertilising the eggs. This can go on for two hours or more, until all the eggs have been laid.

Left: Female wild grey form *C. labiatum*.

Above left: Female festae with a brood of one month old fry.

Above right: Female *C. managuense* fans the two thousand plus eggs she has just laid.

Parental care

Generally, once the eggs have been laid, they are fanned and watched over, mostly by the female. She will occasionally mouth the clutch to remove any particles of debris, and any eggs that have fungussed because they are infertile will be removed. Fanning the eggs with her fins helps to circulate aerated water over the eggs and also waft away anything that may have settled on them.

In some species the male will also take an active part in egg care, in other the female will reject him and prevent him from attending to the eggs. If the female gets really aggressive towards her mate he should be removed, or a tank divider installed.

It is the male's prime function to patrol his territory against intruders. In the breeding tank there are none, so his function becomes obsolete. The pair should be observed, and if the male is being intimidated then his removal solves the problem.

It is seldom necessary to split a pair once the eggs have been laid. The eggs begin to hatch after two to four days, depending on the species. Once they start to hatch the emerging fry will be picked up in the parent's mouth and deposited into a pre-dug pit, or under the edge of a rock. At this stage the fry are totally helpless and they can been seen as a solid mass, quivering like a lump of jelly, and difficult to distinguish as fish at all.

During the next week or so, the young develop their finnage and other characteristics more fully, prior to their first attempts to swim. They can be observed flitting across the pit as they attempt to swim, with the parent picking them up and spitting them back into the quivering mass.

Feeding the fry

Once they do become free swimming you can begin to feed them. Although the yolk sac will still be evident, there will not be a great deal of nutritious value left in it, as this will have been used up while the fry were in the pit developing. Their first foods can consist of just about anything small enough to be eaten - newly-hatched brineshrimp *nauplii*, microworms, finely sifted daphnia, and powdered flake.

Feed little and often thus preventing a build up of uneaten food on the base of the tank. As the tank's filtration should have been turned down (or removed in the case of strong power filters) the base of the tank can be occasionally cleaned using airline to syphon out any mulm or other residue.

They fry can be left with the parents until they attain anything up to one inch in length, but it is often advisable to remove the parents long before this. Parental care is often carried out for many weeks with no harm coming to the young, but you occasionally get a pair that are very prolific and, in their need to spawn they will often eat their previous brood. ■

NEXT MONTH: Case studies of difficult pairs; culling; and the problems of in-breeding.

Home made fry food

As there may be in excess of 1000 mouths to feed, then it can prove difficult to keep up a constant supply of live foods and the authors have found that dried food is adequate as a first food. This can be made in large enough quantities for very little cost, using any of the commercial foods available. Flake or pellets can be ground down fine enough even for dwarf cichlids using a coffee grinder. For the fry of large cichlids the food need not be this fine and one method to produce a powder fine enough is described below.

Virtually any dried foods can be prepared in this way at very little cost and this has been found to be more than adequate to get the fry

1 Kit required:
- Rolling pin
- Fine tea strainer
- Plastic bag
- Good quality flake or pellets
- Tubs

2 Put several pellets or flakes into the bag, crush with the rolling pin on a hard surface

3 Funnel crushed food into the tea strainer and shake over a piece of paper

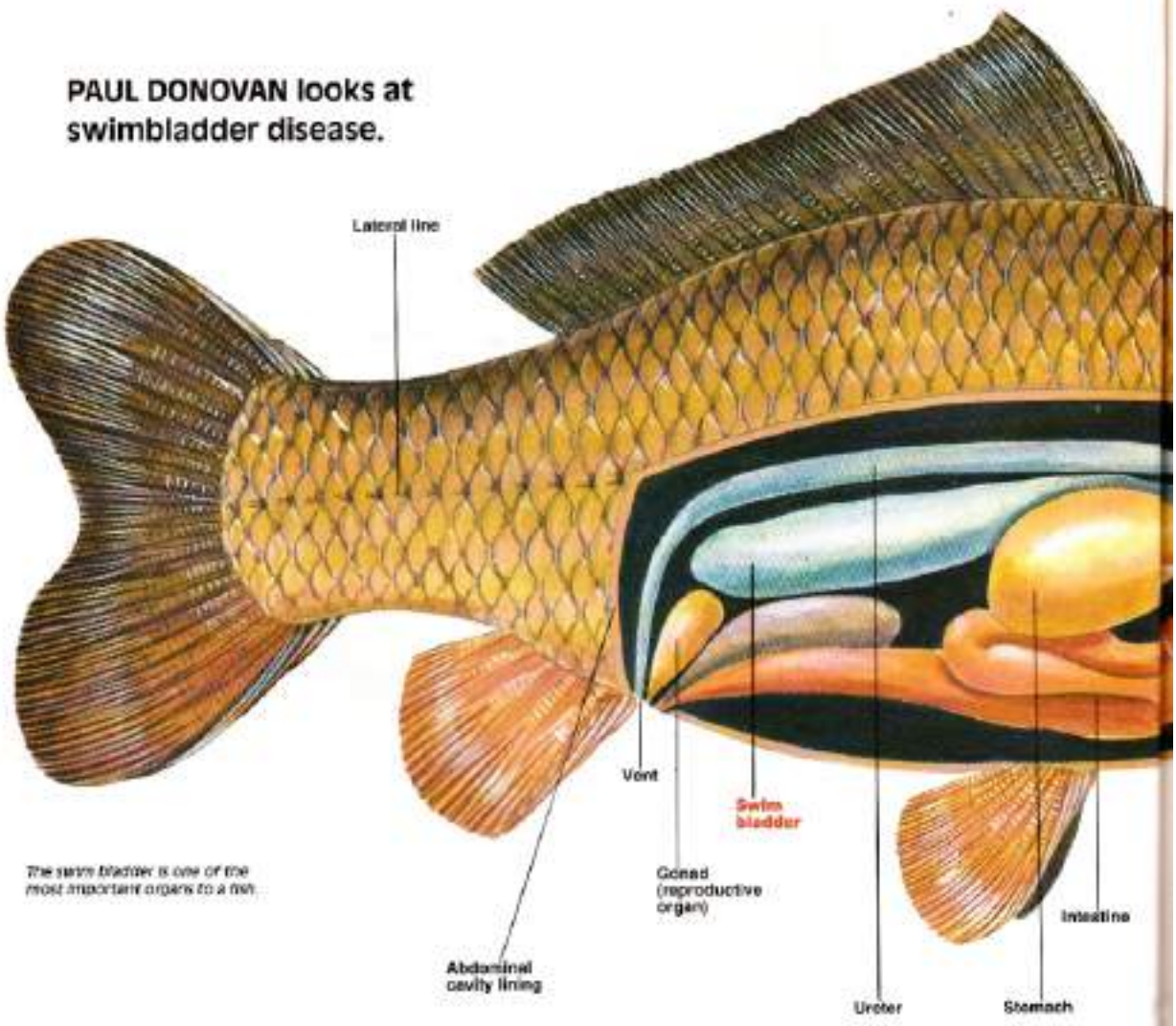
4 Funnel fine powder into one tub, and reserve granules left into second tub for larger fry

5 Repeat as above until sufficient food has been done

■ Add freeze dried food for added quality

When using only flake all the food is fine enough and there is no need to sieve it.

PAUL DONOVAN looks at swimbladder disease.



The swim bladder is one of the most important organs to a fish.

Puffed-up pr

Like all other living things in the animal kingdom, fish are complex biological 'machines' which, from time to time, break down or suffer defects. Fortunately, 90% of the time these problems can be cured, but there are times when, despite the cause being visible, the treatment is less evident. And this is how you could best describe swimbladder disease.

What is the swimbladder?

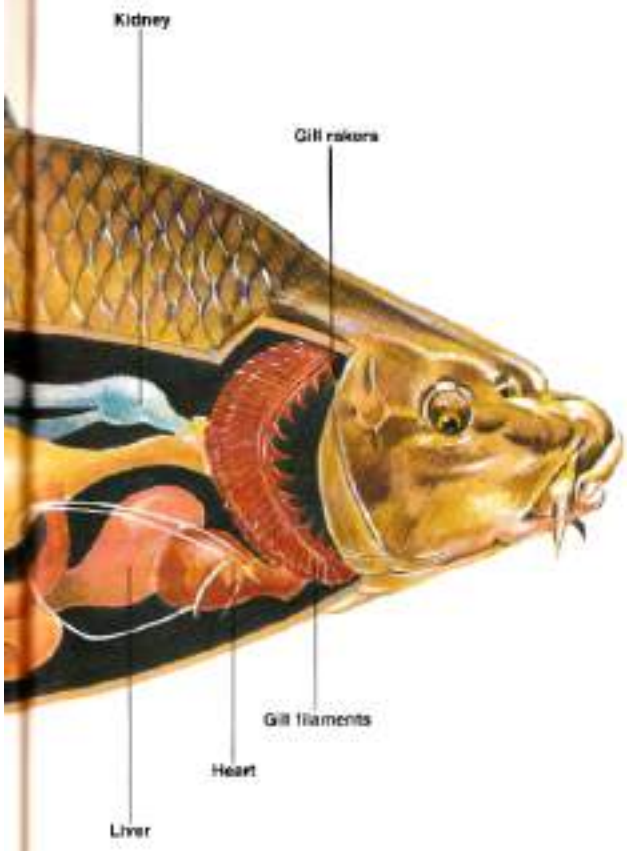
Before I cover this particular problem, it is worth spending a few paragraphs on the bladder itself and its function.

With a few exceptions, all fish have a swimbladder, the function of which is to allow the fish to float and maintain equilibrium in the water.

By increasing or decreasing the air or gas in the bladder, equilibrium can be achieved. Equilibrium is at its lowest at the water's surface and as pressure is exerted on the bladder its volume decreases which causes the fish to 'sink'. To equalise the pressure in the bladder to that being placed on the body, it is inflated during descent and deflated on rising.

Most fish we maintain in our aquarium tropical or marine live at a pressure of between one to ten atmospheres - **1 atmosphere = 1 kilo per sq cm.**

■ For every 10m a fish descends, atmospheric pressure is increased by one atmosphere.



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Swimbladder disease

Now that we understand a bit about the swimbladder, let's turn our attention to a 'disease' which affects it. I use the word 'disease' loosely here as, as we shall see in a moment, it may not be attributed directly to a disease infection.

Causes

There is no one specific cause for swimbladder disease, though several factors have been identified which instigate it; sudden changes in temperature, both above and below those considered normal,and microbial infection.

A further cause could result from the exchange of gas in and out of the bladder. Gas is diffused (in most cases) into the bladder through the venous capillaries, while the gases being taken away are diffused into the arterial capillaries.

If the gas is unable to escape from the bladder while additional amounts are being added, this could then lead to the swimbladder being blown up like a balloon.

All fish, that actually have a swimbladder, are prone to this disorder, but it seems some species particularly the fancy varieties of ornamental fish are especially at risk, in particular goldfish.

It could be that these varieties, which have been selectively bred for their appearance may, and I can only speculate here, have suffered some genetic or other biological imbalance caused through this selective breeding, which has opened the fish to this problem. The same thing as can be seen in certain breeds of dogs; hip dysplasia is a typical example.

Symptoms

The symptoms shown by a fish suffering from swimbladder disease are limited. Primarily there is a pronounced listing to one side, the fish may float upside down, remain in a vertical position, sink to the bottom of the tank, or have difficulty in altering its position in the water.

Unfortunately, the problem is not a progressive ailment which can be spotted early on, and preventative measures taken to alleviate it. It is a disorder which can crop up spontaneously, and healthy fish one day, can 'blow-up' overnight. ■

Treatment

Due to the mystery which surrounds the exact cause of swimbladder disease, giving a reliable course of treatments is difficult. Several treatment routes can be taken, but there is no guarantee,that any of them will prove effective.

■ First, one could remove the fish to an isolation tank and treat it with a proprietary antibacterial treatment.

■ Second, the addition of aquarium salt to the isolation tank has in some cases also proved positive; add approximately 1gm per litre.

■ Third, you could plump for the isolation tank, but have just enough water for the fish to swim in,and raise the temperature to 5 or 6°C above the normal show tank or pond.

■ Finally, if the fish shows signs of distress, is not feeding, or none of the above treatments shown any signs of working, the kindest thing is to painlessly destroy it. In all the cases I have encountered, despite strenuous efforts to cure it, the latter is unfortunately the most usual course of action.

Although I have said "remove the fish to an isolation tank", there is no reason to believe the disease is contagious to other inmates, it is simply the safest way to effect a tentative course of treatments without stressing your other fish.

Fancy Goldfish like this black and red Oranda are especially prone to swim bladder problems.

9 *Where do all the wires go (if) the perhaps over-optimistically named "cable tidy" is your best bet. On a first tank you may choose to cut cables to length and glue the cable tidy to the side of the tank - however as you get more experienced and acquire more tanks you often realise that you'll be moving kit about a lot, and leave the full length of cable in place on the item so that it's more adaptable. Your best bet then is to loosely coil the excess cable, secure with a plastic-covered wire clip, and conceal behind the tank. Still use the cable tidy.*

10 *An air pump should be chosen to suit the size of tank. If running more than one unit (filter, air stone etc.) from one pump, you can buy a slightly larger pump and use an adaptor to split the air flow. These vary from simple chose way junctions to fully-fledged units with adjustable taps like the one shown. With a simple T-piece you may need clamps to adjust air flow to each appliance.*

Some larger pumps have two separate outlets.

13 *We used plastic plants in this set-up, a popular choice with many beginners. Real or plastic plants can be used to further hide the tank's hardware, like the upflow tube in the back corner.*

Real plants should be planted with warmed water in the tank, to prevent their drying out. You can also see the effect more clearly, so some fishkeepers prefer to position plastic plants underwater too.

11 **PFK TIP:** *Here's a useful little idea. This security alarm plug from Powerbreaker has a battery in it, which powers a loud alarm - telling you when a fuse blows or the power fails, even through the plug being accidentally pulled. Could be a boon in busy child-dominated households.*

12 *Natural and/or artificial rocks can be used, not only to decorate the tank, but also to conceal the technical equipment. Decor materials and techniques were discussed fully in last month's PFK.*

We used this artificial cave to provide a hiding place for bottom-living fish, like Kribs. It will look even more natural when a little green algae has grown on it.

14 *There are many ways of adding water without breaking up your display and moving gravel about. This is one is to pour the water through a colander (we also use this for washing gravel). Alternatively place a plate on the gravel and pour onto it, or use a clean (no fertilisers or weedkillers) watering can with a rose. The thermometer is stuck in a clearly visible position to monitor the temperature, - from the heater/air and from the room temperature, which in summer may exceed comfortable levels for your fish. Let the heater/air adjust to the water temperature for an hour or so.*

15 *With water in the tank, switch on the heater, filter, and air pump, if used. If you used real plants, switch the lights on too.*

Your cable tidy allows independent switching of the lights, and of the filter, which you may need to switch off for maintenance and when feeding.

Add a water conditioner to neutralise chlorine, and other nasties. You could also use a filter starter containing a bacteria culture to speed the establishment of a sound colony of bacteria in your chosen filter (PFK April).

Stocking

A good selection of fish for this tank would be:

- A shoal of five small danios, - Zebra, Pearl, or Leopard Danios.
- A pair of Rosy Barbs, or four Checker Barbs.
- A pair of Kribs.

A good selection of fish for a similar tank, but with air-powered filtration could include:

- A shoal of six small, or four larger Tetras, such as Neons, Lemon Tetras, Serpae Tetras, Black Widows, Red Phantoms, etc
- A pair of Dwarf Gouramis
- A pair of any of the Three-Spot Gouramis, - Blue, Opaline, Golden, Amethyst or Three-Spot
- Two or three Corydoras - Bronze, Spotted, Peppered, or Albino.

OR

- A pair of Siamese Fighting Fish
- Three pairs of Platies (different colours, or all the same)
- Three pairs of Guppies (different varieties, or all the same)
- Two small Suckermouth Catfish, like Bristlenose Cats

There are lots of choices, but always check on an unfamiliar fish before buying it, to make sure it will fit in with your set-up. A good dealer will be happy to advise you.

16 The completed tank. No allowance has been made for variations in local water - but with a pH between 7 and a most bread-and-butter tropicals will survive. Our recommended list for this relatively open and well filtered style of tank, with plenty of water movement, is given, plus some recommendations for other styles of community tank. (Fish choice was covered in June's PFK).

Special tanks

Catfish or Dwarf Cichlids
Add plenty of hiding places, in the form of bogwood, caves of flowerpots or stone(s), pieces of piping, and ornaments. Use subdued lighting (mask the tube with red, or use floating plants). Read up on the chosen fish and match the turbulence to their requirments.

Remember that your fish will hide less if they know that shelter is available when they want it.

Gouramis and Angelfish
With these species, go for calmer water (perhaps opting for the air-powered foam filter) and consider planting natural plants in pots, or at least add a layer of Duckweed, Azolla, or other floating plant at the surface to encourage bubble nesting in Gouramis. Too much turbulence is bad for bubble nests and plants alike.

Fish which like calm water:
Gouramis
Angelfish
Some tetras

Fish which like flowing water:
Danios
Most barbs
Rasboras

Fish which like hiding places:
Kribensis, and other Dwarf Cichlids
Corydoras, and other catfish

Fish which like densely-planted tanks:
Harlequins
Midget Catfish (Otocinclus)

Often a "defensible" hiding place like a small flowerpot is important for the female after (and even before) spawning. ■

■ **NEXT MONTH: Basic maintenance for your tank.**

WHAT DOES IT COST?

One 2' tank - £14 to £18 (3' around £25)
Hood 2' tank - £18 to £25 (3' around £25)
Undergravel plate and uplift for 2' tank - £5 to £9 (3' £8 to £12)
Foam filters - £4 to £10
Internal power filters - from £12
Cable tidy - around £6
Air pumps - from £10
Airline - from 5p a foot
Airstones - around £1
Heaterstat - from £14
Lighting (one tube and starter) - from around £20
Gravel - 10lb for a £1
Plastic plants - start at £1.30
Ornaments, rocks, etc - various prices
Power Breaker alarm plug - £12.99
Stick on thermometer - £1.25*
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Pleasing PYGMY

A.M.I.C. OUGHTON on a tiny jewel of a rasbora.

The Spotted or Pygmy Rasbora, *Rasbora maculata*, originally comes from the Malay Peninsula. It belongs to the family Cyprinidae and like all species of this type of fish it is equipped with pharyngeal or throat teeth, instead of jaw teeth, and has no adipose fin.

Rasbora maculata also possesses the Weberian apparatus a modification to the vertebrae immediately behind the skull, which joins the swimbladder to the inner ear. The fish uses this to detect changes in water pressure, from which it gets a greater appreciation of sound and its position in the water.

Having a torpedo-shaped, semi-transparent body, with an iridescent reddish colouring, overlaid with black spots (one in the middle of the flank, one at the base of the tail and one or two above the anal fin, depending on the individual's size) the Spotted Rasbora is a beautiful and enchanting fish.

Growing to about one inch in length, *Rasbora maculata* is a very peaceful species that is an ideal addition to a community environment. On the other hand, a shoal of about 50 or 60 Spotted Rasbora, kept in a 4' x 1' tank, can be an extremely interesting exhibit in its own right.

General tank care

Rasbora maculata can be housed then in either a community environment, or on their own - an ideal size of aquarium being three or four feet, depending on the numbers of fish that are kept.

Filtration

Either one or two internal power filters (depending on the size of your aquarium) would be an ideal method of filtration for this species. Such filters are easy to install and provide a good quality of water, although on the minus side they are clearly visible in the tank.

Another slight problem is that when the filters are cleaned, much of the bacteria colony that has built up in the foam could be washed away. This leads to an increase in ammonia and nitrite levels for a short time; but this can be reduced by using two smaller-than-normal filters and washing them (in water change tank water) at alternate two weekly intervals maintaining one at full capacity at all times.

Water conditions

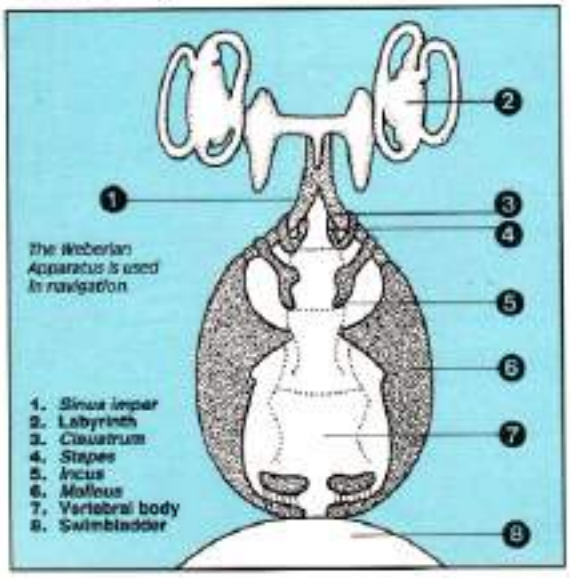
In order to keep Spotted Rasbora in good condition aim for water that is soft, clear and well-filtered.

Their native waters have a pH of 5.6 and a normal temperature of 76°F. They will be fine in a temperature range of 72-85°F.

To maintain water quality it is vital to carry out regular water changes. Partial water changes will be sufficient - about 15% of the tank's volume every fortnight, provided a larger water change of about 30% is carried out on a monthly basis.

Feeding

The Spotted Rasbora's natural food consists mainly of mosquito and other insect larvae. As a result, they should be fed on live foods, if possible, such as white worms, bloodworms, daphnia, tubifex worms and mosquito larvae. ■



Breeding

This species of Rasbora is quite easy to breed and, provided full females and active males are chosen, they usually spawn successfully.

Step one: Sexing Sexes can can be differentiated by the female having two spots above the anal fin, while the male has only one.

Step two: The tank The breeding tank should be planted with a number of Cryptocoryneas and Sagittaria, and contain soft water with a pH of 6.4.

Step three: Conditioning The pair should be seasoned in separate tanks. During the evening the females are placed in the aquarium, after which some brine shrimp and sifted Daphnia are added.

The next morning the males are introduced and spawning should occur within 48 hours. If the adults are reluctant to spawn, however, an increase in water temperature sometimes triggers them off.

Step four: Spawning dance Constantly dancing around her, the male drives the female to a clean leaf (usually a Cryptocoryne) where she chooses a spot on its underside.

Once in position, the male begins to nudge her and as she lays her adhesive eggs, he fertilises them.

This can go on for several hours on a number of occasions two hundred or more eggs have been counted.

Step five: Remove the parents After spawning the parents should be removed.

Step six: Feed the fry At constant temperatures of 78°F, the eggs hatch within 24 hours and it is then essential that they are fed on infusoria, as the larger infusoria may choke them.

The Yellow Sword, *Xiphophorus clemenciae* is quite rare at this site but can be found in many rivers throughout this remote part of Mexico. This is a mature male showing the distinctive red spots in the caudal peduncle region. The red on the mouth is damage caused when nesting the fish.

Swordsmanship

DEREK and PAT LAMBERT have already reported on their 'Aquarian' sponsored Mexican trip. This month they recall how they confirmed that the Yellow Sword was not in danger of going extinct - and tell us how we can keep and breed them.

For many years the beautiful Yellow Sword has been by far and away the most desirable livebearer in the European hobby.

The Yellow Sword, *Xiphophorus clemenciae*, has a turquoise blue body, with a number of salmon red stripes running from the head to the caudal peduncle. The sword is bright yellow (hence its common name) edged in black, and the dorsal and caudal fins have red spots.

The red spots in the caudal peduncle region are one of the unique characteristics of this species. Apart from this attractive colouration, part of this species' desirability has been its rarity, while another factor is its reputation as an extremely difficult fish to work with.

Easy to keep - or impossibly difficult?

Before our trip to Mexico I carefully researched all the available material on the Yellow Sword. During this research I came across a startling discrepancy in various fishkeeper's views on this species.

Some in Europe who had maintained the Yellow Sword declared it was an extremely difficult fish, only giving birth to about 20 very weak fry - which often died in the first few weeks.

Diet was often suggested as being the problem, possibly a vitamin deficiency being to blame.

Poecilopsis gracilis - The Portholt Livebearer which is common at this location was Pat and Derek's first wild livebearer species which they bought from a local aquarium shop about 20 years ago.

The adult size of the fish was reported as only being 4cm for the male and 5.5cm for the female.

American fishkeepers who had maintained this fish had a somewhat different view.

They said it was no more difficult to maintain than the Green Sword and had up to 50 babies per brood. Though small, these created no problem with regard to rearing. Even the adult size was quoted as being nearly twice that of the European fish.

In normal circumstances I would have written this information off as being about the small Green Swords which come from the Rio Sarabia, but in this case I could not, as the fish concerned had been supplied from Dr Kallman's laboratory and were correctly named.

Cichlasoma fenestratum - just one of the many cichlids which live in this area.

Just why there was such a dramatic difference in experiences with the same species really baffled me.

However, the American experts concerned are by no means "normal" in the aquatic hobby. Both Dr Joanne Norton and Jim Langhammer feed very large amounts of live food and do extremely large water changes on a regular basis. In Jim's case, he changes at least 50% of the water in all his tanks daily! Such fantastic care could lead to a somewhat distorted view of how easy a fish is.

Care

Pat and I now have a small group of wild-caught Yellow Swords from one of the new collecting sites. They number three males and six females. The females were all small with the largest being barely 4cm.

They were placed in an 8 gallon (36l) tank with some plant cover and my normal tap water of pH 7.8, GH 450ppm and a temperature of 76°F (24°C).

This is somewhat harder water than we found at Puente Chinohaiz but the fish seem to do well in it.

We followed our normal maintenance regime of 80% water changes weekly and two feeds of live baby brineshrimp, plus one feed of Aquarian Flake, daily. They seemed to thrive on this and some of the females soon looked pregnant.

Astyanax mexicana - A hard water Characin which is common in this part of Mexico.

Breeding

We missed the first brood to be born, but managed to save some of the fry by netting them out of the adult tank. The two other gravid females were moved to individual tanks, 25cm x 15cm, (10" x 6") with plenty of plant cover on the bottom.

They produced fry two days later which were born during the afternoon.

This is very unusual, for most livebearers normally have fry during the night, or in the early hours of the morning. The brood sizes were small, numbering six and eight, but the females were still very young.

The fry were fed on baby brineshrimp and although not fast growers they seemed to do well.

All but one of the females produced broods over the weeks, but the smallest female filled up with fluid and died instead of delivering the expected babies.

Over the next months the wild females produced babies on a 25-28 day cycle. The broods were always born during the day and mortality among the fry was quite low.

The brood sizes have been steadily increasing but we are still waiting for our oldest fry to start reproducing. Until they sex out and start producing fry of their own we will still be unable to make any positive decisions about just how easy or otherwise this species is.

At the moment it seems our American friends had the right of it, but we are still working with the wild-caught fish and quite often these do not behave in the same way as tank-raised fish do. Time will tell but at the moment we are quite hopeful that this lovely sword will now be established within the European hobby and grace fishkeepers' tanks for years to come. ■

False alarm

Until last year the Yellow Swordtail was thought to occur only at its type locality in the headwaters of the Rio Sarabia, to the west of the town of Sarabia. This location is almost impossible to reach in anything less than a Jeep. Occasionally it was found in the Rio Sarabia, as it passes under the road near the town, but this was very rare.

In 1989 the American Fisheries Society list included this species as being of Special Concern due to its very limited range. Dr Kallman of the Osborn Laboratory in New York felt this was probably an unwarranted addition to the list as its range had not been fully studied. So on his next few field trips to Mexico he searched this area properly to find out just what the range is for this species. In his search he was aided by a number of new roads which the Mexican government has been building in this area to open up new regions to cultivation.

When I met Dr Kallman in May last year, this study had not been completed, but he was able to suggest a number of locations along a new road to the east of Sarabia, where he had found several new populations. When we reached this area we found a small stream passing under a bridge marked Puente Chinoluiz.

This stream was only some 2m (6') wide at its greatest point and no more than 1m (3') deep. The bottom was mud and rocks, with some overhanging plants but no aquatic vegetation. The water quality was pH 7.2, and GH120ppm by the Aquarian Test strips. We checked the pH by an electronic meter and came up with the same reading.

The pool we seined was only some 7m (23') long but was teeming with fish. The commonest species we found were *Priapella intermedia* and *Astyanax mexicana*.

However, we also found *Poeciliopsis gracilis*, *Poecilia sphenops*, *Xiphophorus helleri*, *Cichlasoma aureum*, *Cichlasoma fenestratum* and, in small numbers, the Yellow Sword, *Xiphophorus clemenciae*. I must admit we were certainly not expecting such an abundance of fish, nor such a diversity of species, from such a small pool.

We went on to the Rio Coatzacoalcos, and searched here for the Yellow Sword. We could only find Green Swords. It seems the Yellow Sword prefers the quiet backwater streams to the large deep rivers.

Dr Kallman has since been on another field trip to this area and is able to confirm the widespread range of this species throughout most of the small tributaries of the Rio Coatzacoalcos, and eastwards from Sarabia.

It has, in fact, one of the widest ranges of any of the swords and is in no danger of extinction.

Right: The little stream which flows under Puente Chinoluiz where we found an abundance of fish.

Above: A very rare photograph of a female Yellow Sword, Xiphophorus clemenciae. While not so attractive as the male it still shows the red stripes down the sides and a hint of the red spots in the caudal peduncle.

Apistos *that pass the* acid test

MARY BAILEY has noticed that Apistogramma agassizii is once again available. As Apistos go, it's one of the easiest and longest lived - an ideal dwarf if you're looking for something different and beautiful.

One of the best-known and most popular members of the *Apistogramma* genus is *A.agassizii*, a fish which is interesting enough to attract the cichlid enthusiast, but at the same time amenable to community care by the relative beginner.

Although it has tended during its fairly-long aquarium history to virtually disappear from time to time, it is currently fairly-commonly available, so this seems a good time to take a detailed look at this fish and its requirements.

About apistos

Apistogramma are true dwarf cichlids, with 3" (Standard Length) being a good size for a fully-grown male; with females usually considerably smaller. While males, especially conspecific males, can be decidedly hostile to one another, territorial requirements are small, and non-cichlids are left alone unless they are unwise enough to come too near to a female with fry.

Even then the bulk and mouth size of the cichlid are such that they are unlikely to do any damage unless the intruder refuses to take the hint and leave.

A.agassizii is even more peaceful than most - I have two males and a female occupying an 18" breeding tank without the non-dominant male showing so much as a frayed fin. For those who are wondering why I have this set-up, the three were introduced at a small size when I thought them a male and two females; and I am unwilling to upset a settled pair by unnecessarily removing the decor and setting so with a net!

Left: The "plain blue" A. agassizii is still very handsome Pic by Max Gibbs, The Goldfish Bowl, Oxford.

Above left: A. trifasciata shows its splendid dorsal.

About agassizii

A.agassizii has been known to science for over 100 years, having been described by Steindachner in 1875. It has not been in the hobby quite that long, but has, I estimate, been around for well over 10 years, and was probably the first Apisto to be kept in captivity.

It undoubtedly owes its early discovery by both scientists and the hobby to its distribution pattern; it is found all along the main drainage of the Amazon in relatively accessible waters, unlike some of the more recent introductions (eg *A. nijsseni*, *A. macmasteri*) which have a very restricted range in small bodies of water off the beaten track.

It is a fairly elongate species with, compared to some other *Apistos*, rather short and underdeloped dorsal and anal fins, with no hint of the splendid "crest" seen in species such as *A. trifasciata* and *A. bitaeniata*. Both male and female have a black longitudinal band and the characteristic *Apistogramma* eye-stripe.

But what sets *A. agassizii* apart from all other known species, and more than makes up for any deficiency in the dorsal "plumage", is its splendid tail.

Above: *A. agassizii* is easily spotted by its lance-shaped tail.

Right: *A. cruciasta* by comparison has a plain tail but sports a dorsal crest.

Both pics by Alex Didds, the Colour Bowl, Oxford.

This is lance-shaped; the longitudinal band extends onto the base of the fin, and inside a transparent outer edging there is a striking "V" of pale blue.

This tail makes the species easily recognisable and prevents any confusion with the otherwise rather similar *A. gephyra* and *A. elizabethae*. I know of no other cichlid anywhere in the world with a comparable tail pattern, and we have no idea what has led to its evolution in this species.

Not surprisingly in a small fish with an extensive but virtually one-dimensional (East-West) range, different populations have developed different colour patterns, and perhaps in time these will become different species altogether.

The best known is the "plain" blue variety; over the past few years the new "red" form has become very popular with *Apistogramma* enthusiasts - this form has an orange-red centre to the caudal fin and a bit of orange-red in the dorsal, and is the type I am currently keeping and breeding. Regretably it seems that with age, and perhaps successive generations in captivity, the red diminishes, but it is still a very striking fish.

What I have not yet seen in the UK - but I can hardly wait - is the yellow form, which is bright yellow with orange in caudal and dorsal, and blue facial markings. I have seen photos in German books, and it is a real stunner.

Sexing

All these colour forms apply only to males - the females of all three types are indistinguishable, being whitish yellow with a black longitudinal band, and black in the pelvic fins and anterior dorsal.

Obviously the fishkeeper should be careful that the female he mates with a particular male is of the correct form for that male, as otherwise the offspring are likely to be genetic mish-mashes of indeterminate appearance.

It would, I think you will agree, be a pity to lose the natural forms by indiscriminate cross-breeding.

Water requirements

Here in the UK we are used to major variations in water chemistry from area to area despite this being only a small country; the huge Amazon system, however, consists generally of soft and acid waters. In all of South America it is only in the southern, non-tropical, waters of Argentina and Chile, in the ▶

Life span

Some fishkeepers are less than enthusiastic about *Apistogrammas* because some of them are effectively annual fishes, dying off after producing a brood or two, at as early an age as 9-10 months.

Such species seem to live in very small pools of water which almost dry up during the summer season, and only the fry survive.

I am glad to report that *A. agassizii* is not one of these species - some years ago I had a male live for four years in hard alkaline water, and a lifespan of three years is quite normal.

So they are just as long-lived as many other small community fish and it would be a shame to deprive yourself of the pleasure of their company on this account.

Substrates

A factor with this species, and with other Apistos, is the substrate. This should be of a fine grain size to allow the female to do the small amount of digging necessary to convert her cave into an ideal home for herself and her fry.

She will, sometimes just before spawning, sometimes after, sometimes a bit of both, dig a small pit in the cave and use the "spoil" to partially block the entrance.

It is quite normal for the male to have to stay outside and drive his mate in with beats of his tail, because he cannot get in through the reduced entrance. It is not at all uncommon for a female to completely wall up the entrance after spawning and then have to dig herself and the fry out later. Obviously this is a most effective defence against predation.

northern parts of the Guyanas, and in the northward and westward flowing rivers of the Andean cordilleras that we find more neutral and alkaline conditions.

Apistogrammas are essentially Amazonian fish, and ideally should be provided with soft acid water. In practice, however, this is not essential for all species, and in particular those which have become acclimated to aquarium life over a period of many years are remarkably tolerant of what is strictly quite unsuitable water chemistry.

These "hardy" species include *A. cacatuoides*, *A. borellii* (*reitzigi*), and the "original" blue form of *A. agassizi*. But I would be extremely chary of asking the newer "red" and "yellow" forms to live in alkaline or even neutral water.

It must also be borne in mind that when breeding takes place in an "unsuitable" pH then the sex ratio of the fry may be affected - in *A. cacatuoides* it appears that the more alkaline the water the more males are produced, though I do not know if this is true for other species.

Water quality is also important; not only will nitrite make a speedy end of these fish, but a high nitrate level will significantly shorten their life-spans. Given the quality of much tap water in recent years this point should be borne in mind when considering keeping this fish. If your tap water is of doubtful quality then you must be prepared to remedy the situation.

Diet

For general maintenance, and especially to promote breeding, a diet rich in live (or frozen) point foods is important, and they will eagerly take finely chopped earthworms (if you can face the necessary "murder").

They are less than enthusiastic about flake or other dried foods, and although they will take these to keep body and soul together, you are unlikely to achieve breeding success on such a diet.

If live food is not available, and frozen too expensive, then finely-grated heart, and other finely-chopped foods such as mussel, prawn, chicken, together with cod roe, may do the trick.

or use rain water instead.

As long as these structures regarding water are taken into account, then *A. agassizi* is an ideal dwarf cichlid for the well-planted community aquarium. Alternatively a pair can be maintained and bred in an 18" or 24" tank of their own, or make excellent additions to a Discus aquarium as long as this is of the planted rather than the bare type.

Decor requirements

For some reason, flowerpots or coconut shells are preferred to rocky structures, though, of course, a flowerpot can easily be camouflaged with stones.

I suspect this preference of *Apistogrammas* (and many other cichlids) for flowerpots is the security offered by a such a container. There are no crevices in which small mates (fish or otherwise) might be lurking.

I find it is important that the "ceiling" of the cave should be reasonably low and the entrance small, for which reason I usually use broken pots which make for smaller caves.

An excellent alternative popular with the fish, is the small clay saucers sold for pots to stand on. I use the 3" ones, breaking a ½" - 1" V-cut out of the rim with a pair of pliers. ■

Breeding

As with most other *Apistogrammas* the male and female have quite distinct roles in the breeding process. The function of the male is to guard the territory and to keep all intruders away; meanwhile the female - or females, as males will maintain a harem if given several females - tends the eggs and wrigglers, and is responsible for their immediate safety when they emerge from the cave.

I have noticed that, given the opportunity, males of several species are quite happy to make a meal of eggs and fry, and this probably explains why the females are generally extremely hostile to any approach near their family.

When a female is ready to spawn she will leave her cave (in which she will have previously have spent a lot of time) and approach the male, who will display to her by quivering his body slightly and beating his tail in front of her, so that she is buffeted by the current created.

Although this might appear unfriendly - and is also a gesture of warning to other males - the female will usually stand her ground, letting the male know she means serious business.

After a little display of this type she retires to her cave, followed by the male, and proceeds to spawn, normally on the ceiling of the cave. As already mentioned, the male frequently has to make his contribution from outside.

The eggs, which normally number 20-50 depending on the size and condition of the female, hatch after about 3 days at 80° F, and the fry become free-swimming 4-5 days later.

At this point the female brings (digs) them out, and allows them to feed just outside the entrance to the cave.

She takes on a special brood-care coloration at this time; she becomes a much brighter golden yellow than usual, and her black markings are accentuated. She uses twitching and flicking movements of her sooty-black pelvic fins to communicate with the fry.

The fry are extremely tiny, too small to take even *Artemia nauplii* for the first 5-6 days. If the tank is well-established, however, they will normally find enough microorganisms to keep them going during this initial period.

For this reason it is advisable to be a little "sloppy" in your maintenance when fry are expected. Water quality should be maintained, but do not be too diligent in syphoning off mulm and plant waste, especially near the cave. It is far easier to let the fry feed naturally than to have to mess around with infusorians.

After about a week they can be given brine shrimp nauplii and microworm, and will also peck at the food offered to the adults. They are rather slow-growing and usually take a good six months to reach 1".

Above: A planted community tank is an ideal home for A. agassizi. Pic: Peter Hewett.
Top left: An A. agassizi female in drab non-breeding colours.

DIARY DATES

SUNDAY AUGUST 23
■ **BKKS Avon Section Closed Show** at **Park Garden Centre, Over Lane, Almondsbury, Bristol** 9am to 6pm. More information: **Mr Lerway on 0454 898287**
■ **Skelmersdale and District A.S.** are holding an **auction** at the **Skelmersdale Labour Club, Westgate.** Book-in lots from 10.30am to 12.30. More details **Gary Lester** on **0695 25734** or **Frank Carlson** on **0695 21613**
■ **Peterhead and District A.S. open show and fish auction** at the **T.A. Centre, Peterhead.** All enquiries to **W. Stephen** on 0779 76784 or **S. Muir** on **0779 77874**

FRIDAY SEPTEMBER 4
■ **North West Cichlid Group video night** at **British Legion Club, Liverpool road, Skelmersdale, Lancs at 8pm.** More information **Brian Wilson 0695 21486** or **Ken Hilton** 0565 633318

SUNDAY SEPTEMBER 6
■ **Thorpe and District Aquarist Society of Norwich** hold their Open Show at **Hewitt School, Norwich.** More details from **Paul Sparks**, on **0603 400276**
■ **Cardiff and District Fishkeepers' Society** are holding their annual Open Show at **The Heath Community Hall, Heath, Cardiff.** More details **Michelle Aukin** on **0222 761397**

SATURDAY SEPTEMBER 12
■ **The Bristol Aquarist Society hold their Annual Open Coldwater Show at St Ambrose Church, Stretford Rd., Whitehall, Bristol** plus **Fish Auction** at **3pm**, open to the public at 3pm. More details from Show Secretary **R.A. Jones 0454 417487**

SUNDAY SEPTEMBER 13
■ **DFK (Darlington Fishkeepers Klub) Open Show,** at **Eastbourne School, Hundens Lane, Darlington.** More details from **Steve Wood** on **0325 288934**
■ **The Northern Area Group of the Catfish Association** are holding their **Catfish Open Show** at the **Darwen Library Theatre, School St., Darwen, Nr Bolton.** More details from **R. Thompson** on **0942 234009** or **B. Walsh** on **0254 776567**

SATURDAY SEPTEMBER 19
■ **Plymouth Aquarist Society** are holding their open show at **Plymouth Polytechnic Main Hall**

SUNDAY SEPTEMBER 20
■ **Dunfermline and District Aquarist Society 21st annual show** at **Parkgate Community Centre, Rosyth Institute, Rosyth** plus possible **fish auction.** More details from: **Derek Long** on **0383 413275**
■ **Otley Aquarist Society** is holding its **Annual Open Show** (plus fish auction) at **Prince Henry's Grammar School, Otley, West Yorkshire.** More details **Shaun Midcalf 0943 464632**

SATURDAY SEPTEMBER 26
■ **The East London Aquarist and Pondkeepers 44th Breeders Open Show** at **Cottrell Hall, Cecil Rd., Chadwell Heath, Essex** - public viewing from 3pm

SUNDAY SEPTEMBER 27
■ **Darwen A.S.** open show at and specialist fish auction at **Darwen Library Theatre, Darwen** - benching 11.30am. More information from **J. Gibson 0254 776060** or **B. Walsh on 0254 776567**

INTERDAB WINNER

The first winner of a new **Interdab Nova 200 Submersible Pump** is **Mr G. J. Smith of Benfleet, Essex.** His returned warranty card was the first drawn out for the month of April under a new scheme to encourage registration of pumps and a faster system of repair as featured in February's Newsround. Look out for more monthly winners.

Testing times?

The Editor says

One of the commonest letters of complaint or query that we receive covers the topic of out-of-date test kits.

At this stage I have to briefly pause and and praise the majority of our aquatic goods manufacturers who are getting a staggering amount of praise mail at present. I wish the same was true of aquatic outlets in general...

The latest test kit complaint concerned a kit bought at a garden centre outlet. It was for nitrate, one of the least concerns for most fishkeepers (should it be I wonder) but high on the list for marine fishkeepers who probably use mainly specialist outlets. Readings from the kit, used on tapwater, showed no nitrates present, a most unlikely situation these days. The manufacturer who quickly and generously replaced the kit was able to identify it as three years old, and quite useless. He presumably went by his own codes on the packet.

The answer to this is surely a date stamp which will force the disorganised or unscrupulous outlet to sell off old stock cheaply or discard it. The date stamps now required on flake and other foods will be a real boon to the fishkeeper - now's the time for the same on test kits.

Readers sometimes imagine that the various tanks in our office would provide a fascinating array of exotic fish and equipment. The truth is that they're so often used as fast turnover test beds for review equipment, and new fishkeeping ideas, that they are probably less interesting than the majority of our readers' tanks. At present for instance, we have a cichlid growing-on and breeding (we hope) project in our cleanest largest and best tank; we have a misbehaving Picasso Trigger on its own in a marine tank (he was a bully in his owner's community); we have a "planted" tank (planted in the sense that it's used as holding tank for plants) housing four corydoras, temporarily; and three tanks devoid of occupants and in one case water.

Downstairs in our reception we have a community tank that I've mentioned many times. Of course, we all keep fish at home, too.

In the office we have test kits for almost everything. But the fact is in the hustle and bustle of the production of a large magazine we rarely use them. Enter freelance writer Ian Lucas and his enquiring mind. Test kits to hand, Ian has been monitoring most of our tanks, with startling results.

Triple tests for ammonia, nitrite and nitrate have revealed startling fluctuations over a few days. While we have avoided lethal doses of the first two, in the community tank, levels of nitrate were so high that to introduce new fish might have been lethal (hence the swords being elsewhere). We were aware that the reception tank was undermaintained but not, we thought, dangerously so.

The time has come to use test kits more often, and with greater care - and to experiment with Siporax which, we are so regularly told by the distributor, can deal with nitrites and nitrates.

The alternative, which revolves around the controlled clogging of one filter so that it begins the anaerobic denitrification process while the other handles aerobic filtration (the 15/30 method referring to the day of the month when each filter must be alternatively cleaned), has never worked for us.

Meanwhile, the Picasso Trigger needs constant water tests and monitoring, like all marine fish, and should get us into good habits again. Now if we can just lower our tapwater nitrate levels...

■ I hope you like our new series of free fish cards. Part of a set of 30 in all, this month's cards represent the first of four instalments, covering popular tropical fish. Don't miss them over the next few months - in fact you can ensure that you get them, and get a free thermometer, by filling in the form on page 23.

Steve Windsor

STEVE WINDSOR

FACTFILE

Our monthly question and answer session with a well-known fishkeeper

Name: Pete Trevett
Home town: Bracknell, Berkshire
Occupation: Telecommunications Training Officer
Hobbies (apart from fishkeeping)? Photography, rock/blues music, birdwatching/nature
Years of fishkeeping experience? 15
Favourite type of fishkeeping? Freshwater tropical
Best book on fishkeeping? Baensch Atlas/Encyclopedia of Koi
Favourite species? Geophagus or Corydoras
Least favourite species and why? Piranha - I personally find them uninteresting
How many tanks do you own? 17 plus two ponds
What was the first tank/fish you ever had? A 36" x 15" x 12" with livebearers, tetras and corydoras
What was the first fish you ever bred? Zebra danio
Worst mistake in fishkeeping? Trying to keep marines in a 36" tank
What's the most you've ever paid for a fish? £60
What do you think is the most important current issue in fishkeeping? The possibility of severe limitations being placed on what fish can be kept by hobbyists when we join with the rest of Europe in 1993
Biggest fishkeeping gripe: The lack of knowledgeable staff, poor quality of service and "over the top" prices in some aquatic outlets
Are there any fish you wouldn't keep - and why? Some types of marine which do not survive well in an aquarium i.e. some Butterflies
Which fishkeeper do you most admire - and why? Hans Baensch for being involved in the publication of one of the best general reference works on coldwater/tropical fish and for his lifetime's work with fish
Favourite fishkeeping myth? That it is difficult and highly scientific at all levels
Biggest fishkeeping ambition? To be editor of PFK
If you were reborn as a fish, which fish would you be? A corydoras because they are cute, or a koi because they're beautiful
How would you like to be remembered in fishkeeping? No reply

ch....Newswatch....Newswat

● Several papers report a new invention from the USA aimed at the angling market which is supposed to cause fish to go into a feeding frenzy. Rejoicing in the subtle name of Gotta Bite, the substance joins a long list of similar "Snake Oil" fishing aids from the USA.

(One of its predecessors, Doctor Juice, claimed to match a Brazilian jungle formula that drove fish crazy. Traditionalist trout anglers were horrified by the formula for trout (which are not exactly common in the Brazilian Jungle). No problem - as our angling journalist colleagues found, it simply didn't work.)

However, this product has a better pedigree, being formulated by the Louisiana State University and containing amino acids found to trigger the feeding impulse.

This does raise one point of interest to fishkeepers. Often a debilitated fish could be saved if it could just be persuaded to feed - perhaps such formulations have a role to play. Indeed it was for captive catfish farming projects that the product was first designed. But as catfish are described as "swimming tongues" with taste receptors all over their bodies, this may mean that other fish are less stimulated.

● **The other major story this month concerns the surveying of Loch Ness which titillatingly talks about the discovery of "new species" Not necessarily Nessie however, but various small invertebrate worms which may be living in the extraordinarily deep loch.**

● *The Daily Telegraph* reports that US scientists have (for some reason best known to themselves) succeeded in making water run uphill. Water drops are placed on a thin piece of polished silicone pointing slightly uphill and coated with a water repellent of increasingly lessening effect as the coating goes uphill. The difference in surface forces makes the water run uphill. Why did they do it? Apparently because it hadn't been done before ...

● **Green pond water pales into insignificance compared to the blue-green algae menace plaguing England's reservoirs and even Loch Awe in Argyll. Once again it's claimed that the algae is toxic enough to kill animals, specifically two dogs according to the *Glasgow Daily Record*.**

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

This month's contributors G. Pinion, *PFK* staff.

AQUACHAMP '92

The **AQUACHAMP** fishkeeping club quiz, is sponsored by **'Aquarian'** and ourselves. Club quiz evenings are underway all over the UK, with the prizes and questions supplied by 'Aquarian'. Returning the top scorer's marks to 'Aquarian' gives them a chance of a free weekend for themselves and a partner at the Pontin's Weston Super Mare-based **Supreme Festival of Fishkeeping on November 7 and 8.**

If their marks are among the top six in the country they'll be invited to take part in a new two part grand final, with a specialist round on the Saturday and a general fishkeeping knowledge round on the Sunday.

Every club in the country has received an invitation to enter from the FBAS. If you're a club secretary and if you haven't received your invitation you are running out of time so write to **Aquachamp Contest, PO Box 47, Ellund, W. Yorks HX5 0SJ**

You'll then receive everything you need for a great club night including a set of questions and answers, prizes of Aquarian food and winners' certificates.

REMEMBER: Even if you're too late for the main competition the kit still offers an enjoyable club evening's entertainment.

GOLD LINE FOODS

PRIZE CROSSWORD

Here is September's prize crossword sponsored by Gold Line Foods makers of Phoenix 2000 fish food.

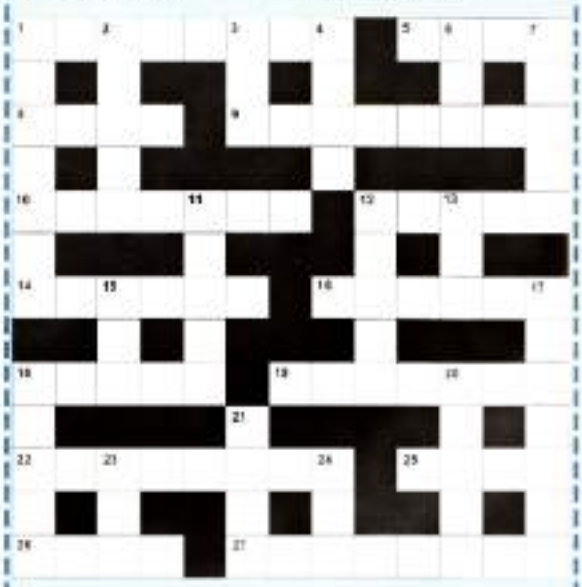
This month's prize is :

An 8 watt U/V filter from Remanoid

Cut out the completed crossword and send it to: *PFK Crossword, Gold Line Foods, Pinfold farm, Welham, Retford, Nottingham DN22 0SQ* to reach them by first post on *Saturday September 12.*

● The winner of the crossword puzzle for July is E. Price Williams, of Rhos. He wins £100 worth of Phoenix 2000 fish food.

IF YOU'D LIKE TO TRY YOU 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 18: Sponsoring manufacturer(4,4,5)
5. Mountains not molehills are this (4)
8. Certainly not the winner (4)
9. And another one (8)
10. Name of fish food - as a bird from the ashes (7)
12. Small wooded area (5)
14. Feeding ensures this (5)
16. Water purifier (5)
18. See 1 across
19. Wrestling hold (7)
22. Pump sponsors (8)
25. Give out heat or light (4)
26. Notice (4)
27. In fishkeeping there are good and bad ones (8)

DOWN

1. A tea (7)
2. Cowboy's rope (5)
3. The self article - girls name (3)
4. Tie these loose ones up (4)
6. French here for large company (3)
7. A swinging joint as on a door (5)
11. Observes quick writing (5)
12. Original home of carp? (5)
13. Irish short name(3)
15. Stock cube? (3)
17. Meeting for boat or yacht races (7)
18. Crosses a stream (5)
20. A homing pigeon is called this (5)
21. Tool for grooming (4)
23. Short for Practical Fishkeeping perhaps (3)
24. Short doctor (3)

ADVERTISEMENT

THE UNDERWORLD MARINE FORUM

Dave Keeley is Underworld's expert.

SUNK WITHOUT TRACE

Q Most makes of synthetic salt go to great lengths to advertise the number of trace elements they include in their formula. I have always used Instant Ocean, largely because it seems to represent such good value for money, and I have to say been very pleased with the results, but I am concerned that there is no mention on the packet about trace elements. Is Instant Ocean simply less expensive because it is lacking vital elements, or am I missing something?

A Well, you are missing gold, aluminium, arsenic, bromide, lead, mercury and dozens of other 'vital' elements. Most salt manufacturers try and replicate the sea – well, it's only natural isn't it? And they go to great lengths, not to mention expense, to add elements which are, frankly, at best, redundant.
Instant Ocean follows a different philosophy. Following many years of trials in the Instant Ocean Hatchery, where millions of baby clown fish were spawned and raised, Stephen Spotte's original formula has been honed and improved over the years. Instant Ocean contains only elements which are beneficial to marine fish, and deliberately omitted are potentially harmful elements.
Since most marine fish obtain all the vital additives and vitamins they need from their food, Instant Ocean contains none of these either. So, in sheer numbers of ingredients, Instant Ocean probably contains less than half of some other brands. But this means that you end up paying for ingredients which will benefit your fish, rather than ingredients which in larger quantities are outright lethal.

THE CRYSTAL MAZE?

Q Besides reading PFK, I also subscribe to the American magazine FAMA. I keep seeing adverts in there for American products which don't seem to be available here in the UK – a good example is a new salt called Reef Crystals, which has been advertised for the last few months – when will I be able to try it for myself?

A Reef Crystals are formulated by Aquarium Systems, who already manufacture the Instant Ocean Reef Crystals are aimed at Reef Aquaria, and contain many additives for the long term welfare of filter-feeding invertebrates. They were launched in the U.S.A. in late 1989, and they have been slow in coming over here mainly because the 'Reef' side of the hobby is so much more popular in America than it is over here.
But now the good news. Aquarium Systems have now decided that the demand in Europe is sufficient, so an extra production line has been established in the Aquarium Systems French factory, and even as I write Reef Crystals are being produced. The first shipments have landed in England earlier in the year, and most top marine shops already have supplies.

MARINE BUTTERFLY

Q I am confused. I was in a marine shop in a garden centre site in the South West last week, and he had the biggest stock of marine butterfly fish I have ever seen. I did not think to make a list, but I do remember Pakistani Butterflies (Ch. Collare) and Foureyed Butterflies (Ch. Quadrimaculatus), both of which I regard as virtually impossible to maintain in home aquaria. In years past I have tried both, and failed to get either to feed sufficiently. Surely it is irresponsible for shop keepers in these times to try and sell these sorts of species – both as far as the fish are concerned and in fairness to unsuspecting beginners who might be put off the hobby for life?

A My moral stances on the marine trade have led to frequent clashes in the past. I will support and campaign for any movement which is more concerned with the long term welfare of marine life rather than making a quick profit at fishes' expense.
Taking matters step by step, first you have to decide that the marine hobby is 'permissible', and this statement is by no means universally accepted – there are movements afoot to ban all trade in wild animals – which would kill off our hobby in a stroke. If you accept the first premise, that the keeping of marine fish is acceptable, then the next step is to ensure that we practise the hobby responsibly. Very briefly, this means a) MOST IMPORTANTLY, not damaging the habitats (hence the current regulations concerning hard corals), b) only collecting fish on a sustainable basis, and c) not collecting those fish which have no chance of survival in captivity. (a) is now covered by legislation, (b) is being monitored far more than ever before by both exporting and importing agencies, but (c) at the moment, is still largely up to individuals, though this situation is very much under review. The problem is who decides which fish can not be kept in captivity. Ask 10 experts to draw up 10 such lists, and I guarantee every one would be different.
Not only would different aquarists disagree about the survivability of individual species, often based on their own experiences, but most would agree also that new technology and new knowledge are pushing back the barriers all the time. What were 'impossible' fish a year ago might well now be far more easy. So many fish die because of problems with diet – this is not the sole reason, but certainly a primary cause – and now the introduction of the Ocean Nutrition range of formula foods has suddenly opened so many opportunities previously unavailable – we can now keep Angels which demand Sponges (+), and we can tempt what we have always considered finicky butterflies to eat copiously (**). So it is essential that while maintaining a responsible attitude to marine fish, we also keep a mind open to new developments which will open up the hobby even further.
*Ocean Nutrition Angel Formula, the only marine food to contain sponges.
**Ocean Nutrition Very High Protein &I use your butterflies eat Ocean Nutrition Brine Shrimp Plus) like never before!

Q My local supplier has told me that I need not do water changes in a Mini Reef which I suppose to buy in the near future – do you agree? I intend to use Reef Crystals, which I believe contain extra additives for my corals.

A I could not disagree more. In theory it is possible to filter out most of the measurable waste products produced by the tanks' inhabitants, and in theory it is possible to replenish all those components which are used up by the marine life by adding a mixture of additives, buffers etc. In practice even the most comprehensive maintenance programme will perform these functions deficiently.
I often get the impression that hobbyists think that there they are particularly targeted for water changes, and the rules only apply to them. This is not the case – all public aquaria and all professional and successful breeders, importers and retailers have to institute programmes of water changes – larger installations obviously install more sophisticated systems than buses and buckets, and may well install at some expense the infrastructure to do a 1000 gallon water change as quickly as a home aquarist can do a 10 gallon change. Nevertheless, I do not believe that there is one major professional handler of marine fish which has found any system of water management more efficient than regular water changes. The whole raison d'etre behind Reef Crystals is that by doing regular water changes, the user is both removing waste material and replenishing depleted material in the correct quantities in a regulated fashion. If water changes were not essential, manufacturers could simply supply a cheap and unsophisticated raw salt along with a bottle of additives, at a far cheaper cost than are current salts. Nobody has yet come near to achieving this.

PRODUCT INFORMATION

If you would like further information on any of the products featured in Underworld Marine Forum, please complete the enclosed form and send with a S.A.E. to:

Dave Keeley, Managing Director, Underworld Marine Forum, Underworld Products, Units 1 & 2 Belton Road West, Loughborough, Leics, LE11 0TR

Please send me details of
Reef Crystals Polyfilter
Ocean Nutrition Visi Jets

Name.....

Address.....

.....

.....

■ THIS ADVERTISEMENT COMES FROM UNDERWORLD, SPECIALISTS IN AQUARIUM TECHNOLOGY, AND ALL VIEWS EXPRESSED WITHIN ARE THOSE OF THE AUTHOR DAVE KEELEY.

OLD FISHFINGER'S FORUM

Old Fishfinger kept his first fish warm with a night light under a tin tray. Unfortunately the newspaper caught light, but undetered he has continued to keep fish for over ninety years. Despite the smell. He writes only for *PFK* and the *Sunday Sport* - and acquired most of his fishkeeping knowledge while flying a bomber to the moon.

It is not widely known that Old FF keeps a diary. Like Samuel Pepys before him, he writes it in code.

Your Editor, however, has managed to produce a rough translation after several hours with a magnifying glass and a copy of *Secret codes for boys*, by Major "Kipper" Piranha of the Argentinian Secret Service. Join us on a day in the life of Old Fishfinger.

Friday March 13, 1992

5am: Woken as usual by my Lungfish demanding food by nibbling on one of my toes. Limped with him back to his tank, fed him, and retrieved the Climbing Perch from my rubber plant. Mudskippers nowhere to be seen, but will probably come back through the catfish flap later.

6am: Flake on toast for breakfast - full of vitamins, even if 1932 date stamp gives cause for concern. Off to fishouse for daily inspection and water changes. Test tap water before use - tastes fine.

6.25am: Get syphon tube going - glad to have learnt the trick of regurgitating fish from Indian guru. But do wonder where two extra White Cloud Mountain Minnows came from?

7am: Inspect pond. Once again I admire my dummy heron and think how realistic he is and what a great job he does scaring other herons away. Slightly alarmed when he realistically swallows goldfish - find dummy heron, feet encased in concrete, at bottom of pond.

Old Fishfinger is unlikely to receive fan mail at the following address:
Old Fishfinger, C/O The Editor, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ
■ Please do not enclose an SAE for a reply as Old Fishfinger has recently been hand-feeding his Piranha - with real hands.

8am: Delegation of Talking Catfish arrive with demands for better food and conditions.

10am: Talks break down after cats claim they can't understand a word I say.

11am: Visit friends at *PFK* office.

11.01am: Pavement feels softer than usual, so I lie for a while before crawling to the 'Suck and Syphon', Editor's favourite pub. Conduct 8 pint "water change" on self, topping up with 'Old and Cloudy' and filtering out excreta at regular intervals.

12 noon: Explain to landlord that his Old and Cloudy would benefit from a trip through some filter floss. Pavement softer still. Vaguely notice *PFK* editor sneak into pub hiding behind copy of *British Journal of Unbelievably Advanced Aquatic Studies and Extreme Cleverness*. Magazine seems to be upside down but this could be due to position of neck in gutter.

1pm: Home to Mrs Fishfinger's sumptuous lunch, not in the least spoiled by al fresco picnic off the Fishouse Floor where she's left it. Share chicken bone with Lungfish.

2pm: Inspect breeding project.

2.05pm: Hide binoculars and climb off fish house roof after panda car cruises by....

2.06pm to 5pm: The best part of the day, answering reader queries. I always get a thrill out of sharing my vast experience, and my almost intuitive understanding of the readers' real needs.

At times, a simple piece of advice can quickly get to the heart of the matter.

Dear Old FF,
I'm at a loss as to what to do with the soil I've excavated while digging my pond. Any recommendations?
N. Cavator, Diggleswade

I usually dig a hole in my back garden and bury it. **O.F.**

5pm to 5.00 and 30 seconds: Open my fan mail. What a pleasure it always is to hear from my sole mate Mollie O'Finn from Bo'ness. The Editor had asked for some more films to add to my list to share to your fish. She suggested:
WESTERNS - ***For a few Silver Dollars more; Gunfight at the OK corral; Stagebunch; Heaven's Skate; The Outlaw Josey Whales; She wore a yellow rasbora***
MILITARY MOVIES - ***The Guns of Abalone; Tuna of Glory; Catch 22 Others - The Prime of Miss Jean Gaby; One swam over the bubblenest; A star is mouth-bred; A star is prawn; The King Prawn and I; A tale of two Plaices; The Wizard of Oscar; and the Ecoling classic - The Ladykillies.*** Dear Mollie!

6pm: Thanking only of my comfort, Mrs Fishfinger kindly throws me some bedding from an upstairs window. Sadly forgets to remove bed first. She bolts and bars the door, no doubt to protect my rare collection of empty flake tins - dating back to 1911.

7pm: Cook lance fish and pond chips over fire of old bogwood. Delicious. Lungfish agrees. Notice garden gnome with little fishing rod is missing from pond.

8pm: To Greater Snoring Aquarist Club to deliver my famous talk on Syphoning through the Ages. The Chairman is full of praise for my erudition. Pity the rest of the club didn't come...

9pm: With the chairman to the 'Two Guppies' (now renamed 'The 63 Guppies') for more water changes. Found six pints of 'Old Conditioner' turned my water a funny colour. Ate two charcoal biscuits.

10pm: Back to the fishouse - floor feels softer than usual. Note from Heron's Liberation Front demanding ransom for return of Gnome.

Lungfish joins me under the blanket. Deep sleep only troubled by noisy return of Mudskippers from 'The 361 Guppies' 30 minutes after closing time. ■

Young fis

KIT TIP

The air pump

How does it work?

Most use a vibrating diaphragm over a chamber with one-way valves, to take air in from the room and pump it out to the tank.

Some pumps use a piston instead of a diaphragm. They are quieter in use, but involve a little more maintenance.

Fine plastic tubing, called **airline**, takes the air to where it's needed.

Aerating your tank helps to dissolve oxygen into the water for your fish to breathe. It also helps to drive out excess carbon dioxide. Circulation is just as important as the actual bubbles of air in the water.

What extra equipment do I need?

You will need airline to take the air to the tank.

An airstone (or a larger air curtain) can diffuse the air into lots of small bubbles.

Air pumps can also power internal or external filters.

To run more than one airstone or filter, you need connectors, and valves to balance the flow-rates.

Fortunately these accessories are all cheap.

How do I use it?

You may need to fiddle with the valves quite a bit to get the right balance between the different outlets.

When connected and adjusted, an air pump needs very little attention.

Most pumps have a filter to clean the incoming air, and this needs cleaning or replacing when it gets dirty.

Eventually the internal valves wear out, but they are easy and cheap to replace.

Good features

Most air pumps are cheap and efficient. The better ones are also very quiet in use.

Are there any drawbacks?

The pump should be sited above the water level, or else have a non-return valve in the airline. This will prevent water syphoning into the pump if it should stop working.

Underwater Safari

This month we look at the Alder Fly

The Alder Fly, *Sialis lutaria* resembles a large Sedge Fly but is a quite different creature. It has hard shiny veinous wings, while those of the sedge are hairy and softer in appearance.

Its larva is a fierce predator of small fish, insects and invertebrates, which lives in a silty tunnel on the lake or river bed. It leaves this to eventually crawl ashore and pupate among the roots of trees, to emerge as the adults - shown in this case mating to complete the cycle, the female returning to lay her eggs on the water.

You can recognise the larva by its long flattened body fringed with gill fibres, leading into a beetle-like fore section with legs and a formidable pair of mandibles.

DID YOU KNOW?

- The coral sand surrounding coral reefs is believed to be mostly produced by Parrotfish and Triggerfish. These fish bite off pieces of coral with their beak-like teeth, to eat the living polyps inside. The coral skeleton is ground into small particles, but cannot be digested. This accumulates on the sea bed as coral sand.
- Artificial pearls were once made (before more modern materials were developed) from hollow glass beads, filled with ground-up fish scales. The European Bleak was commonly used as its scales are very reflective and pearlescent. Thousands of these small fish were killed for the pearl trade.
- Many fish have ingenious ways of protecting their eggs from predators, - mostly other fish. One of the strangest is the Splashing Tetra, which jumps out of the water to lay its eggs where no fish can reach them. They are deposited on an overhanging leaf, or, in the aquarium, an artificial substitute. The male then has to tend the eggs to prevent them drying out. He uses his enlarged tail fin to regularly splash them with water, until they hatch about two days later.

Something ELSE

Baby fish are more vulnerable to predators than large fish. Many highly evolved species protect their fry from being eaten, as the parents are more able to drive away a would-be predator.

Even in a cave, or a nest, some fry can be lost, but mouthbreeders go one step further. The parent carries the eggs and young in his or her mouth until they are too big. By this time they are more able to fend for themselves, and have a better chance of survival. This behaviour sounds like a one-off freak, but it has evolved in many, unrelated, groups of fish.

The best known to fishkeepers are the Cichlids - Mbuna, Egyptian Mouthbrooders, and others. Some labyrinth fish have the same habit, as do the marine catfish, *Arius*, often called Shark Cats. Some other marines are reputed to be mouthbrooders, including Grammas and Jawfish, although little is known for certain about the breeding of many marine fish.

You can judge the effectiveness of different methods by the number of eggs produced.

Mouthbrooders lay very few eggs, the record probably goes to *Tropheus duboisi* from Lake Tanganyika, which usually lays fewer than ten eggs in a clutch.

Fish whose eggs and fry have little chance of surviving produce much larger numbers. Goldfish, for instance, lay hundreds of eggs at a time, but give them no parental care at all. In the wild most of the eggs or fry of this type of spawner are eaten, but just enough make it to adulthood to keep the population steady.

Other fish with parental care, like pit-spawning cichlids, or bubble-nesters, lay more eggs than egg scatterers, but fewer than mouthbrooders. Livebearers usually have small broods, too, as the fry are quite well-developed, and are more able to fend for themselves than eggs or newly hatched egglayers.

Open-sea fish, like Cod, lay several million eggs each breeding season, but they are left to drift in the plankton, where almost all are eaten by various small creatures. This is all part of nature's balance, of course, as these small animals get eaten by fish.

shkeeper

Quick tip

When photographing your fish any tiny marks on the glass will show up very clearly, so scrape the algae off and polish the outside well.

WIN! THIS SUPER TANK AND CABINET WORTH OVER £200

This month's prize consists of a 24" x 20" x 12" tank, with a splendid cabinet type stand and matching hood, from **Aquariums, Cabinets and Hoods**.

To win this great prize just spot the ten differences between the two cartoons, mark them clearly on the right hand cartoon. Fill in your name, address and age, then cut round the dotted line and send it to:

Young Fishkeeper Spot the Difference (September), Bretton Court, Bretton, Peterborough, PE3 8DZ.

Photocopies are acceptable. You must be 17 or under, and the closing date is **September 14**.

All aquaria from A.C.&H. are built to order from top quality materials, in a variety of sizes and colours. Odd sizes and personal designs can be catered for. Matching furniture is also available and cabinets and tanks can be supplied separately.

Prices range from around £200 for the 24" x 20" x 12" tank, cabinet and hood to around £800 for a six foot size.

Aquaria and cabinets can be sent anywhere in the UK for a small extra charge.

■ For more details ring 0733 232 792 (trade and public supplied).

Name ..... **Age** .....

Address .....

.....

Floyd by fran

Tropical *Answers*

Black Algae

My plants are strong and healthy, but suffer from Black Algae. My 48" x 18" x 15" tank is lit by two 42" tubes.

I have a Dennerle substrate heater cable system, and a CO_2 injection unit. I feed the plants with fertiliser every 7 days, and do a water change every 10 days, using de-ionised water. How can I clear my tank of the horrible stuff?

Dennis Corbett, Harrogate.

The Black Brush Algae, or Hair Algae hints poor conditions in your tank, or spots of your expensive equipment.

Two tubes are not enough. Although your plants grow, they do not assimilate fluxes fast enough to deprive the algae of their food.

Your de-ioniser takes out all vital mineral ions. De-ionised water must be mixed with raw tapwater, restoring the hardness, but not eliminating it completely. **BG**

Shell spawners

I would like to keep *Neolamprologus brevis*. Would a tank of 18" x 12" be big enough?

What substrate, filter, etc will I need?

H. W. Ryder, Birmingham.

You could keep about six *Neolamprologus brevis* in your tank. You can use undergravel, or sponge filtration. Water should be hard and alkaline, pure and well-oxygenated, and at about 80°F.

I suggest 75% gravel and 25% coral sand, to act as a pH buffer. Grain size should be small to allow digging. It should be deep enough for the fish to bury the shell with only the opening showing.

Shells are essential - to keep shell-dwellers without shells would be cruel. If the shop cannot supply shells with the fish, you could try delicatessens, or French restaurants! **MB**

Cover story

Pearl Gouramis like shelter.

Q **I had two pairs of Pearl Gouramis in two separate tanks. Both females were full of eggs, so I put both pairs in a 24" x 12" x 12" tank to prevent the fry being eaten. The males started fighting, so I moved one to another tank, leaving two females with one male.**

There is no gravel in the tank, as I find that fry get stuck in it. There are plenty of floating plants for the male to build a nest in, and a cave in which he spends most of his time.

At the slightest movement outside the tank the fish now whizz around, bumping into the glass and even jumping out of the tank. The red colouring on the male's throat has disappeared.

Any advice?

• Christopher Hickey, Cardiff

A The only way to cure this nervousness is to provide extra cover, giving the fish a sense of security. Use real or plastic plants. A gravel substrate will also help, using a fine grade to avoid the fry getting stuck.

The red coloration is the male's breeding dress, and will return when he settles down. **PD**

Above: Gymnogeophagus brasilianis.

Right: The aggressive Jack Dempsey.

Peaceful Amazons

Q **I have a 72" x 24" x 24" tank with Hagen filter plates under 1½" of gravel. Decor is slate rocks, bogwood, pebbles, sewer pipe and plant pots.**

I have two Blue Acaras and eight Angels, and will be adding a pair of *Nannacara anomala* and two pairs of Flag Cichlids.

Could I also add a Jack Dempsey, or can you suggest something similar?

• David Dwer, Willenhall.

A The fish you have are peaceful Amazonian Cichlids, from soft acid water. The Jack Dempsey is a Central American species from hard, alkaline water. It is also a bit of a bruiser.

Why not consider one of the smaller geophagines from the genera *Biotodoma* and *Gymnogeophagus*? These would fit in well temperamentally and size-wise. They may sift open bottom areas, but are unlikely to uproot established plants. **MB**

No eggs

Q **For 4 months or so, my Nicaraguan Cichlids have displayed all the signs of breeding. They dig holes in the gravel, clean the slate beside the hole, even float above the hole shaking their bodies.**

Unfortunately, though, there are no eggs.

Water quality is good, and the temperature is 74°F. They are well fed, on a varied diet.

They share a 42 gallon tank with two *Geophagus balzani* and a plec.

• G. Turnbull, Denny.

A I have little doubt that the "Nicas" are spawning, but the plec is making a midnight feast of the eggs. Try removing the plec.

'Cichlasoma' *nicaraguense* lays non-adhesive eggs in a pit, so you could remove the slate. They sometimes take the eggs into the mouth for short periods, perhaps to clean them, perhaps for protection. This may be how mouthbrooding started in other Cichlids.

I would raise the temperature to 77 - 78°F.

The BCA Information Pamphlet on *C. nicaraguense* is 50p (P.O) + SAE from **BCA (PFK), 7 Delamere Avenue, Sale, Cheshire.** **MB**

Saving the fry

Q **I have a 36" community tank with Guppies, Neons, Glowlights, Bronze Corydoras, Clown Loaches, a Plec and a *Farlowella*.**

The Corydoras have laid eggs twice, the Glowlights once, and a female Molly gave birth to 20 young before dying.

All of the young died, presumably from lack of space in the isolation net. I have bought another tank, 24" x 15" x 12", just for breeding. What should I put in it to keep it going between broods? I was thinking of a pair of Dwarf Gouramis, as I feel they would be safe with eggs or fry.

• Colin Boyd, Newcastle-upon-Tyne.

A I doubt that the death of your Molly fry was due to overcrowding, but through lack of water movement through the netting. These nets should be placed where there is good, but gentle, water surface movement.

When breeding the Dwarf Gourami, the female should be removed when the eggs have been laid, and the male when they hatch. Therefore, eggs or fry of other fish are liable to be eaten.

Fish kept in the breeding tank while it is not in use could be removed when it is required. **PD**

Above: the dwarf gourami is peaceful, but cannot be trusted with fry.

Dwarf Tilapias

Q **I have become very interested in West African Cichlids. Could you give me any information on the following species?**

***Thysia anurgei*, *T. annectens*, *Tilapia joka*, and *T. ruweti*.**

• P.C. Best, Oldham.

A *Thysia anurgei* is now placed in *Thysiachromis*, as *Thysia* was found to have been previously used for something else (not a fish).

T. annectens is generally regarded as the same species, although separation has been suggested. They are very similar and have the same requirements.

Thysiachromis anurgei grows to about 3", and comes from coastal areas of Nigeria. It inhabits small streams of soft, acid water rather than brackish coastal lagoons. It requires a temperature in the upper 70s °F.

It is a peaceful species, though territorial at breeding time.

It breeds in caves, and should be given a reasonable amount of space, - a 24" tank for a pair. Adults are sexed by the female's rounder shape, and reddish belly.

Tilapia joka is another small species, maximum length about 4". It comes from coastal regions of Sierra Leone, again in soft, acid water. Unlike most *Tilapias*, it has no bad habits, such as plant destruction. As far as I know, no breeding or sexing data are available.

Small numbers were imported into Europe years ago, but I did not know they were available again. You may have been offered the similar *T. buttikoferi*, which has the usual bad habits when adult.

In *T. buttikoferi* the light and dark bands are about the same width, but in *T. joka* the dark ones are about 3-4 times as wide as the light.

Tilapia ruweti is another Dwarf Tilapia, not fussy about water quality, and quite easy to breed. **MB**

Bogwood growth

I recently set up a new tank, and used a large piece of bogwood, for the benefit of my plecs.

A white filamentous growth has appeared on it, which I suspect to be fungi, similar to *Saprolegnia*.

Will it be harmful to my fish (especially if they get wounds etc), and how can I get rid of it?

Patrick Barrow, Barnstaple.

The white growth is a natural aquatic fungus. It lives on biological matter, and shows that your bogwood is not fully petrified.

It will not harm your fish, but it is not good to have decaying organic matter in the tank, - it can lead to bacterial blooms, and water quality problems.

Dry the bogwood, in a cool oven if necessary, and coat it with 2 or 3 layers of clear polyurethane varnish (some other types of varnish are poisonous).

This gives a protective coating, and also stops the bogwood staining the water brown. The artificial look is lost underwater. **DF**

A case of fin-rot

My three-year-old Oscar is feeding and acting normally, and has lost none of its colour, but it has a problem with its pectoral fins. The edges are frayed, with the ends sloughing off. There are also a dozen or so whitish spots about half-pinhead size. I have tried various parasite cures without success.

M. Reeves, Bristol.

This sounds like a case of fin-rot. It is a warning sign that your water quality is unsuitable. This is probably due to your area's tapwater, especially with the drought conditions. To improve your tank water quality, do a series of water changes on alternate days for a week or so. But first check your tapwater for nitrates. You may need a tapwater treatment unit. **MB**

■ Awesome algae

I am having trouble with my 3' community tank, set up with an undergravel filter and two powerheads.

The tank has green hairy algae all over the rocks, heaterstat, gravel and glass. It is lit for 13 hours a day, and cleaned every two weeks.

Would it be possible to have just one uplift, as I think the aeration of two powerheads could be causing the algae?

Some algal growth benefits those fish which feed on greenery. However, the algae may become excessive, and make the aquarium look tatty.

The filament algae you have is *Spirogyra*, *Oedogonium* or *Cladophora*. There are a number of reasons why these filamentous algae flourish, the two most common being too much light (artificial or sunlight), and too few aquarium plants.

Aeration cannot be a factor, as this algal growth also occurs in stagnant water.

To remove established algae:

1) Remove as much as possible by scraping it off the glass and syphoning it out. Take out any rocks, decor, heater (switch off first) etc covered with algae, and scrub them in hot water with a stiff brush. If this fails to remove the growth, discard the item.

2) Syphon off loose algae in the water, or it will return another day.

3) Having removed as much algae as possible, use an aquarium hoover on the filter bed. Thickets can be removed with a net.

4) Next, treat the water with a proprietary algicide, following the instructions.

Now set up the tank again.

If you can temporarily house the fish in a spare tank, completely strip the original, wash, scrub, and re-set up.

If your tank receives direct sunlight, consider a more shaded location.

To help prevent the return of algae:

1) If you don't already have them introduce living plants. They will compete with the algae for nutrients and CO_2.

2) I assume you don't have any 'algae grazers'. Many fish help to control algae, including the Sucking Loach, Labeo sharks, and certain catfish, such as *Hypostomus* and *Otocinclus*.

If you can balance the lighting, plants, and fish, you should see your algae problem come under control. **PD**

Send in the Clowns

Q **I have four Clown Loach, 2-3" in length, and would like to know how to sex and breed them. What conditions do they need? How big will they grow, and what size will they breed at?**

• S. Kyme, Grimsby.

Clown Loach do best in a shoal.

A As far as I am aware, the Clown Loach, *Botia macracantha*, has not been bred in the home aquarium. Males are slimmer than females, with a more deeply forked tail fin. They may not reach maturity for several years.

In the wild they spawn in fast-flowing streams, and the fry grow up in the slower reaches of the river.

Wild specimens reach 30cm, but 16cm is a good size for tank-raised fish.

Botia macracantha is tolerant of other species, and does best in a shoal of its own kind.

Water conditions: avoid extremes of pH, they prefer moderately soft, neutral to slightly acid water. Temperature 23-28°C (73-82 °F), tank size, at least 1m (36"). **GS**

Bichirs and Tyre-Tracks

Q **We recently purchased two Bichirs, *Polypterus palmas*, and a Tyre Track Eel. We normally read up on purchases, but we cannot obtain detailed information on either of these species.**

The Bichirs take live and frozen Tubifex, frozen prawn, and catfish pellets. They have also eaten our Neons, but do not interfere with our Gouramis, Feather-Fin Catfish, Clown Loach and Plecs.

How big do they grow, and will they then eat larger fish?

• L.N. Smith, Basingstoke.

A Bichirs (family *Polypteridae*) originate from Africa, where they live in the shallow flood waters of tropical rivers. They are among the most primitive of bony fish, though their skeleton consists largely of cartilage. As well as gills Bichirs have paired air bladders, which allow them to breathe air from the surface of the water.

Polypterus palmas is a nocturnal, predatory species.

Foods include insects, worms (especially Earthworms), shrimps, and small fish.

Bichirs prefer slightly hard water (8-12°DH), at 22-28°C (72-82°F).

As your tank is large, and none of the stock is overly small, your Bichirs should be fine in your set-up, especially if it is well planted.

Provide plenty of hiding places, as these fish are aggressive towards their own kind.

Your Tyre-Track Eel, *Mastacembelus armatus*, is from South East Asia, where they are used as food. They reach a length of 1m (39") and are nocturnal, not settling down in a brightly-lit tank. Provide dark recesses where the Eel can retreat. Tyre-Track Eels do best in a large, well-planted tank, with an area of soft sand into which the Eel can burrow. They prefer live foods, such as Bloodworms, Tubifex, fish and Earthworms. They, too, will not bother large tankmates. **PD**

Cherry Barbs are good community fish.

Bowl of Cherries

Q **Please could you advise me on keeping and breeding Cherry Barbs?**

• Tina Fletcher, Bristol.

A The Cherry Barb, *Barbus titteya*, is found in the brooks and lowland rivers of Sri Lanka, where they reach a length of 5cm (2"). It is a good, hardy community fish, though a little shy, so provide plenty of shelter.

Diet should be varied, and include some plant matter, such as lettuce.

Sexing is by colouration, the male is a reddish colour, deepening during the breeding season. The female is more brownish.

The breeding tank should have plenty of gravel, lots of fine-leaved plants, and lighting diffused by floating plants. Temperature should be 25-27°C (77-80°F), pH 6.5 -7.0, and hardness about 2°DH.

The males display actively, and can end up on the floor unless the hood is well-fitting.

150-300 eggs are attached to plant leaves, in batches of 2-3. They hatch in 24-48 hours, and the fry should be fed on Brineshrimp *nauplii* and infusoria. **PD**

Fish and amphibians

Q **I have been mysteriously losing fish in my 24" x 18" tank. I have 3 Platies, 5 Neon Tetras, 1 newt, 1 Albino Clawed Frog, 1 African Knifefish, 1 Mountain Shrimp, and a collection of plants.**

I thought the newt or the Knifefish might be eating the fish, but one of my books says they are community fish, and another says they are not. Could you tell me about the newt and the Knifefish, and suggest what happened to my disappearing fish?

• John Pettmine, Hull.

A Newts and Clawed Frogs are amphibians. They should really be kept on their own, as they do not mix well with fish.

You don't say what species of newt you have, perhaps it is the Japanese Fire-Bellied Newt? Let us know and we can tell you more about it.

The African Clawed Frog, *Xenopus laevis*, reaches a length of about 12 cm. They are completely aquatic, and breed readily in captivity. Unfortunately, the parents will eat the tadpoles, given the chance.

This frog likes a warm, shallow environment, at about 25-26°C (77-79°F). Diet includes worms and insects. They will also eat small fish.

The African Knifefish, *Xenomystus nigri*, is a secretive fish, which grows to about 30 cm. Though nocturnal, they will show themselves during the day if kept in a well-planted tank. They require a temperature of 24-26°C (75-79°F), and a pH of 6.8.

They eat Tubifex, Daphnia, and mosquito larvae. They, too, will eat small fish, but they are good community fish with similar sized species.

The newt, the Clawed Frog, or the Knifefish could be responsible for the disappearances.

I suggest you move the newt and frog to a separate tank. **PD**

Handle with care

Q **I recently bought a young Butterfly Plec and two *Platydoras costatus*. My local aquatic dealer informs me that the plec will not grow very big and that all three will live happily together.**

They are kept in a 36" x 15" x 12" community tank containing a total of 25 fish, including Mollies, Albino Sharks and an Angelfish. Will my tank be big enough for all these fish when they are fully grown?

• Sue Wood, Staffs.

A There are two Corfish available in the trade as Butterfly Plecs: *Peckoltia pulcher* and *Pterygoplichthys gibbiceps*.

P. gibbiceps is a loricariid which comes from the Peruvian and Brazilian Amazon. It is a majestic fish which will grow to about 450 mm, and adults can be territorial. Colouration is brown overlain with a lacy network of gold and brown — similar to the markings on a giraffe. They are herbivores and like lettuce, peas, spinach, and the occasional treat of a chopped prawn. They will also accept tablet foods.

Peckoltia pulcher is a much smaller loricariid, which reaches a maximum of 100 mm. A native of Colombia and Brazil, it feeds predominantly on vegetation and small invertebrates found among the algae. They can be territorial, so if keeping several specimens in the same aquarium allow plenty of hiding places. From your dealer's comments it would seem that you have this creature.

Platydoras costatus is a widespread doradid originating from Peru to Brazil. You are unlikely to see much of this fish during the day since it is crepuscular, so you will need to provide hiding places for it. After the lights go out, feed with a variety of foods — tablets, worms, chopped prawn, insect larvae, and snails. It will tolerate most water conditions, although very hard water may cause the fish's eyes to become cloudy.

It can reach a size of 200 mm and although not usually aggressive towards other fish, it is not averse to eating any small fish it may come across during its night time forays.

Use caution when handling *Platydoras*. They can inflict nasty wounds to an aquarist's fingers if they become trapped between the fish's strong pectoral spines and the row of scutes on the body. These heavily armoured dorsals are easily entangled in fine nets, so catch them with care.

Your tank has certainly reached its limits now, and some of the fish have yet to reach their full potential, so start saving for another tank! **GS**

Mollies grow well on a varied diet.

Unsuccessful fry-up

Q **In my community tank I have Guppies, Mollies, Platies and Swordtails which have all bred. I raise the fry in a 24" tank. The Guppies grow quite quickly, but the others do not reach the size of the adults. The Swordtails and Mollies are five months old, and only 4 cm in length.**

I feed them growth flake and occasionally Brineshrimp.

What am I doing wrong?

• Michael Ashely, London.

A As you have had such success in breeding your fish, and raising the fry to a reasonable size, you cannot be judged to be doing anything wrong.

I would extend their range of foods to include freeze-dried Daphnia, Bloodworms, Tubifex, etc. Also feed the fry some greenery, such as lettuce or spinach, or allow some algal growth in the tank.

If you have a lot of fry, it is worth thinking about thinning out their numbers. Remove any which are weak, deformed or diseased, concentrating on those which appear healthy. This is normal breeding practice. **PD**

Moving tank

Could you advise me about moving fish to different water conditions?

M. Tipperny, Sussex.

Water quality is more important than water chemistry. Keep ammonia and nitrite at zero, and nitrates low, and your fish will be happy and healthy. Only concern yourself about water chemistry if you want to keep or breed special species, such as Malawi Cichlids. **DF**

Snakeheads

I have two Red Snakeheads, 6½" and 5" long. What size will they grow to?

How could I condition them for breeding?

T. Thompson, Carlisle.

The Red Snakehead, *Channa micropeltes*, reaches a length of 100 cm in the wild, though slightly less in captivity.

I cannot find any reference to them having bred in captivity, except one paragraph, which says they may be induced to spawn by frequent water changes, which would represent the onset of the rainy season when their breeding takes place. Sexual differences are not known.

General water conditions are pH 7.0, hardness 8°DH, and temperature 26°C (79°F). **PD**

Infertile eggs

Recently my female Oscar laid eggs, but they were not fertilised by the male. I read that having a plec in the tank would not help, so I removed him. Should I also remove the Clown Loach?

Peter Porter, Stevenage.

I find it difficult to believe that a male Oscar would let a female spawn on her own - unless she was so much larger than him that he dare not go near. I wonder if your 'male' is not, in fact, another female. Sometimes two females will 'pair', and go through the motions together.

A plec is not recommended, not because of any effect on the mating, but because it is likely to polish off the eggs at night. Clown Loach might also prey on eggs or fry. **MB**

■ Young convicts

When can I move my Convict Cichlid try from their 24" tank into the large tank with their parents? Can I see them when they are small, as I would like to keep a female for myself?
Stuart Miller, Ayrshire

It would be best to grow them on in the smaller tank, as they are likely to be attacked, if not eaten, by the larger fish.

They cannot be sexed when small, but it would be better to obtain an unrelated female to avoid inbreeding. **MB**

■ Brine solution

I have been trying to hatch brine shrimps to feed fry, but the eggs just settle on the bottom of the tank, in spite of aeration. Should I use a powerhead to swirl them about instead?
E. Stevens, Windsor.

A container that tapers in at the bottom is best for hatching brineshrimps. Purpose made hatchers are available, or a fizzy pop bottle, with the bottom cut off, and turned upside-down is ideal. An airstone is placed in the neck of the bottle. As the eggs sink to the bottom they are guided towards the centre, where the aeration sweeps them upwards again.

■ Red-tail tankmates

Is there any fish I could keep with my Red-tail Catfish in his 5' x 4' x 4' tank, that he would not eat as he grows?
Craig Champness, Surrey.

I suspect that your *Phractocephalus hemioliopterus* is already quite large as it is in an 8' tank. It is not generally recommended that anything else is kept with a Red-tail as they can be very territorial and aggressive. However, I have seen Red-tails kept with very large Pacu, and large *Hypostomus*, but all the fish were purchased as juveniles, and grew up together.

Your Catfish may regard the whole tank as his territory, and attack anything you put in as a companion. **DS**

Attack of the worms

Q **The glass of my aquarium contains clear worms of about 2cm long. There are also bugs on the glass, which are mainly free swimming and congregate at the top of the water. The tank is 68" x 18" x 18" and contains Discus, Clown Loach and Corydoras, and is run by two Eheim 2015 external power filters.**

This problem has been carrying on for two months or more, and so far I have not found a successful treatment. I am not sure if these bugs and worms are affecting the fish, which seem to have a gill irritation, along with a twitching of their pelvic fins. They jerk from side to side and rub themselves on the plants, but there is no redness or inflammation of the gills.

Every week I carry out a 10-gallon water change and two gravel cleans. All chemical tests have proved OK.
• Jason Finch, Suffolk.

A I suspect the worms are Planarian Flatworms, which tend to appear in aquariums with large amounts of organic matter, particularly in the filter bed. In small numbers the worms will probably cause no harm to your fish. Their appearance is more worrying than the actual effect on the fish.

There are several ways you can eradicate these worms. As you have a community aquarium you could introduce some of the smaller Gouramis, who relish these worms as food. Removing the current stock and raising water temperature to around 36°C can also serve as a cure. A slightly more expensive cure would be to add a Diatom filter.

One of the easiest eradication methods is to scrape the offending worms from the glass and syphon them out. Good management of the filter and substrate (regular hoovering) will help prevent and control an outbreak, as will avoiding overfeeding.

The bugs you see at the water surface sound as though they could be Mites, which usually congregate between the surface and the cover glass. These can be removed simply by wiping them off with a damp cloth.

Take a careful look at your fish to see if there are any external parasites, such as flukes, which may be causing the fish to rub themselves constantly. These are parasites of the family *Dactylogyridae* and respond well to a treatment of Sterazin, which is an effective cure for most parasitic crustaceans, gill parasites, lice and internal parasites. **PD**

Mbuna look best in sunlight

See the light

Q **My 40 gallon Mbuna tank is filtered through a Fluval 303, and part of the return is through a trickle filter.**

Nitrite is nil, and nitrate is low. My *L. caeruleus* and *M. exasperatus* have spawned, so things must be about right!

How can we duplicate the gentle water flow Mbuna experience in the wild, and still provide adequate filtration?

I believe in trickle filters, but they rarely get more than a passing mention. Just how slow should the flow-rate be?

I am using two 80W mercury vapour lights, from when my tank was planted. I have added a 40W actinic and a reflector as I did not think I was seeing the true colours of my fish. The effect is now spectacular, but looks a bit unnatural. Any comments?
• Tony Grayson, Purley.

A Wild Mbuna experience variable water flow, depending on the weather, and the depth. What they need is highly oxygenated water, hence the need for good aeration, and surface agitation. This can be achieved with a good air pump - a mini-jacuzzi of power filters is not necessary.

I do not share your enthusiasm for trickle filters. I have known skilled fishkeepers have nothing but problems with them.

In theory the slower the trickle the better, so you would need a huge filter to treat a heavily-loaded tank.

I find Mbuna look stunning in sunlight. Next best is a tube with a good blue content. Over-bright lighting, combined with a reflective substrate (coral sand), makes the fish look washed out. **MB**

White's Tree Frog is one of the most appealing

Fish and frogs

Q I am contemplating setting up a paludarium, and would like to know what animals are suitable for the top part.
• J. Morris, BFPO.

A With its plants and high humidity, the paludarium is ideal for Tree Frogs of the family *Hylidae*. One of the most appealing is White's Tree frog, *Litoria caerulea*. It has green skin with a waxy appearance, and reaches a length of 10cm. They are placid and undemanding frogs.

Frogs require a diet of, depending on size, crickets, locusts, moths, spiders etc. Large specimens will eat mice, but this is not compulsory.

If you start with small frogs, make sure the fish are too small to eat them if they fall into the water. **PD**

Asbestos safety

Q I would like to convert my garage to a fish house. However it has an asbestos roof, and would have to double as a store for my petrol mower.

I am worried about possible toxic effects, from the petrol fumes, and the asbestos. Could you advise?
• MRA Tweddle, Helensburgh.

A You have every reason to worry about the effects of asbestos, but you will reduce the likelihood of any asbestos dust getting into your tanks if you fit an insulated false ceiling inside the garage roof. You will need to do this anyway, to reduce heat loss, and keep your electricity bill out of 'telephone numbers'.

Also insulate the walls, and eliminate as many draughts as possible. Try to avoid water drips from the roof, as they could have picked up asbestos particles.

The petrol fumes could be far more dangerous to your fish, especially as they would be pumped into the tanks by your air pump, as well as settling on the water.

I would be inclined to house the mower elsewhere, or replace it with an electric one. **PD**

Seven dwarfs?

Q I am setting up a 54" x 24" x 24" tank for dwarf cichlids. Filtration is by Fluval 303 and Fluval3. My shop recommended the following:
1. American Flag Cichlids (are these the same as Festivums?)
2. Keyhole Cichlids
3. Agassizi Dwarf Cichlids
4. Yellow Dwarf Cichlids
5. Egyptian Mouthbrooder
6. Golden Eyed Dwarf Cichlids
7. Ramirezi

Are these OK?

What stocking levels are acceptable?

Can you recommend any other varieties?

My tap water is pH 7 - 7.5, what pH and hardness is required?

Will my densely planted tank be uprooted?

What chance have I got of breeding these fish?
• P. Horner.

Above: Papiliochromis ramirezi needs soft, acid water.
Below left: Lastacara curviceps – one of many 'Flag Cichlids'.

A It is unfortunate that you have used only "common" names, as some of them could apply to a number of species.

The Flag Cichlid is *Mesonauta insignis*, but the American Flag fish is quite different, and not even a Cichlid.

Apistogramma agassizi, *Aequidens maroni* (Keyhole), and *Papiliochromis ramirezi* are all Amazonian fish from soft, acid water. These conditions are vital for the *P. ramirezi*, and best for the others.

Pseudocrenilabrus multicolor (Egyptian Mouthbrooder) thrives in most conditions.

Your list is more than enough fish for your tank, as they are nearly all substrate spawners, and need territory.

There should not be too much uprooting, and you have a good chance of breeding as long as you do not overcrowd. I would have four pairs of dwarfs, or three pairs of dwarfs and one of the larger species. You could also have the Mouthbrooders, which have minimal territorial requirements. **MB**

TROPICAL ANSWERS is our FREE reader service designed to help YOU get more from your hobby

- Answering general queries and specialising in "oddballs and lurkhunters" is **PAUL DONOVAN.**
- 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

Star ratings

Don't bother	*
Barely acceptable	**
Average/adequate	***
Good	****
Very good	*****

Convertagrar from elsepet

Versatile lighting gear

The new Convertagrar fluorescent lighting control units from **Interpet** can each accommodate two different tube sizes, 1" and 1½". Nine sizes of tube are taken care of by just four models of Convertagrar.

Possibly the biggest advantage is for the retailer, who only needs to stock four different units, helping to keep his costs down. Cost to the fishkeeper is a comparative £12.70 (recommended retail).

For the fishkeeper perhaps the main advantage is that small adjustments to the lighting level can be made without having a new control unit. For instance, one unit can handle a 20W, 36" tube or a 25W, 30" tube. If two 30W tubes proved to be too bright over a 3' tank, one or both could be swapped for a 25W.

Different tube diameters are taken care of by reducing collars in the end-caps. I found these rather awkward to fit. They need to be right to be waterproof, but these needed so much force I was scared of breaking the tube, although this did not happen. Both sizes of tube clips are supplied.

More impressive are the two-wire leads, allowing you freedom to position the unit safely and conveniently.

Don't try messing around with ordinary control units, by the way, as they may not be able to cope with the different wattages.

H.

Star rating

Quality	****
Practicality	***
Price	****

WHAT'S

Star ratings

INTERPET POWERFLOW	
Quality	****
Practicality	****
Price	***
EHEIM JUNIOR COLOR 2007	
Quality	****
Practicality	***
Price	***

Plain or fa

From **Interpet** comes a new range of neat-looking internal power filters, called **Powerflow.**

Four sizes are available, to suit tanks from 1' to over 4' in length. Prices run from £13.20 to £34.99.

The flow rate is adjustable, and so is the angle at which the water is pumped back into the tank - upward or downward as well as to either side. An aeration feature is also incorporated, drawing in air to mix with the output water. This, too, is adjustable. You can use all these features to tailor the flow and turbulence to suit the kind of fish stocked, without compromising efficiency. For gentle movement you would use a large model, with the flow turned down.

The filter sits on a cradle for easy removal. This is attached by the traditional suction cups. Ours didn't want to stick (as with many others) but hopefully those in the shops will be improved.

Thanks to a neat design, no muck got spilled into the tank when removing the filter, and it was pretty full. We had the smallest model - IPF1 - to test, and used it in an emergency for a 3' tank.

The table of tank sizes and volumes supplied is not terribly clear, however a 3' tank seems to be the largest this filter is recommended for. (125l/h - 30gph - seems to be the maximum flow rate.)

It did a fine job of clearing the muck and aerating the water. In long-term use it should give a good biological action, the sponge having a surface area of 113cm². The largest model - IPF4 - claims 441cm² of sponge area.

Additional filter media, such as carbon, can be accommodated inside the sponge support grid.

All parts except the sponge are guaranteed for a year, and Interpet undertake to keep spare parts available for at least five years after the last filter is produced.

Power consumption for the IPF1 is 4 Watts.

•Interpet products are widely available in the aquatic trade, in case of difficulty contact Interpet, Vincent Lane, Dorking, Surrey RH4 3YX.

Another internal power filter comes to us from **Eheim.** The **'Junior Color 2007'** is a brightly-coloured model presumably aimed at the younger fishkeeper. With a flow rate of 180l/h (40gph) it's recommended for tanks of 30-60l (approx 5-15 gallons). Power consumption is just 3 Watts.

The flow rate is adjustable by a

NEW?

The latest fishkeeping equipment reviewed by Editor STEVE WINDSOR and IAN LUCAS.

ancy?

shutter over the intake slots. This is also used to close the filter for removal, keeping the contents inside. Flow direction is adjustable in steps by moving the pump head on the filter body, so again you can tailor the flow in the tank to suit your fish.

The filter body sits on a hanger equipped with four of Eheim's excellent suckers to keep it in place. These do work!

Two positions are catered for on the hanger, giving still more options of flow direction.

A similar but more conventionally coloured filter, model 2207, is still available in **Eheim's familiar green** livery, along with the larger models in their range. Price is £20.59 for either. IL

•Eheim products are distributed by John Allan Aquariums, Eastern Way, Bury St Edmunds, Suffolk IP32 7AB.

NEW PRODUCT NEWS

New aquarium decor from Similastone includes these items.

Will your fish go to church?

The range of **Similastone** aquarium decor has recently expanded. New items include:

- A Background Rock 16cm high, with holes for your fish to swim in and out of.
- A 26cm long Church with windows and doors for your fish to take sanctuary in.
- A Hollow Burial, which may find favour with shell cave-spawning fish.

Similastone (and Similawood for the more traditionally minded) is safe for tropical, coldwater and marine tanks.

The range also includes a number of items suitable for a formal tank, as featured this month.

•Manufactured by Batstorn Products, Holy Lane Industrial Estate, Atherstone, Warks CV9 2HA Similastone and Similawood are available from most aquatic outlets.

Remedies

Interpet have announced a new range of aquarium treatments. These fish medications and water quality aids are designed for coldwater and tropical tanks. Each pack includes a fish health leaflet, as well as a pipette for accurate dosing, and enough of the preparation to treat 500l (110 gallons) - equivalent to a tank 5' x 2' x 2'.

The range consists of:

No 1 - Fresh Start. A tap water conditioner

No 2 - Flora Boost. A nitrate-free plant food

No 3 - Filter aid. To clump fine particles together and assist filtration

No 4 - Green Away. To help clear green water in the aquarium

No 5 - Liquifeed. A general fish tonic

No 6 - Anti White Spot

No 7 - Anti Slime and Velvet

No 8 - Anti Fungus and Finrot

No 9 - Anti Internal Bacteria

No 10 - Methylene Blue

Interpet's new treatment range.

The Luscombe Aquarium.

Have you got the bottle for this?

The **Luscombe Aquarium** comes from **Luscombe Interiors.**

A large, teardrop-shaped bottle is the basis of the system we saw. A lamp above lights the 'tank' - and the room, too. A lamp shade is part of the package, which also includes a heater/stat, filter and pump by well-known manufacturers.

Decor is provided in the form of plastic plants and bogwood.

The leaflet shows a straight-sided bottle, which might hold more fish and be more accommodating to equipment than the teardrop option, which is probably best suited to just a couple of goldfish. The overall effect is a matter of personal taste, of course.

•Manufactured by Luscombe Interiors, Luscombe, Golston Rd Buckfastleigh S. Devon TQ11 0JD.

The Sea-Max comes with UV sterilizer, coral compartment, four injectors, foam injection, 2 x pre-filters, probe holders and four outlet heads.

New wave of marine filtration

New Wave is the name of the company, **Aqua-Lok** the name of the filters, and **Sea-Max** and **Sea-Pro** the name of the two models both of which incorporate extremely advanced features too numerous to mention here.

Indeed it is the complexity of the two units and their additional protein skimmers, UV units and other extras that has led New Wave's Geoff Saunders to seek out a distribution network of high-quality shops and shop owners who can really sell and explain the virtues of the system. The first of these is Stan Kemp's Kingfishers in Beckenham, which has a fully-working Sea-Max system on display.

•Systems are available from 75 gallons to 350 gallons. For more details 'phone 081 395 0615 or 081 395 9619.

New additions to the Coralife range.

Coralife aids

The Coralife range from Energy Savers Unlimited, of California, includes a selection of products to keep your marine or freshwater fish, plants and inverts in good health.

These preparations are made from pharmaceutical grade materials, and even the water used in making them is de-ionised.

For freshwater use only there are:

- Freshwater Plant Food
- Freshwater Feast - a high-protein mixture of seafoods and vegetable matter
- Freshwater Tank Clarifier - claimed to keep microalgae from adhering to your plants, gravel, glass etc

Freshwater fishkeepers as well as marinists can also benefit from:

- Glass Cleaner Polisher
- Acrylic Buffer/Polisher - which removes superficial scratches as it cleans
- Micronutrient Supplement
- Ana Food - to feed anaerobic bacteria in denitrification filters
- Iron Supplement - to aid plant growth

Marine keepers are also offered:

- Marine Tank Clarifier - to prevent undesirable algae
- Marine Plant Food - nitrate and phosphate free
- Marine Iodine Supplement
- Marine Trace Elements
- Carbonate Hardness Controller

Invertebrate fans are not forgotten, with a range of foods and supplements:

- Invertebrate Vitamin Formula
- Invertebrate Gourmet Gumbo
- Invertebrate Appetite Stimulant
- Invertebrate Calcium Supplement
- Invertebrate Smorgasfood
- Invertebrate Target Food
- Strontium Plus - for healthy corals and anemones

Coralife also produce Purefil filter pads, Activated Carbon, and Phosphate Remover.

Anti-static absorbent cloths are available for use with tank cleaning preparations, and Quick Wipes for tank interiors.

Their range of frozen foods is supplemented with vitamins, and suitable for marine and freshwater tanks. It includes:

- Gumbo Red - seafood and algae diet for marine fish
- Gumbo Green - for algae eating fish
- Reef Stroganoff - for reef systems
- Coral Cuisine - for fish and inverts
- Bloodworm Banquet - frozen Bloodworms
- Gourmet Green for herbivorous fish
- Freshwater Feast
- Cichlid Souffle - with Spirulina

Colour co-ordinated tank and hood

A smart new 'Gem Horizon' tank and hood arrived from John Allan Aquariums just in time for our step-by-step beginners' set-up this month. The blue top and bottom trims not only set off the looks of the tank, but also obviate the need for a layer of polystyrene under the tank. Red or black trim is also available if they suit your room better.

A matching Mini Horizon Deluxe hood completes the effect. This has a compartment to house the lighting starter gear (and a small air pump if required) under a hinged cover. Clips for a fluorescent tube are fitted.

The front of the hood is also hinged, allowing access for feeding and maintenance. The aluminium construction is finished in vinyl, and the interior is finished in white vinyl to help reflect light from the tube into the tank.

The tank we used was 24" x 12" x 12", a size which retails at £21.68, and the hood sells for £19.56.

Star rating

Quality	★★★★
Practicality	★★★
Price	★★★

...REVIEW UPDATES...

Glass airstones and disposable diffusers.

Ginger products

Last month we expressed concern that the Ginger Foods imported by Atlantis from the USA might not be as fresh as they should be, coming in screw top jars with no other seal. Since then we have enjoyed excellent results with the food - the Spirulina in sinking stick and flake form being outstandingly popular with a wide range of fish including brackish water puffers and gobies, a Picasso Trigger, and our newly-acquired shoal of Severums.

Brine shrimp sinking stick has also gained the five star fishy version of Egon Ronay approval.

We are assured that the foods now have a date stamp and are guaranteed to reach British shops within six weeks of production.

We are continuing tests on the undergravel plates which we thought may be slightly brittle, utilising a 30° plate in one of our office tanks.

The Z-rock (Clinoptilolite Zeolite) which we placed in a test tank has split into pieces along what appear to be sedimentary lines and turned yellow. Judging by the ammonia levels our test kit recorded it had become fully charged on its surface in around six weeks. We shall try recharging it in a salt solution.

The Ginger range includes a new glass beaded air stone, designed particularly with protein skimmers in mind and claimed to be very long lasting if washed regularly. It produces a very turbulent stream of air compared to similar airstones, and looks well worth investigating.

Hagen Biolife

The Hagen Biolife filter in our office tank has been running for a few weeks now, and one or two little problems have shown up.

The first was when a fish got stuck inside the heater compartment. This was not a tiny new-born Guppy, but an American Flag Fish over an inch long. Fortunately our filter is a demonstration model with a transparent casing, so we were able to see the fish and (eventually) rescue it. It must have jumped to do it...

The other problem is with the suckers which attach the hanger to the tank - they have given up sucking. This allowed the filter to slide down to the bottom, submerging the inside filter section.

One solution would be to silicone the hanger to the tank wall, but that would mean draining the tank. At the moment the filter is resting on a flowerpot to keep its top above water and complete the wet and dry circuit.

SNAP HAPPY

IGGY TAVARES PhD with some tips for the newcomer to fish photography.

I have had a lot of pleasure over the years keeping and breeding tropical fish, and cichlids in particular. Recently, I have added a new dimension to my hobby - fish photography.

I have one of those new fangled small cameras which does almost everything for you, and takes perfect photographs. It loads the film, has a zoom lens with autofocus, autoflash, and even winds the film back when finished.

Unfortunately the camera is not really suitable for fish photography since it is not able to focus on close objects. Its minimum focusing distance is about three feet and unless the fish is enormous, one needs to get within six to twelve inches to take successful photographs.

Moreover, autofocus lenses have the annoying habit of frequently being confused by the aquarium glass, resulting in out of focus photographs.

The camera

After reading some articles about close-up and fish photography, I realised that I needed a single lens reflex (slr) camera, where the image seen through the viewfinder is actually produced by the lens.

Such a camera has the advantage of interchangeable lenses such as wide angle or telephoto lenses, thus enabling one to obtain superbly-focused photographs under varying conditions.

Ten years ago I had purchased such a camera, a Pentax ME Super, and fortunately, I was able to dig it out from the back of a cupboard to find that it was still in excellent working order.

Extension tubes or bellows

Close-up photography can be done using the standard 50 mm lens which comes with the camera, providing extension tubes or bellows are used. Extension tubes which are relatively cheap, usually come in sets of three and are fitted between the camera body and the lens.

The larger the extension tube, the closer the camera to the subject to photograph and one has to select the correct tube or combination to suit the situation.

Bellows work in a similar sort of way but provide a continuously variable separation between camera and lens, hence allowing greater flexibility in approaching one's subject, but are of course more expensive. Another alternative is a special lens which screws onto the front of the standard lens and enables one to do close-up photography.

The macro lens

However, since I was very keen, I decided to go even better and invest in a macro lens. Macro lenses are expensive and are hard to come by secondhand.

Sigma make a very good 50 mm, f 3.5 lens with full macro facility, which is capable of focusing down to one inch and giving one to one magnification.

The macro lens cost more than the camera body but I have been very happy with it, especially since the lens functions as a normal lens as well.

The flashgun

Most of the books I read, suggested using three flash guns, one on each side of the aquarium and one above, pointing downwards at a 45° to the aquarium glass.

However wanting to keep my set-up as simple as possible, I decided to try and use one flashgun mounted in the hot shoe of the camera.

I purchased a dedicated Pentax flashgun with an adjustable flash head which could be adjusted to point straight ahead or angled upwards. Later purchases included an autowinder, a long remote release cable and a tripod.

Catfish tend to stay stationary for long periods making them ideal subjects for photography.

Shutter speeds and apertures

The shutter speed on the Pentax is synchronised for flash photography at 1/60 sec and so invariably that was what I used. For normal flash photography with a 50mm lens, the aperture is usually set at f5.6 - but with the macro lens in close-up mode, the best results were obtained between f/11 and f/22. With the lens in macro mode, the depth of field is very small and using larger f stops is beneficial since they give greater depth of field in focus.

Fast Film

Using a fast film such as 1000ASA, one can use the aquarium lights supplemented by natural light to get reasonable photographs without using flash.

However the aperture will probably have to be set at 5.6 and the shutter speed at 1/4, thus reducing the depth of field and possibly causing some blurring, if either the subject or the photographer moves, because of the slower speed.

The film

There is a whole range of film on the market, but I had heard that slide film is best. I started off by using Kodachrome (100 ASA) and after some trial and error got some good results. The cost of a 36 slide film roll and processing is about £8.

Apart from the obvious disadvantage of not being able to view your slide without a projector or viewer, the problem arises when one wants an extra set of slides or prints, say of a spawning sequence. At £1 each, the cost quickly mounts up.

Ordinary negative colour film (100 ASA) and prints are much more cost-effective, since a whole range of photographic houses will develop, produce two sets of 36 prints, and give a free film for under £7. I almost always use negative film (100 ASA) and am not inhibited in my shooting, by the cost.

Practical Fishkeeping is very happy to accept good-quality prints or slides for publication.

Above: A typical beginners' mistake – the flash gun features large in this angelfish picture.

Right: Arguably even worse – out of focus and poorly lit - with a superb view of the photographer himself!

Experimenting

When I first got the macro lens, I tried a whole range of permutations with aperture, shutter speeds, flash angles and camera angles.

I quickly learned that pointing the camera and flash straight at the glass of the aquarium did not work.

Not only did one get flash reflection thus ruining a sometimes good photograph, but occasionally "special effects" were obtained and I even managed to get a reflection of the camera in the photograph.

This problem was soon overcome by always having the camera a couple of inches or so above the fish, thus pointing the camera down at a small angle to the aquarium glass, while the adjustable flash head was directed straight ahead. This simple set-up avoided the problem of flash reflection.

First Photographs

Taking good photographs of fish needs patience. In a community tank, most fish are always on the move and coupled with the small depth of field that one has to work with, fish are a difficult subject to photograph.

Fish photography is probably best started with a species that stays relatively still on the gravel. This gives ▶

Left: Good shot of the blayeti spawning – but look at the out of focus tail and body in the foreground.

Below: When shooting cichlids they show their colours best when not stressed so try to shoot them at home in their shelters.

one the chance to focus and shoot, taking care to keep the camera pointed at a small angle to the aquarium glass. Of course it goes without saying that that the aquarium glass must always be perfectly clean for best results.

Good subjects are large cichlids or catfish, since the camera needs to be further away to capture the whole fish, making it easier to focus and giving greater depth of field.

Care has to be taken not to frighten the fish when first approaching and when the fish are accustomed to you and the camera, they generally take no notice of the flash.

It also helps if the fish have been well-fed before photographing, because they do not associate your approaching with feeding time which gets them rushing around madly.

More Photographs

With experience, one can start panning, that is following the fish with the camera and shooting when the fish is in focus.

This is hard work and an easier alternative, particularly with cichlids is to study their prefered routes in the aquarium, and then to set-up the camera at a select vantage point, and shoot when the fish comes into view.

A special photographic tank

For difficult-to-photograph fish, or if your patience runs out, one can use a special photographic tank.

I made a small 10" x 10" x 3" tank by sticking the panes of glass together with silicone rubber glue.

An additional pane of glass 9.8 inches square is needed and is placed inside the tank to restrict the movement of the fish if necessary.

I have used this set-up to photograph cichlids, but found that they invariably show their fright colours and not their lovely breeding colours. The photographic tank is more successful for tetras, barbs, Guppies, Swordtails and other fish which do not easily loose their colouration.

Using the extra pane of glass angled from the bottom front of the tank, to restrict fish movement, with gravel or sand on the tank bottom and a nicely-planted background, a very "natural" photograph can be produced, since the extra pane of glass is invisible in the final picture. Again care has to be taken to avoid flash reflection.

Spawning Fish

Fish photography comes alive when photographing spawning cichlids, and this can be surprisingly easy, especially with the open spawners.

A good cichlid to start with is a small to medium sized one such as *Aequidens curviceps*. Providing you have a healthy male and female which are well-fed, they will spawn frequently.

A well-planted 30" tank, with an open area in the front where a flat stone is placed, will usually induce the fish to use the stone to spawn on where they are easily accessible for photographing. Once you see prolonged pre-spawning activity such as fin-flaring displays, cleaning of the spawning site and perhaps even jaw- locking, it is time to have your photographic equipment on standby.

It is best to mount the camera on a tripod so that the lens is some two inches above the spawning stone and the camera is placed such that the field of view is sufficiently large to capture both fish during spawning.

The small angle caused by pointing the camera downwards hardly causes any distortion in the final photograph but does avoid the dreaded flash reflection.

The adjustable flash head is set pointing straight at the aquarium glass and great care is taken on the initial focusing in order to ensure sharp photographs.

Using a long remote release cable and an autowinder to expose and wind the film, one can now retire to a safe distance, leaving the fish to spawn undisturbed.

The spawning fish are usually so engrossed in their own activities that will hardly notice the flash going off. Using a similar aquarium and photographic setup, I have also achieved good results with *Haplochromis bloyeti*, an East African mouthbrooder.

Get snapping

An old manual slr camera and a cheap set of extension tubes is all that is needed to get one started in this absorbing hobby.

Many of us probably purchased such a camera in the seventies or eighties and it is probably now sitting in a cupboard unused, following the invasion of the small fully-automatic camera.

Alternatively a secondhand slr manual camera can be bought for as little as £40. Successful fish photographs can be taken any place any time with just the single adjustable head flash mounted on the camera.

So get out your camera and start shooting because fish photography is fun. ■

SEND US YOUR PICTURES

Practical Fishkeeping demands the highest possible standards of fish photography – but if you follow the advice in this article, and take a high quality picture of your fish, please send it to us. If we use it, we'll pay for it, and you'll get the picture back.

Send it to: *The Editor, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ.*

References:

Dr Axelrod's Mini Atlas of Freshwater Aquarium Fishes. Dr Axelrod, 1987, TFH Publications, Inc.

Photography - The Guide to Technique. A Hawkins and D Avon, 1980, Book Club Associates.

Kissing and breeding

I have bred Pink Kissing Gouramis.

I have a 48" x 12" x 15" tank with a UVG filter, lit by a 40 watt Triton. In our area the water is hard, and I maintain pH at around 8 and 82°F. There were four Kissers in the tank between 13 and 16cm long.

The tank is usually well planted but suddenly the Kissers tore up most of the plants and began to wrap their bodies around each other.

I placed a pond lily tuber in the tank. It grew quickly, putting six fairly large leaves on the water surface - but the Kissers ignored them. The plant died off almost as quickly as it grew. A water test put the pH now as low as 4.8.

I removed the lily and replaced half the tank water and added new (treated) plants bought locally. Within a few hours I noticed a large number of fry appearing at the water surface. The pH at this time was 5.7. One of the Kissers was still dropping an occasional tiny egg. The fry grew rapidly on a diet of brine shrimp and Liquifry.

Interestingly, I have a pair of Kribensis in the tank, but they have not shown any interest in the fry.

M. Swanson, Neath

***Ed's comment:* Kissing Gouramis are surprisingly tolerant of water chemistry, and farm-raised specimens can breed at a more manageable size than wild fish. Apparently a good diet is the important factor in getting them to spawn.**

Glass warning

In a recent reply to a letter, Dr Ford advises using cheap glass such as ex-shop window glass to build tanks. I totally disagree. Apart from being almost impossible to cut, second hand shop windows are usually of inferior quality. The stresses set up by the effects of heat and cold on the glass could have weakened it to the point that it may fracture under pressure in the aquarium.

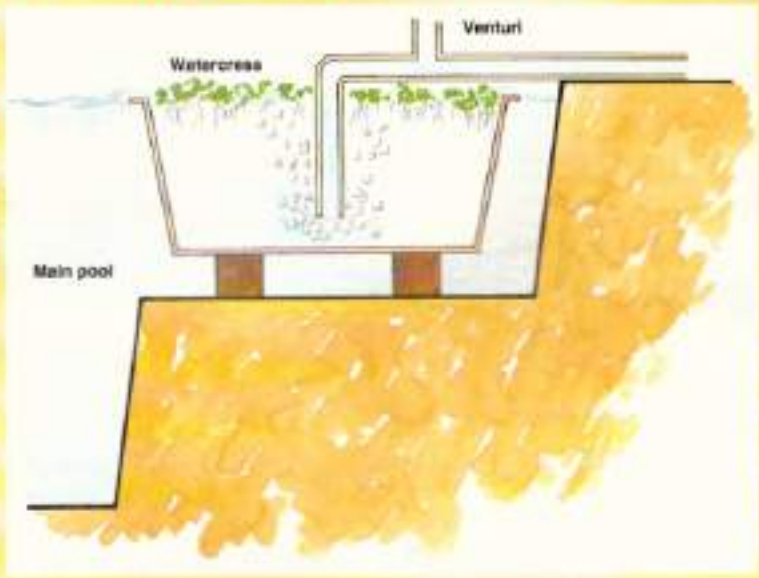
When building tanks, especially of large proportions, a more professional approach is required as outlined in a recent PFK project on tank building by Audrey Reid.

If you are thinking of building a tank with a water capacity of say 250 gallons in your front room, nothing can be left to chance.

Graham Huyton, Isle of Wight

***Ed's comment:* While I agree with your comments in principle, Mr Huyton, it has to be said that Audrey Reid's article in *PFK* also recommended shop or scrap glass but suggested getting it professionally cut to size. Remember Dr Ford's comments are extracts from the longer personal answer that every reader gets to their queries. What a service - and it's free....**

Keeping watercress off the menu



Koi will eat pond vegetation - especially watercress which can have benefits in removing nitrates from the pond. Mine constantly dregged it out of the pots. So I used a large plastic storage box, and filled it with rocks but loose watercress and placed it in the main pool fed by the return flow from a gravity-fed filter.

The Koi eat only what they can reach and the unit appears to make an effective vegetable filter.

Martin Byrne, Roker

Against syphoning

In June's Tropical Answers D. Benton asked about an anti-syphoning device for his external filter.

I've found that a small hole drilled in the filter intake just below water level will prevent accidental syphoning.

As long as the hole remains clear of debris, if a pipe should split, air leaking into the system through the hole should limit any mess and prevent an accident from turning into a catastrophe.

Steve English, Weybridge

Bloodworm feeder

An old filter canister with a row of holes drilled in the bottom can be floated on the surface of your tank, and will make a useful live bloodworm feeder.

John Court-Holmes, Welwyn, Herts

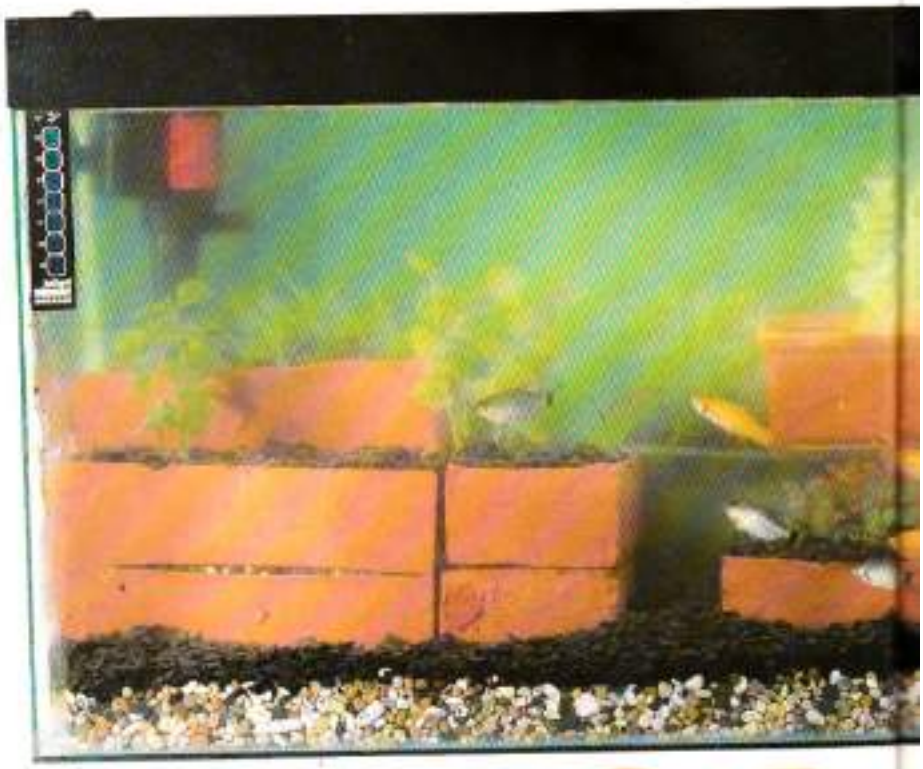
Travelling right

I read with interest John Nicholl's article *Travelling Right* in the April issue.

In one of his diagrams (page 53) mention is made of a step-up transformer. I feel I should warn your readers that only 'inverter' types that use special electronic switching circuits should be used. Under no circumstances should ordinary AC mains transformers be used with a 12v DC car battery, as the circuit will not work, and damage is likely to occur.

Steve Halliwell, (Electrical Engineer) Morton, Lincs.

In fishkeeping it is traditional to aim for a very naturalistic effect to the aquascape, but why should this be so? There are many other possibilities. Here, IAN LUCAS takes a look at some ideas for aquascaping a tank in a more formal style.



A tidy for tidy

A furnished aquarium is a form of living artwork, comparable to a garden, or a pond. In those two areas many styles are used.

A formal garden with a raised, brick-built pond among its raised flower beds is quite different to a traditional cottage garden, but both are considered valid, and both can be very attractive.

Neither shows the plants in a close simulation of their natural habitat, but both impose an idea of how the gardener would like that habitat to be.

Even naturalistic styles of aquascape do not replicate nature, but are an idealised vision of how we would like nature to be.

A formal tank would perhaps owe as much to landscape gardening as to an idealised stream bed. Within the limits of a suitable environment for the kind of fish we intend to keep, any style of decor which appeals to the fishkeeper should be acceptable.

Materials

Plastic plants can be useful, as it is possible to have two or more identical specimens, which is not easy with living plants.

Some live plants, such as *Amubias* spp, or the Japanese Rush, *Acorus*, have striking shapes, suitable for this style.

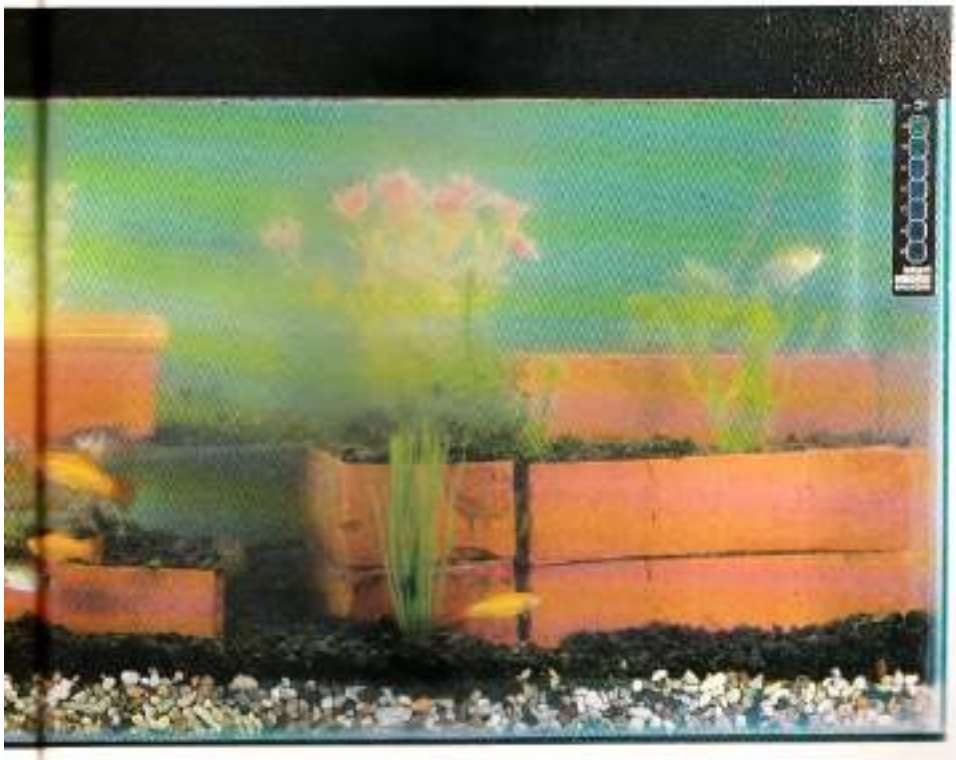
Some manufacturers produce 'formal' looking tank decor, such as 'stone walls' archways, etc, but more adventurous materials can be found elsewhere.

Apart from aquarium dealers, good sources of items for a formal tank include kitchenware shops, DIY stores and model shops. Keep your eyes open wherever you go.

Safety first

When experimenting with objects or materials for potential tank decor, the health and safety of the fish should be of paramount importance.

- **Sharp edges** must be avoided.
- Any built-up structures **must be stable.**
- Fish must not be able to get **trapped.**
- Items designed for **food or drink** use will be non-toxic.
- **Glass and ceramics** should also be OK.
- Plastics not intended for food use vary: **some may leach dye into the water, and some can be toxic.**



Left: Our set-up sited
Brick facings
Black gravel
Ceramic jewellery box
Ceramic cooking beans
Plastic plants
Plastic glazing sheet

TIP: Test unknown materials by soaking them for several days. If the water colours, change it, to see if more dye comes out.

Test for toxicity with a few *Daphnia* in the container, as they are more sensitive to toxins than most freshwater fish. If they survive all should be well. Check pH and hardness for extra certainty.

y tank
y minds

Design

When it comes to design, you can exercise your artistic abilities to the full, restrained only by the fish's needs and yours. The fish, according to species, will need swimming space, and hiding places, and you will need accessibility for tank maintenance.

You can aim for a stylised representation of nature, but include straight lines and symmetry, which are rarely found in nature. Alternatively, you can turn your back on nature entirely, using sculptural shapes and textures, which appeal to you in their own right.

Colours do not have to reflect nature either, although subdued colours will show off most fish better. You may like to experiment with colour schemes designed to display ▶

MATERIALS

Silicone sealant and polyurethane varnish help keep your fish safe.

Safety items:
- Aquarium silicone sealant for attaching decor items
- Polyurethane varnish for sealing decor materials
- Non-aquarium sealant, and other varnishes, may be toxic to fish

Synthetic substitutes for rocks.

Rockwork can be represented by:
- Tiles for terracing, backgrounds or even substrate
- Fishing net floats - these need plenty of silicone to stick them down
- Dressed stone blocks
- Glass ashtrays

Colourful substrates - but not too bright.

Substrates include:
- Coloured aquarium gravels
- Stone chips
- Ceramic cooking beads
- Glass beads
- Marbles

A variety of planting containers.

Planting containers:
- Sundae dishes (grapefruit dishes in picture)
- Brandy glasses
- Pencil holders
- Mini-seed trays
- Earthenware plant-pots and half-pots

Above: Clown Rasboras look almost hand-painted

Right: this boldly-patterned pleo will keep algae at bay

TIP: Decor materials can be sealed with matt or gloss polyurethane varnish, as is sometimes done to bogwood. Any soluble matter will be sealed in.

particular fish species to best advantage. For instance black and white decor, with Silver and Black Mollies.

A formal aquascape can be tailored to compliment the decor of the room, following the same colour scheme and style. Black, angular items can be used to aquascape a tank in a modern, hi-tech styled room, or gentler shapes and colours in a more traditional room.

Our set-up

We have used a style which reflects, but does not try to imitate, nature. The symmetrical terraces were built up with brick-effect facings, designed for fireplaces. These needed several coats of polyurethane varnish to prevent the dye leaching out.

Clear perspex sheet behind the terraces prevents gravel eventually seeping out between the bricks.

The central planting 'bed' conceals the heaterstat, and provides a hiding place for shy fish.

The raised planting shelf could be siliconed to the back of the tank, with vertical braces, for a more permanent installation. We preferred to keep the heaterstat more easily accessible by resting the shelf in place.

the planting tub is a ceramic jewellery container.

The plastic plants soften the harshness of the terracing, but we could have used more spiky plants, such as Acorus, to emphasise it instead.

Dramatic-looking black gravel can be hard to come by, so we used a small amount to cover a thick layer of ordinary gravel for the undergravel filter. This would be very sensible if using an expensive substrate such as glass beads. The trick would normally be concealed at the front of the tank.

Constructions

Silicone sealant is ideal for attaching decor materials to each other. It is non-toxic (once cured), and it can be removed if required. It can also be used to attach bouyant materials to the tank base, or to a concealed heavy rock.

If you make complex constructions, make sure they are stable enough not to tumble, possibly injuring your fish, or breaking the tank glass. The requirements here will depend on the destructive capabilities of the chosen fish species.

Ensure that fish, or decomposing waste, cannot get trapped inside or behind your structures.

Also bear in mind that you might want to catch your fish one day, so make their hiding places accessible or removable.

Cement can be used in making formal 'rockwork', and other structures, but remember to wash all the lime away before placing cement

SUITABLE PLANTS FOR THE FORMAL TANK

Nomaphila

Water Clover.

Amazon Sword.

Aponogeton.

Above: A Flying Fox.

Left: A striking Hypancistrus zebra.

Below: A Blind Cave Fish.

structures in the tank water. Soak cement in several changes of fresh water, until it no longer increases the hardness and/or pH.

Equipment

The tank's equipment can either be disguised, as in an informal tank, or incorporated into the formal aquascape.

Aeration, particularly, could be used as a design feature. Air curtains and long airstones can be used to release bubbles where they will play onto other features.

A modern-looking internal power filter could be left exposed, as a feature in itself, rather than hidden behind aquascape features. Two small filters in the back corners would give a symmetrical look, as well as allowing you to clean them in rotation to minimise loss of bacteria.

Fish

Algae may not be a welcome sight in a neat formal layout, so some algae eating fish would be advisable. Sucking Loach, Otocinclus, Plecs, Platies, Mollies, or other algae grazers are very useful.

You may like to co-ordinate your fish, perhaps mixing Tiger Barbs with Clown Loach, so that the bottom-swimming fish and the midwater swimmers are similar in coloration and pattern.

Visually, some fish might suit a formal layout better than others.

Fancy Goldfish, which look 'man-made', could suit a 'man-made' tank style, as could fancy varieties of livebearers - specially the single-coloured types.

Plants

If real plants are used, those with a definite shape, like Amazon Swords, will be more in keeping than, say, Cabomba.

Creeping plants, such as Java Moss, can be trained into shapes, perhaps by growing them up a trellis, or over suitably-arranged rockwork.

Other species which may look appropriate include,

- Japanese Rush, *Acorus*
- Hairgrass, *Eleocharis*
- Water Cabbage, *Somalus*
- Vallis, *Vallisneria*
- Water Clover, *Marsilea*
- Anubias

TIP: If using an expensive substrate, use a thin layer for show. An under-layer of cheaper gravel can provide the depth required for terracing, planting, or undergravel filtration. ■

Some formal-looking tropicals

Royal Zebra Plec, *Hypancistrus zebra*
Penguin Fish, *Thayeria boehlki*
Red Tailed Black Shark, *Labeo bicolor*
Tiger Barb, *Barbus tetrazona*
Black Widow, *Gymnocorymbus ternetzi*
Blind cave Fish, *Astyanax mexicanus*
Black Phantom, *Megalamphodus megalopterus*
Pencil Fish, *Nannostomus* spp
Lemon Tetra, *Hyphessobrycon pulchripinnis*
Red Eye Tetra, *Moenkhausia sanctae-filomenae*
Bloodfin, *Aphyocharax anisitsi*
Spotted Headstander, *Chilodus punctatus*
Clown Rasbora, *Rasbora kalochroma*
Flying Fox, *Epalzeorhynchos kalopterus*
Spotted Pim, *Pimelodus pictus*

Certain brackish water fish could also look good:
Malayan Angel, *Monodactylus argenteus*
Bumble Bee Goby, *Brachygobius* spp
Knight Goby, *Stigmatogobius sadanundio*
Amur Catfish *Arius* spp

Marine Answers

Too tiny

I have kept tropical fish for several years, and would now like to try marines. Unfortunately my tank size is limited to 28" x 15" x 18" (30 gallons), would it be possible to have a fish-only marine set-up? If so what type and number of fish would be suitable?
David Turney.

Small quantities of marine water are inherently unstable, and are best left to very experienced marine fishkeepers. I would not attempt a 3' tank as a first marine set-up.

Try to find space for a minimum of 36" x 15" x 18".

Confine the Porcupine

The Porcupine fish in my 48" x 24" x 24" tank is very friendly, but when I try to feed my other fish it simply eats all the food.

I do not want to get rid of him, so I was considering buying a 24" x 20" x 24" tank for him alone.

Could two fish live in the new tank? And how do you sex these fish? If you cannot tell them apart, would two fish of the same sex fight?
Steven Jackson, South Humberside.

It would be an excellent idea to provide your Porcupine Puffer with a separate tank, but don't introduce another into the same tank because they just don't get on and one of them would almost certainly die.

Too small for a Dwarf

I have a small tank (24" x 15" x 12") in which I am planning to keep only two fish: a Cherub Angel and a small Regal Tang, which I would return when it grows too big. I intend to start with the Dwarf Angel, and after three months I will put in a very young Regal Tang, which I would keep until it is three inches long.

Should I soften the water now, and will the similar diet of these two fish make them competitive and territorial in such a small tank?

A 24" tank is extremely small for marines and would usually prove to be very unstable indeed. I certainly would not choose a Dwarf Angel or Regal Tang as inhabitants. Two or three hardy Damsels would be more like it.

Condylactis gigantia in the Caribbean

Anemone advice

Q **My 48" x 18" x 15" first marine tank will have undergravel filtration, with two powerheads and a protein skimmer. Would it be possible to keep anemones, with three 40W Triton tubes and one 40W actinic tube?**
• Tina Spry, St Austell.

A This lighting is adequate for anemones. About 1" of fish to 6 gallons of water after one year is the recommended maximum to preserve the excellent water conditions that anemones demand.

I would also advise a canister filter fitted with activated carbon.

Batfish behaviour

Q **I have a Dwarf Lionfish and a Batfish in a 6' x 2' x 2' tank. The Batfish swims on its side at night, is this normal?**

What else could I keep in my tank?
• J. Preman, Dalley.

A Your Batfish may swim on its side at night because it has lost orientation with the tank's bottom, or it may be an instinctive camouflaging technique.

I see no cause for alarm unless it does it during the day, or shows signs of sickness.

Although you have a good-sized tank, many other fish may be inclined to nip the fins of a Batfish, so tankmates will have to be chosen with care. They must also be large enough to avoid being eaten by the Lionfish.

I would be tempted to introduce some other species of Lionfish, which make ideal tank companions.

Night-time camouflage? Batfish in lying doggo

Tank for a Peacock

Q **I have a 30 gallon corner tank, and would like to set it up for a Black Peacock, *Pterois volitans*.**

I am thinking of reverse-flow undergravel filtration using a Fluval 303 or 403, filled with ceramic prefilter, carbon, and foam block or filter wool.

Substrate would be calcium plus and coral gravel, with coral sand on top, separated by a gravel tidy.

How many uplifts should I use, and do I need special adaptors to connect them to the filter?

I have a 200W heater mat and external thermostat, will these be suitable, or should I buy a heater/stat?

How do I determine the size of protein skimmer I need?
• Gary Smyth, Bolton.

A Use the Fluval 403. Run it into two uplifts at opposite ends of the tank, and pack it with filter floss and carbon. Reverse-flow adaptors can be supplied by a good dealer.

Internal protein skimmers are determined by the depth of the tank. Choose the largest that will fit.

A heater mat and thermostat are fine.

Spotlight on the wandering anemone

Q How can I treat a 'wandering' anemone? I have a 48" x 18" x 12" marine tank, containing a Blue/Yellow Damsel, a Long Nose Butterfly, two Clownfish, and the problem anemone. I have a rock and coral arrangement in one corner, with a mixture of smooth flat rocks and a few coral items.

In the two months since I installed the anemone it has visited virtually every area of the tank, often selecting the most uncomfortable looking places to stay, including perching on the very top of a rather spiky coral 'tree'. At times it almost seems to run rather than wander!

It has managed to fall flat on its 'face' after climbing to the very top of the glass and attaching itself to the underside of the small glass shelf that runs along the top, which, by the way, made it almost impossible to feed.

Can you suggest how I might persuade it to stay in one place?
• J. C. Dawes, Suffolk.

A Some species of anemone, such as *H. gelam*, are particularly prone to 'wandering' about the aquarium and never really seem to settle in one place. There is not a lot you can do, except to make sure your lighting and filtration is up to scratch. It may be possible to encourage it to stay in one area by fitting a spotlight of the mercury vapour variety.

Nitrate puzzle

Q Our three month old Seabray systemised set-up has an Eheim 2252 containing two sponges, and an overtank trickle filter. This has a fine sponge pad and Ehfi-substrat Grob, followed by activated carbon.

There is also a Sander WT 350 protein skimmer. Lighting is by six tubes, with reflectors.

We used tap water, via Purity on Tap filters giving 6mg/l nitrate, and salt supplied with the tank (brand unknown).

After two weeks maturation, test readings were:

Ammonia 0
Nitrite 0.05 mg/l
Nitrate 50+ mg/l.

To reduce the nitrate, we bought lots of Caulerpa, but it went white and died.

Suspecting the salt, we changed. Nitrate was 3 - 6 mg/l. We added a polyfilter to the trickle filter, and changed the carbon for Chemi-pure. We bought more Caulerpa and a Pufferfish.

After two weeks nitrates were again 50+ mg/l. Within a couple of days of adding two Nitrex boxes there was a bacterial bloom of green water, reducing visibility to three inches, but the Puffer and Caulerpa are fine. Lighting is down to two tubes. Nitrates are still 50 mg/l.

Why does the nitrate keep rising, and how can we reduce it, and clear the green water?
• Howard Farley, Portsmouth.

A I, too, am puzzled by your nitrate increase, - could it be the salt? Try mixing a gallon of fresh seawater, and test for an increase in nitrates.

Caulerpa is not very hardy, and sensitive to changes in the chemical and biological activity of a new set-up.

Your cloudiness is an algal bloom rather than bacterial, and is not connected with the Nitrex filter. It is due to excess nutrients in the water - check that your tapwater filter is operating properly, as these should be filtered out.

For the moment I would let things settle, the algal bloom will pass, but the nitrate problem may be more difficult to solve.

Left: A hardy Puffer may cope with nitrate trouble - for a while at least.

Clownfish may spawn given good conditions.

All the way with inverts

Q I have had a 20-gallon marine tank for almost one year. I have two Clownfish, which I bought as juveniles of a similar size. Now one is much larger than the other. Is this the beginnings of a mated pair?

I want to upgrade to a much larger reef tank in the near future, but first should I gain much-needed experience in keeping invertebrates before committing myself to the expense of failure with a large tank?
• Mark Watts, London.

A If I were you I'd go the whole hog and set up a large invertebrate aquarium. It will be much more stable and you are likely to have a greater degree of success. Find a good dealer and be guided by their expertise.

It does sound as if your Clownfish have developed into a pair. Perhaps they will spawn for you in the new tank.

NICK DAKIN is your expert on the saltwater scene

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MARINE ANSWERS
■ Nick Dakin

Turn the page for Nick Dakin's new in-depth marine feature

Dakin IN DEPTH

Most of the telephone queries we get come from marine fishkeepers. So, to recognise the pressing need for more knowledge in the subject we begin a new series which will allow our marine expert NICK DAKIN to answer a chosen query in greater depth each month.

Q **I've never been quite sure how external canister filters should be correctly packed and properly maintained. Can you enlighten me please?**
• J. Sullivan, Maldon, Essex.

A There is no doubting the fact that external canister filters are one of the most versatile but misunderstood pieces of aquarium equipment and I hope the following will give you a clearer insight. Canister filters can be used in three main ways:

■ As a purely **mechanical filter**, packed mainly with filter floss to extract larger particles of detritus and act as a pre-filter for reverse-flow systems and trickle filters. To achieve a good through-flow of water and an extended media life, it is important to pack all materials fairly lightly. Depending on how heavily stocked the tank is the filter media will need replacing every 1-2 weeks.

■ For **chemical filtration**, which usually means packing with an adsorptive medium such as activated carbon or some sort of resin. This may act entirely independently or as a pre-filter to a reverse-flow or trickle system, in which case the packing should include some filter floss just before the water return. The chemical medium should be contained in a nylon mesh bag specially made for the purpose, but if this is not available, then it may be placed between two pieces of filter floss.

If this latter method is used, then the filter floss will have to be be changed once a week to prevent clogging and a restriction in water flow. Replace filter media every two months in the case of carbon but follow manufacturer's instructions with resins.

■ **Biological filtration**, which will require the packing of a suitably porous material that is also fairly coarse and will allow a good water flow (sand is useless in this respect). If flow is restricted in any way, the bacteria will begin to die.

Encase biological medium in a nylon bag to prevent it being drawn into the motor impeller and causing damage. As this type of filter should be disturbed as little as possible, it is not advisable to mix it with other media that require regular attention like filter floss.

Back-up or main filtration?

If an undergravel filter is in use, whether downflow or reverse-flow, then extra biological filtration is totally unnecessary within the canister which could be put to better use with chemical media. If the filter is large enough and stocking levels are kept reasonably low, it is possible to use a canister filter as the sole means of biological filtration, thereby supplying valuable extra water volume as the undergravel media are dispensed with.

It is not, however, a practice to be recommended to the inexperienced unless under expert advice.

Packing

It is vitally important that canister filters are packed fairly loosely and maintained correctly to ensure that the correct amount of water reaches the pump impeller. If the impeller runs dry, irreparable damage can easily be done, or at the very least it will be the cause of clattering, noisy units.

The correct position

Always make sure canister filters are sited below the aquarium and not on the same level or above. This enables the syphon to work correctly.

In an ideal world, the top of the canister should be just below the bottom of the tank; the greater the distance below, the less water will be pumped due to back-pressure.

Equally, never use more hose than is absolutely necessary as back-pressure again will reduce water flow and put an unnecessary strain on the pump. Friction will also cause much the same effect.

Maintenance

Maintenance is much easier if double taps are fitted to both the inlet and outlet hoses. The syphon need not be broken and there is no risk of water leaking onto the carpet.

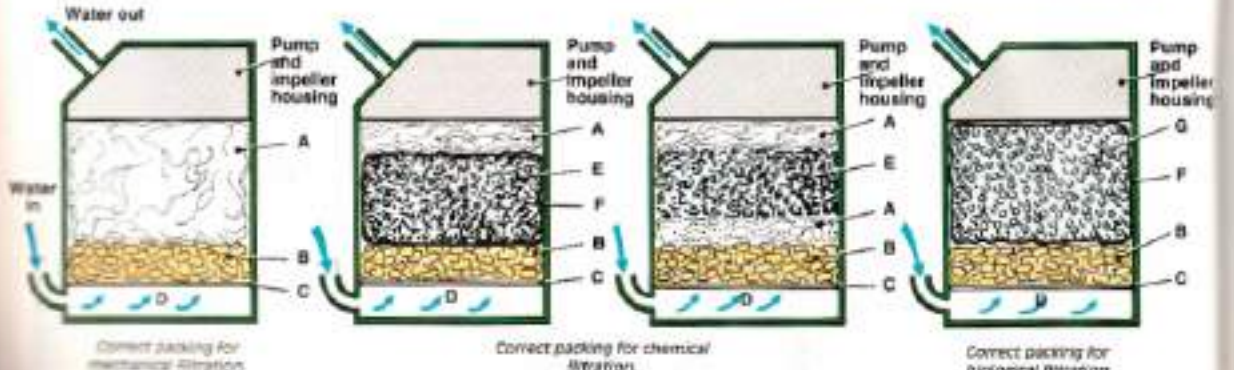
Clean inlet strainers and outlets once a week (more, if required) and all tubing should be cleared of obstructive algae and detritus with a proprietary hose brush every few months.

A useful tip is to exclude all light completely from the tubing by wrapping it in strips of black bin liner, thereby depriving algae of all light so, in theory, they should not form at all.

Lastly, do not underestimate the usefulness of the pre-filter pad or ceramic pieces. They not only extract larger pieces of debris but enable the pump to draw the water through the various media much more efficiently. Never be tempted to dispense with pre-filter media.

Key to diagrams below:
A Filter floss
B Coarse pre-filter pad or ceramic pieces
C Rigid plastic grid (may change according to model)
D Space
E Activated carbon, resin, or other substance
F Nylon mesh bag
G Biological medium (coral gravel etc.) coarse
→ Water flow

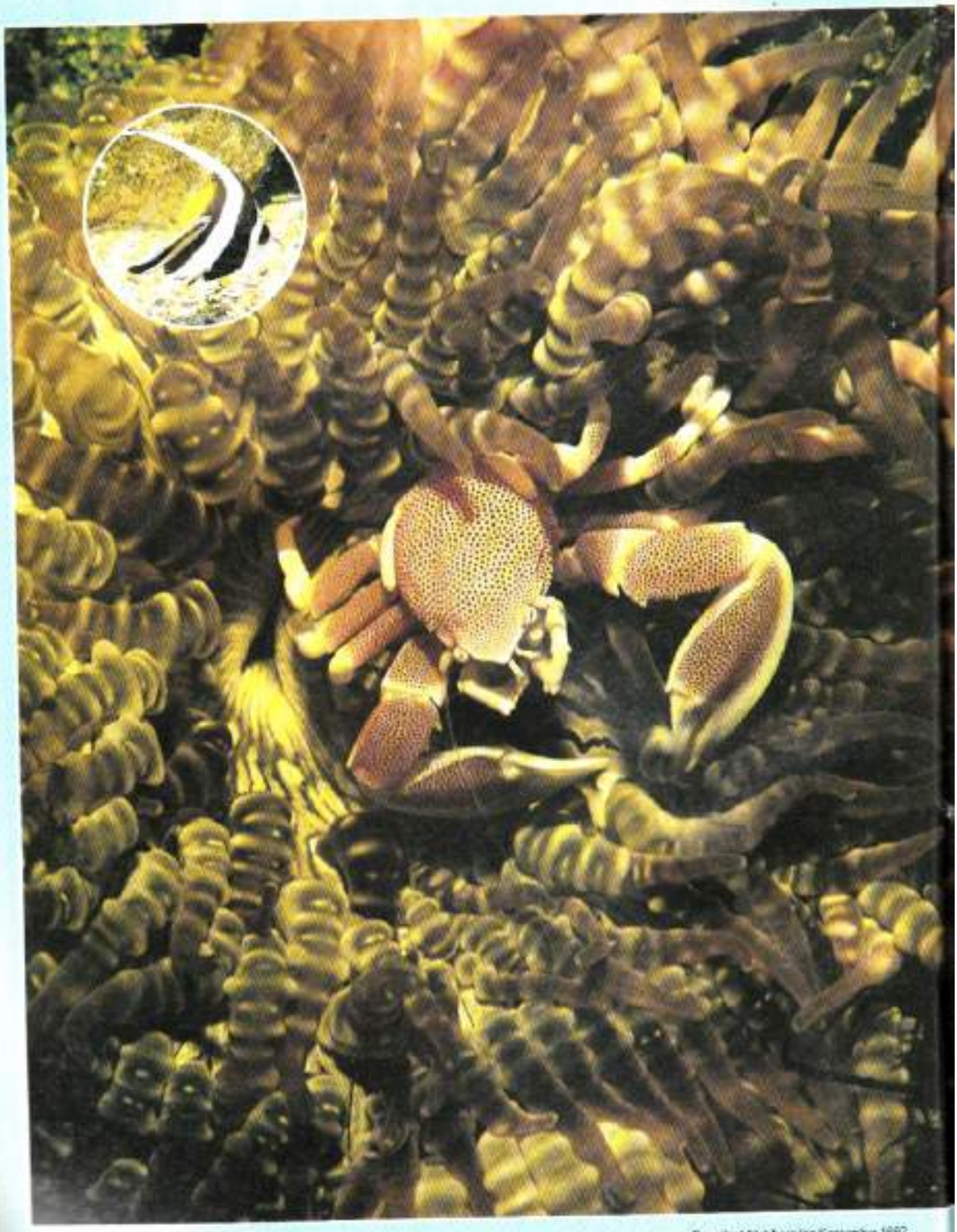
■ ***Although a stylised canister filter is shown, and designs may vary, the packing order will always be the same.***



Correct packing for mechanical filtration

Correct packing for chemical filtration

Correct packing for biological filtration



Friendliness & cleanliness

From mutual protection to personal hygiene, there are many reasons for interdependent relationships on the reefs.

LES HOLLIDAY explains...

Left: Anemone Crab, Neopetrolisthes ohshimai and its host anemone.

Inset: Cleaner Wrasse and client.

Right: Clownfish seldom stray from their host clown.

Below: Cleaner Shrimp/anemone association.

Over the last couple of issues of *PFK* we have looked at the measures we need to take to avoid disharmony in the marine aquarium due to the natural aggressive tendencies of some reef fish and invertebrates towards one another.

Fortunately not all of the natural interactions we import from the wild into the aquarium are based upon such behaviour - which is mainly associated with predator/prey relationships and the constant battle for food and space.

Within the teeming diversity of animals and plants living on a coral reef, there are also many examples of widely differing life forms involved in very close interdependent relationships.

Symbiosis

The most important example and one easily overlooked is the symbiotic relationship of the stony corals which act as hosts to microscopic algae living within their tissues.

Perhaps I better explain that symbiosis is popularly defined as a relationship between two differing life forms for their mutual benefit.

This fits the stony coral's relationship with its millions of single-celled plants (zooxanthellae) admirably.

These tiny plants, safely protected within the tissues of the coral polyp are able to photosynthesise using the energy of the sun to convert carbon dioxide and water into carbohydrates and oxygen. The zooxanthellae benefit their coral hosts which are able to use the supply of oxygen in their tissues for respiration and there is ample evidence to suggest that a proportion of the carbohydrates produced are absorbed by the corals as food.

Recent studies have also confirmed that there is a link between the zooxanthellae and the ability of the coral to deposit their limestone skeletons. Regrettably this has been amply highlighted recently in many parts of the world where coastal deforestation has led to turbid conditions on adjacent reefs. The reefs soon cease to grow as the poor light transmission through the murky waters prevents the

Why are clownfish immune to anemones?

The immunity enjoyed by clownfish from the venomous tentacles of the anemone has only recently become properly understood. How exactly these small fish can be safe nestled within the anemone's embrace while other fish and invertebrates are stung, killed and devoured remained something of a mystery until recently.

The answer was found during detailed studies of the trigger mechanism which activates the the anemone's nematocysts or stinging cells. The anemone was found to be triggered into action by the protein-based mucus covering most fish and invertebrates and therefore stimulated into stinging by the 'taste' of its prey.

To counteract this, clownfish have adopted a dual strategy to deceive the anemone. They manufacture a polysaccharide (sugar) based mucus covering to disguise their otherwise protein based body structure and they also cover themselves with a thin coating of the anemone's own mucus. An anemone is of course naturally equipped to recognise its own mucus to avoid stinging itself.

By such means the clownfish is able to gain refuge within the stinging tentacles as the anemone accepts the intruder, assuming the fish to be a part of itself.

zooxanthellae actively photosynthesising underlining the vital life-sustaining role sunlight plays in this relationship. This is a lesson well learned in terms of the aquarium also, as it is quite impossible to keep reef-building corals and the large number of anemones and various other coelenterates which depend on this association with zooxanthellae, in captivity, **without** high intensity lighting of the correct spectral range.

Clowns and anemones

One of the most fascinating and well known symbiotic relationships, often used to great advantage in the aquarium, is the association between clownfish and their host anemones.

In the wild clownfish seldom stray more than a metre or so from their anemone and are therefore good aquarium subjects, finding no difficulty in settling down in the confines of the average home system.

In nature they are found living singly, in pairs, or in small groups depending on the size of the host and are happy in the aquarium whichever of these alternatives you adopt, although it is wise when keeping a number together to restrict these to one species, as most clownfish species are mutually intolerant of other species of their family and will not share living space or an anemone host.

The benefit to the clownfish is obvious but the advantage to the anemone is less clear. One theory is based upon aposematic, or warning coloration suggesting that the bright coloration of the clownfish acts as a warning to predators against approaching too closely to the venomous tentacles. Anemones are mainly plankton feeders and fish are not regarded as potential prey so there is no loss to the anemone in keeping all fish at bay by adopting such a strategy. The clownfish does therefore contribute towards protecting its anemone host.

There is little doubt that the clownfish is very dependent on the association with its anemone. In fact the numbers of anemones on a reef location control the population of clownfish to be found there. Clownfish are rarely observed in the wild without their protector and contrary to what is often recommended, they are not happy in the aquarium without an anemone.

That is not until recently, when captive bred clownfishes came onto the market.

Clownfish raised in captivity seemingly do not undergo the learning process established in the wild, which closely associates them with an anemone for the whole of their lives. This learning process starts when the female of a breeding pair lays her mass of adhesive eggs on a hard surface below the foot of the host anemone.

Once the eggs have hatched the tiny fry are without parental care and become free swimming for a brief period during which time they must find their own host anemone. Many do not successfully complete this journey as anemones are often a limited resource on the reef and most of the fry are eaten by predators before they can reach protection.

The lucky ones, once established in their new home will remain there for the rest of their lives **unless** driven out by force of numbers.

Aquarium bred clownfish are reared quite differently. They are parted from their parents on hatching and raised without an anemone.

The young fry form into a shoal at first but later become behaviourly similar to other damsel, non-clownfish, species. They appear to have no need of an anemone and usually ignore any placed in the aquarium with them.

Captive-bred clowns are ideal for new starters to the hobby as, although clownfish are the easiest of marine subjects to keep, anemones demand perfect water quality and high intensity lighting to be successful.

It is hard to find a more pitiful sight than a clownfish

desperately trying to associate with a shrunken unhealthy anemone a little larger than its own size. If the required standards to keep an anemone healthy can not be met it must be better to keep to captive-bred clowns and forgo the anemone.

Other anemone associates

A number of other damsel fish species, especially during their juvenile stages also associate with anemones.

The Humbug (*Dascyllus aruanus*) is a good example and although not achieving the tactile relationship of the clowns, is usually found shoaling close to the anemone's tentacles, darting away to hide in crevices around the anemone when approached.

There are also a number of invertebrates, mainly crustaceans, such as cleaner shrimps (*Lysmata amboinensis*) and anemone crabs (*Neopetrolisthes ohshimai*) which seek the protective tentacles.

Crustaceans are able to amble freely among the anemone's tentacles because their hard exoskeletons protect them from stings from the nematocysts.

Other inverts and fish

Similar associations occur between fish/mobile invertebrates and other sessile invertebrates, notably the diadema sea urchin which provides protection to fish fry with its long sharp spines.

The small fish fry of damsels and cardinalfish are often found sheltering within the diadema's poisonous spines, safe from their predators.

This form of association is quite fascinating but not easily replicated in the aquarium as diadema urchins are notoriously difficult to keep in captivity.

Cleaner shrimps

All of these last examples are of course one sided and do not benefit the host, but the association between cleaner shrimps and plankton filter-feeding sea cucumbers is one step further removed and borders on parasitism.

Cleaner shrimps are opportunistic feeders and are not above attacking filter-feeding sea cucumbers such as sea apples (*Pseudocolochirus axiologus*) to rob them of food trapped in their tentacles using the same 'nit picking' techniques they adopt to clean their clients.

Cleaning symbiosis on the other hand is a true form of mutually beneficial arrangement with both cleaner and host benefiting. There are over 50 coral reef fish species and quite a number of invertebrates which live by cleaning parasites and small pieces of dead tissue from other fish living on or visiting the reef.

It pays to advertise and many cleaner species employ dazzling stripes or have characteristic bobbing movements to draw attention to themselves. Particular locations on the reef, known as cleaning stations, are well frequented by the large number of fish that are attracted to these areas.

The cleaner provides a valuable service in relieving its client of parasites and minor infections and gains a meal in the process. The tactile grooming experience also appears to be enjoyed in much the same way a dog likes to be scratched and stroked, and many predatory species forgo the chance of a quick meal in favour of a good grooming allowing the tiny cleaner to even clamber around inside their mouths without harm.

Cleaner species

Quite a number of cleaner species are obtainable for the aquarium but care is necessary in choosing those that will not harass the rest of the aquarium population.

The Cleaner Wrasses (*Labroides* spp) can present such difficulties in a small aquarium and will stress nervous species of fish such as Tangs quite easily by their over zealous attentions. This is hardly surprising as there is no real escape from such irritations in the confines of the aquarium.

The Cleaner Gobies (*Gobiosoma* spp) are far less attentive and are a much better aquarium species.

My favourite cleaner amongst the invertebrates is the cleaner shrimp (*Lysmata amboinensis*) with conspicuous bright red candy stripes and waving white thread-like antennae. An easier species to keep than the Banded Coral Shrimp (*Stenopus hispidus*) the other commonly available cleaner shrimp species and so adaptable that pairs will regularly breed in captivity.

Cleaner shrimps can harass small timid fish species such as scooter blennies (*Petroscirtes temmincki*) and mandarins (*Synchiropus* sp) but as a generalisation are good aquarium subjects and get along well with their own kind.

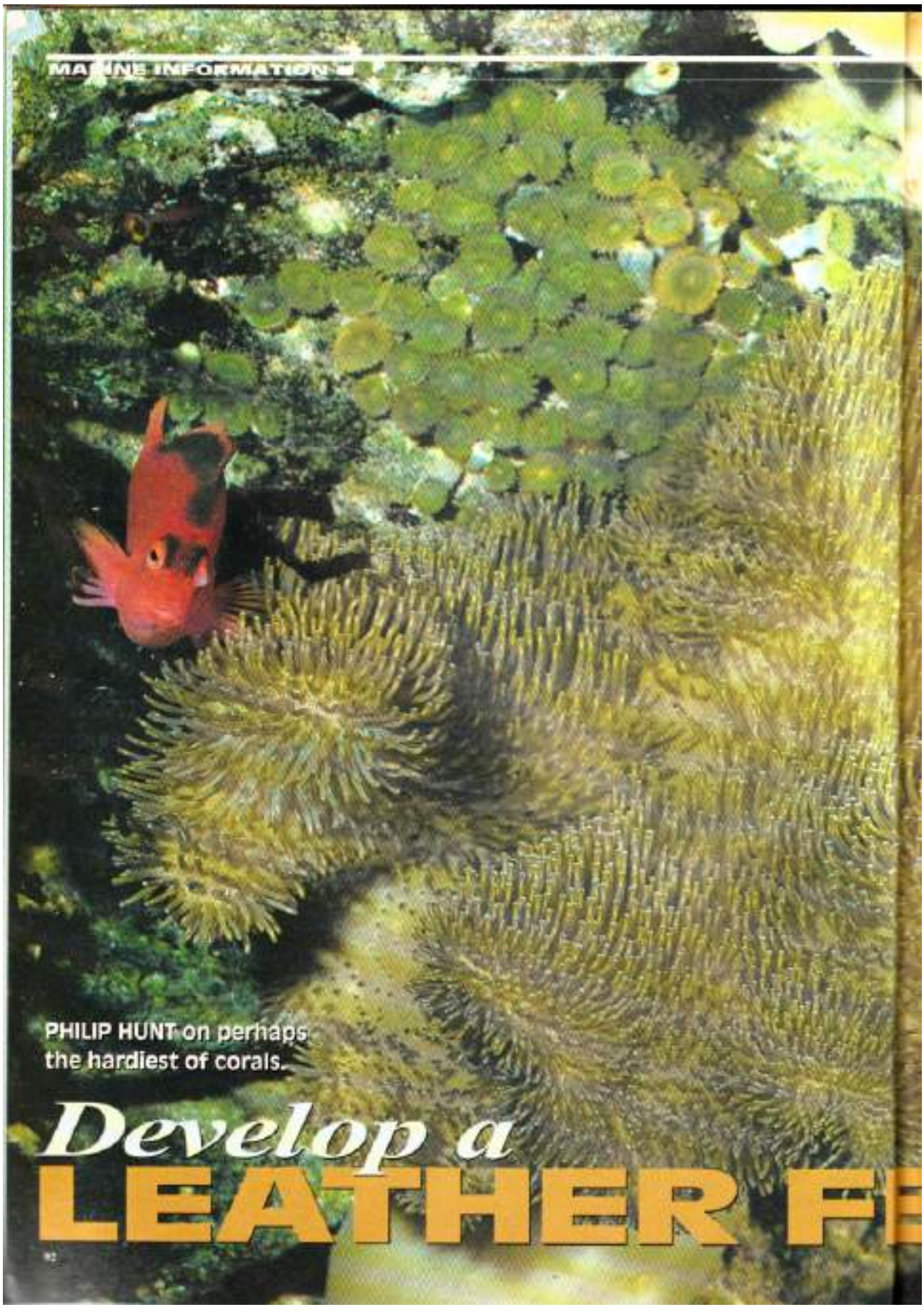
Stenopus hispidus sometimes called the Boxing Shrimp, is far more aggressive towards its own kind and can only be kept as a single specimen or a matched pair. ■

Above: Clownfish and anemone.

Right: Cleaner shrimp robbing a Sea Apple.

Above right: Stoichactis gigas is a sun-loving anemone.

Far left: Soft coral (Sarcophyton).



PHILIP HUNT on perhaps the hardiest of corals.

Develop a LEATHER FE

Buying the best

When buying leather corals, the main thing to check is that there are no bacterial infections, which appear generally at sites of mechanical damage, as areas of greyish slime.

Similarly, although they show remarkable powers of regeneration in the aquarium, there is a better chance of success if the animal is undamaged when purchased, so it's wise to look for cuts and splits of any kind, and reject animals that show them.

Look carefully, too, at the base of the coral, whether it is a mushroom or encrusting type, and check that there is a reasonable amount of rock attached.

Corals which are collected by taking a reasonable amount of rock with them have a much better chance of being undamaged than those which are prised off the substrate.

As an extra precaution, especially for those who are not experienced invertebrate keepers (and for whom leather corals are ideal first choices), it's wise to buy those which have well-expanded polyps.

As I've mentioned above, contracted polyps do not necessarily mean that there is anything wrong with a leather coral, but well-expanded specimens are definitely healthy.

Sarcophyton leather corals like *Sarcophyton lobulatum* have lots of polyps and a "furry" appearance.

Opposite: Lobophytum pauciflorum, like many Lobophytum is an encrusting species, clinging close to the rocks.

All pics: Max Gibbs, The Goldfish Bowl, Oxford.

LEATHER FETISH

In those pictures of beautiful invertebrate aquaria in fishkeeping textbooks, the predominant coral species on view are usually leather corals of various types.

There are many reasons for this; not only are leather corals very attractive, but they are also relatively hardy, much more so than most other coral types, such as stony corals, gorgonians or such beautiful soft corals as cauliflower corals (*Dendronephthya* spp.)

Hardy

Their hardiness in the aquarium is reflected in their natural habitat. They are great colonisers of damaged reefs, whether the damage has occurred due to tourism, with its attendant pollution, from shipping traffic or sedimentation.

They are often found where hard corals have largely died out as a result of one of the above processes. Their ability to thrive in these conditions is due to both their resistance to pollution and their rapid rate of growth, which far exceeds that of stony corals, and can be observed even in aquaria.

Softies

Leather corals lack the hard calcium carbonate skeleton of stony corals. Such skeletal structures as they have are called spicules or sclerites, and are tiny calcereous particles which are present in large numbers. In some species they can be seen through the skin. Another difference is that the polyps of leather corals have eight tentacles, rather than the six found in hard coral polyps.

Form

The basic form of a leather coral is a flat, ridged or undulated structure, the polypary, which as its name suggests carries the individual polyps.

When the polyps are retracted the polypary looks and feels like a piece of wet leather, hence the common name for these animals. The polypary may occur at the end of a stalk, giving the coral the appearance of a toadstool, or alternatively, in encrusting forms, the polypary may rest directly on the substrate, attaching itself by rootlike processes as the coral grows.

Sarcophyton

The largest family of leather corals are the various species of *Sarcophyton*. Most of the mushroom-like leather corals belong to this genus, as do some encrusting species. Most *Sarcophyton* species have the polypary densely covered in individual polyps, which may have long or short stalks, and tentacles which similarly vary in size and may be feathery (pinnate) or simple. The colour of these species varies, they may be yellowish, pale pink, grey or, most commonly, various shades of brown and beige.

Lobophytum

The other types of leather corals usually seen in dealer's tanks are the various species of *Lobophytum*.

These are usually encrusting species, and tend to have a convoluted and ridged polypary, with far fewer individual polyps than *Sarcophyton*. The polyps themselves do not have stalks, but open directly from the body, and the tentacles are characteristically short and fine.

The polyps tend to occur mostly on the crests of the various ridges and projections of the polypary, though some are also dotted around elsewhere.

These corals are usually bought as Mouse's Ear corals, and are often pink in colour, though again they may be beige or brown. Similar in appearance are the cathedral corals, (*Sinularia* species) which are often purple in colour, and have finger-like projections rather than ridges on the polypary, thus being morphologically halfway between the encrusting leather corals and the bushy, tree-like soft corals, many of which are also species of *Sinularia*.

Allow for shrinkage

Leather corals, unlike some coelenterates, do not spend the entire time fully expanded.

The juvenile Emperor Angel needs growing space and perfect water conditions. Pic by Max Gibbs, The Goldfish Bowl, Oxford

MY WAY

JOHN CRIPPS has firm opinions as to the best way to keep marine angels and butterflies. It's not cheap, and it's not easy - but it works for him. In this two part article, he outlines the techniques.

The fishkeeper

If you go into a panic because fish scratch once or twice, and start throwing copper treatments or large water changes about, forget butterflies. They will die quicker than you can say reverse osmosis.

Here are some questions you should ask yourself.

- Can I provide the environment required. (It's not going to be cheap).
- Can I restrict myself to low stocking levels - resisting temptation?
- Who has the expertise to look after them while I'm away?
- Do I have lots of patience?
- Personally, I have found keeping these sensitive fish can nearly drive you mad. Far from being restful they are very demanding, needing almost constant attention.

All this may seem like a put-off - but so many have died through lack of thought, facilities and impatience I cannot give you the impression that they are going to be cheap and easy, quite the reverse!

Angel and butterflyfish are some of the most beautiful marine fish the hobbyist is ever likely to keep. Unfortunately they are also some of the most delicate.

This series sets out to explode the myth that some are impossible to keep.

History lesson

People like to look back to the "good old days".

For the marine hobby the 1960's were anything but good. Little was known about the requirements of certain species. Although UV, ozone and protein skimmers were known, reference books often claimed they were unnecessary. As for nitrate, one author stated that fish could live for years in levels up to 500ppm!

Stock, though, was available and cheap. Addis Butterflies (*Chaetodon semilarvatus*) cost £3 - less if you bought half a dozen. What did it matter if fish died after a few weeks? There were plenty more to fill your tank to the one inch to two gallons stocking ratio recommended.

By the early 1970's the hobby

had taken off. As demand grew prices rose, what had cost £5 now cost £10. Bad distribution, transport and catching methods led to massive numbers of deaths even before the fish reached retailers' tanks.

Hobbyists felt guilty about things outside their control, and lots gave up.

Many myths stem from those early days, one being that butterfly and angelfish are impossible to keep.

On the reef

The waters surrounding a coral reef form one of the most stable environments on this planet (though global warming reports suggest this may be about to change).

- If applied to water from the reef, most hobby test kits would read zero - except for oxygen.
- The amount of water per fish, whatever its size, is colossal compared to our tanks.
- Fish have a constant supply of varied foodstuffs, and there is room to avoid aggression.
- They are not subjected to shock, like tapping the glass or the pounding beat of music.

Butterfly and angelfish are adapted to this environment, with little resistance to disease, or changes in water quality.

Pairs, shoals and harems are the norm for angels and butterflies, and duplicating this in the aquarium is difficult but not impossible.

Clearly butterfly and angelfish require space, zero levels of toxins, high oxygen content, as natural and varied a diet as possible - and no external shocks.

The importer

The importer makes all the difference to the quality, condition and cost of the fish from your retailer.

All fish imported should be quarantined, and screened for disease. Large complexes of U/V, ozone and protein skimmers are used to ensure health.

The first time I use a retailer, I enquire who the importer is. If it's not one who supplies my regular retailer I won't buy the fish.

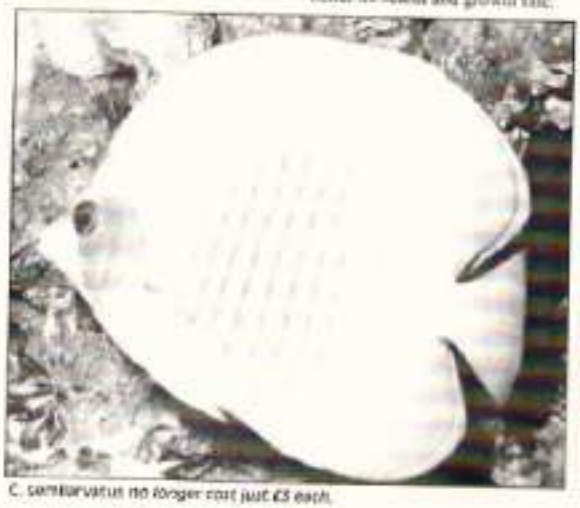
The retailer

The retailer is the vital link between your aquarium and the fish you buy. Most are experienced fishkeepers.

Unfortunately some are not.

To the fishkeeper a good retailer is worth his weight in gold. A bad one should be banned.

Once you have found a good retailer don't fall into the trap of also buying from sources that are less ideal. Establish a relationship with your "approved dealer". Taking him problems caused by using less scrupulous retailers is a sure way of ruining any chance of benefiting from his/her superior knowledge of marines.



C. semilarvatus no longer cost just £5 each.

What makes a good retailer?

- Knowledge
- Immaculate tanks
- No diseased fish offered for sale
- Saying 'no' even if it loses a sale
- The confidence of other experienced fishkeepers.

The aquarium & stocking ratios

I assume that most fishkeepers aim to have their fish live as long and grow as large as possible, so the first consideration is a large tank.

On average butterflies should be capable of growing to at least 6" (15cm) and large angels 15"(38cm) in captivity.

With fish growing to these sizes, the oft quoted stocking ratio of 1" of fish to 2 gallons (2.5cm to 9 litres) becomes misleading.

For example you buy two 3" (7.5cm) butterflies and a 4" (10cm) juvenile Emperor Angel.

This gives a stocking length of 10" (25cm), and placing them in a 20 gallon tank (90l) you have, according to the aforementioned ratio stocked it correctly.

Straight away it becomes obvious that even if delicate species could grow in such a small tank, no consideration has been given to the system's stability under such a heavy load. There can also be problems with aggression and stress.

All my success with butterflies and angels is attributable to less stocking ratios. The less stock, the better its health and growth rate.

Allow 1" of fish (2.5cm) to 6 gallons (27 litres). To some this seems a waste of tank space, but to angels and butterflies it means the difference between life and death.

If, from the outset, you have an idea of what to keep and its potential size, you should be able to calculate the size of tank required.

For example, a 60 gallon tank (270 litres) will hold an initial stock of 10 inches (25cm) of fish. As they grow, this will slowly come towards those stocking levels that most fishkeepers are familiar with, but never reach it.

Technical aids

Protein skimmers, ultra-violet light sterilizers and ozone generators assist in the control of the aquarium environment. But for every plus with this equipment there can be a minus, and caution is needed when using it.

Protein skimmers are a must for any butterfly or angelfish tank, as these species are sensitive to any organics left in the water that cannot be filtered out or broken down by bacterial activity.

Take into account the size of aquarium when considering a skimmer, - it should turn the gallonage over at least twice an hour.

For very large tanks a power skimmer performs better than an air driven one, however, there is one disadvantage with the former - on those models that take air in at the aquarium's surface - when used with ozone.

The contact time with the water is very short and ozone may escape into the atmosphere. With air-driven models, especially those that reach the tank bottom, the contact time is greater and little escapes.

If you use ozone it is worth considering the installation of both types of skimmer, as constant use of ozone can ruin your expensive power skimmer by making its plastic very brittle.

The only disadvantage of protein skimming is the loss of trace elements, but these are easy to replace as an additive.

Protein skimming does far more good than harm. The same cannot be said of **ozone**, if used indiscriminately.

Safety

- Too much ozone can damage the health - of you and your fish.

The safest way to introduce it is in the skimmer, where it can sterilize the water as it passes through.

There are many variables when using ozone, like gallonage, stocking levels and the amount the fish are fed. The level required is very much a matter of experience. If unsure, seek qualified advice.

For all its precautions ozone can reduce free swimming bacteria and parasites, reduce the organic load, produce crystal clear water and increase the redox potential (the water's ability to take on oxygen).

Ultra-violet light sterilisers perform a similar job to ozone without so many possible side effects. However, like ozone, the U/V output rating (wattage) is dependent on the gallonage of your system.

Safety

- Never look at an exposed, working, U/V tube.

◀ The use of all three technical aids will improve the environmental quality of your system and reduce any free-swimming pathogens, but to say they can control the outbreak of disease is being optimistic.

However, in a well-maintained aquarium they can reduce the chances of disease. Prevention is always better than cure.

Filtration & water movement

These are among the most important aspects of keeping butterflies or angels, any shortcomings will stress the fish.

An excess of filtration does no harm, too little (or ineffective) can cause their untimely demise. The water should be constantly on the move, with no dead spots.

Aeration is a must, more so in tanks that are 24" (60cm) deep or more, or there is a risk that gases like carbon dioxide will build up near the bottom and not be expelled from the system.

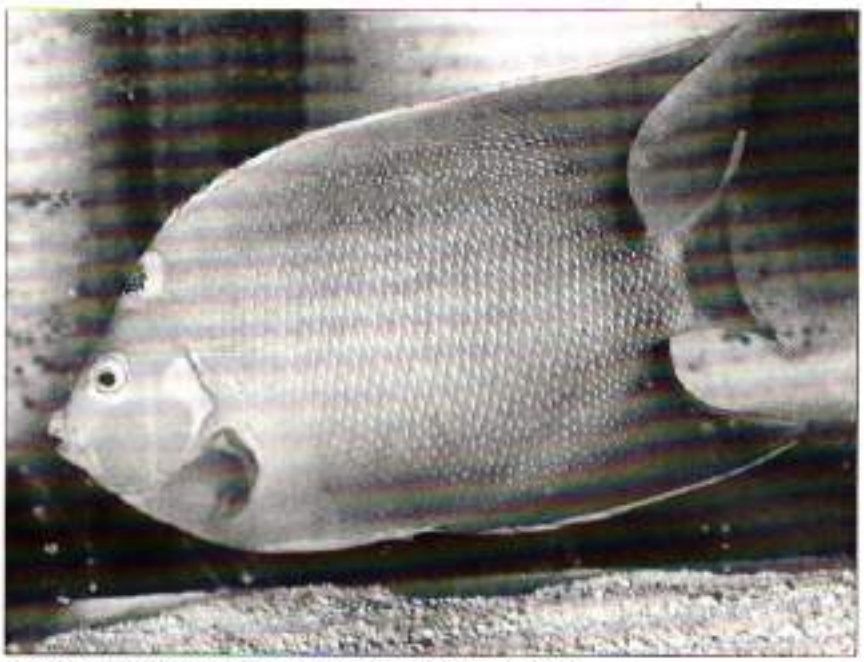
Types of filtration can be divided into three main headings, **bacterial, mechanical** and **chemical,** all of which can be used to achieve the best environment.

■ **Bacterial filtration** in marine systems is normally by undergravel or trickle filters, both have their advantages and disadvantages. The undergravel filter can deal with sudden jumps in organic load, like overfeeding. However in maintaining a high level of performance, it uses vast amounts of oxygen from the system which is detrimental to the stock, unless it is rapidly replaced.

Unoxygenated areas in the substrate can result in bacteria die-back, letting harmful hydrogen sulphide form. Because the U-G filter also filters mechanically, straining out uneaten food, and detritus, it will gradually clog, reducing its efficiency.

The undergravel filter works very well, providing the fishkeeper carries out regular cleaning. Whether the fish enjoy this operation is another matter, - bear this in mind when stirring up silt and syphoning it out.

Trickle filters at the moment appear to be all the rage, but no doubt you will have noticed their name usage has been applied to



The Queen Angel, Holacanthus ciliaris is among the most beautiful marines

invert systems, where the organic load is not so great. Their turnover rate is somewhat slower than undergravels and what could be worrying about them is their ability to deal with sudden surges in load.

One advantage they do have over undergravels is oxygen and harmful gas exchange. In a system that is lightly-stocked problems like these should not occur, but accidents will happen and your system's ability to deal with them will be put to the test.

For peace of mind a combination of both types of bacterial filtration is recommended.

A partial, say two thirds, undergravel filtration with full trickle filter facilities should be able to deal with any unexpected increase in load. The tank gallonage should pass through the undergravels at least five times an hour, and through the trickler at least twice.

PFK has published some excellent articles on the construction of trickle filters at little cost. (See the issues of May 1989, June 1989, August 1990 and October 1990)

Before leaving bacterial filtration the **denitrification filter** must be mentioned. Its use will control the build-up of nitrates, reducing the need for large water changes. The effects of large fortnightly/monthly water changes can prove deadly to angel and butterfly fish by upsetting their stable environment.

■ **Tip:** If, one hour after feeding, there is the slightest trace of nitrite, your filtration is inadequate or you're feeding too much.

The denitrification or 'denitrator' filter is not without problems, it needs feeding with lactose or methanol. Its performance needs very fine tuning, too much food with too fast flow rate will release nitrite into your tank, too little flow rate and the end result is hydrogen sulphide.

Successful operation depends on the amount of nitrate in your system, the filter's flowrate and the amount of food fed to the bacteria that convert nitrates into free nitrogen. This at first sight may look difficult, but once mastered repays you with almost constant zero levels.

■ **Chemical filtration** - for keeping butterfly and angelfish - means activated carbon. While it is very good at removing metals, dyes and some organics in solution it cannot remove nitrite, nitrate, phosphate or ammonia.

The life of activated carbon is limited - factors like gallonage and stocking levels affecting it.

It should be replaced regularly or everything it has removed may be released into the system. Other chemical media are available, but generally they can be limited to quick removal of disease treatments.

■ **Mechanical filtration** is anything, like filter wool, used to strain and collect particles and hold them for removal. As with chemical filtration these media need external canister filters to contain them, which, if used as the driving force for trickle filters, give fish and fishkeeper the best of both worlds. Filters operate best when clean, so ensure that they are inspected regularly and, if needed, the media cleansed or replaced.

Remember, what a filter takes out it can also put back.

You could of course invest in a total systemised tank. But perhaps, like me, you have to gradually build up, or upgrade an existing system. By "total" I mean a system with everything the fishkeeper is ever likely to need incorporated in it. While I recommend such systems for those who can afford them, they can give a false sense of security to the beginner, especially if something goes wrong. ■

ANDY HORTON concludes his look at holiday rockpooling.

Do the h

A strong prawn net eased under the ledges in the rocky intertidal pools will capture a variety of different fish like the blennies, bullheads, small wrasse, pipefish, sea sticklebacks, and the larvae of edible species.

Prawns abound in most locations, and small ones may comprise the majority of the catch. Shore crabs are ubiquitous, and will grip the netting with their legs. If you look more carefully among the dislodged weed, you may discover the cleverly-disguised spider crabs.

The Tide Turns

Engrossed in the technique of sweeping the net through the water, upwards and then up against the rock, underneath the long fronds, it is easy to lose track of what is happening around you.

If you clamber down to the low water mark when the tide is receding (the 'ebb' tide), you will find dry land appear before you and rivulets of water flowing out towards the sea.

Soon the water will become slack, and the tide will turn. If you are not aware of what is happening, the sea could move in behind you and cut off your route to dry land.

Identification

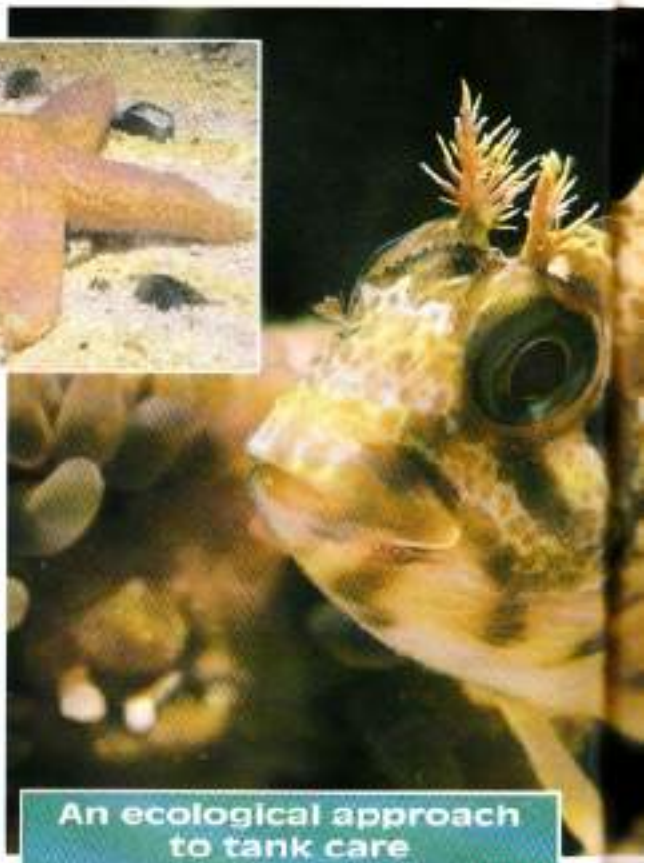
A bucket is useful to look at the animals more closely. A large white one is best because the various fish and crustaceans can be observed clearly against the contrasted background. The larger container the better, because fish will remain alive and in good health in the larger volumes of water. The main danger is suffocation of the larger species through lack of oxygen.

The fish and larger crabs should be returned before this happens.

Marine Aquaria

Exploration comes first. This is almost obligatory, because it takes a bit of practice before your become dexterous enough to become adept with the net and experienced enough to discover the hiding places of the various fish and other interesting creatures.

An aquarium only became necessary when I could not put a name to even some of the commoner intertidal fish, in the short time that the tide was out.



An ecological approach to tank care

My approach is to research the zoology of the various creatures, the ecology, chemistry, and physical properties of the sea, and then try to mimic these conditions as far as possible in a home aquarium.

Cooling the water is the biggest obstacle. Temperature tolerance to higher temperatures by even the hardiest rockpool creatures is within such narrow limits that if the water warms up to over 2°C above that in which the animal is naturally found for more than a few hours, the animal will surely die. Special aquarium coolers are available and beer coolers can be adapted. Alternatives are to keep only fish from southern and Mediterranean Seas that are able to tolerate temperatures up to 24°C. Temperature intolerant species can be collected late in the summer after the Autumnal Equinox, and kept through the winter and released in spring.

Underground cellars may be cool enough for all but a handful of northerly (Arctic/boreal) species. The water in the aquarium will quickly equal the ambient air temperature.

It is usual to keep one at least one specially cooled aquarium with supplementary tanks without temperature regulation.

holiday rock

Above: The Short-Legged Spider Crab will attach weed to legs and shell.

Above: The Tompot Blenny, Parablennius gattorugine is very aggressive in aquaria. On the plus side it tolerates high temperatures.

Above left: Common Starfish require aquaria at temperatures below 22°C.

Far left: The Butterfish is literally a slippery customer and very hard to catch.

Right: Beadlet anemones will survive up to 26°C in tanks.

Transportation

Problems begin to occur in journeys of over one hour. Hints for success include the use of polystyrene containers, battery air pumps, and artificial seawater (without plankton). Some 12 volt 'continuously rated' water pumps are also available.

This in turn compelled me to further investigate the fascinating world of rocky shores.

I lived on top of the sea, so the task of transporting the various fish home, and returning them if they were not suitable, posed few problems. However, I appreciate that most people live some distance from the sea and these factors will need to be addressed immediately.

The most important points are:

1) Marine aquaria need to be established properly with continuous filtration and aeration.

2) Temperature control is crucial, with 50% of the common British species unable to survive in normal summers without some method of cooling the water.

3) Biochemical alterations occur in seawater in a marine aquarium, and these need to be rectified by water changes.

4) Compatibility between species should be considered. This subject has already been explored in a series of articles for this magazine throughout 1991. Bound volumes of *Practical Fishkeeping* are available.

Shallow Pools and Crevices

Considerable variation in shore fauna can occur even in the same stretch of coast. Weedy pools may give way to areas of broken rock, with boulders and small stones which can be turned over to reveal a hypolithic fauna of considerable interest.

It is absolutely crucial to the lives of the small creatures that this rock is returned precisely where it was found.

Sagartia troglodytes is an anemone with no common name which displays best at night.

Animals found under rocks include small fish and innumerable crabs. These include two species of porcelain crabs, and squat lobsters. Crevices provide a home for snail-like molluscs (gasteropods) like periwinkles, but also other species like the topshells. Echinoderms, like starfish, urchins and sea-cucumbers can be found here.

Sandy Shores

Prawns and shrimps are often confused. The common or vernacular names are interchangeable, but in English usage (not the east coast pink shrimp fishery, or in the U.S.A.), prawns are the long legged crustaceans that live in rock and weedy areas, and shrimps are the short legged benthic crustaceans that bury in the sand.

This means that the method employed to capture the shrimp in the colder months is a special shrimp net pushed along in the sandy shallows. The shrimps are too small for eating in the summer, but the net will capture lots of other small fish including the sandy coloured gobies, juvenile flatfish, dragonets, the Lesser Weever with venomous spines, pipefish, rockling; as well as hermit crabs, little cuttlefish, and larvae of all sorts.

Left: it is illegal to collect undersized edible crabs – large ones are assassins in your tank. Leave them on the shore.

Nets

Regular shrimpers use home-made nets, which can be two metres across, and are distinguished by a strip of wood that digs into the sand as you push. The best designs can be folded for easy transportation. However, the semicircular child's shrimp nets are just about passable for occasional use.

Prawn nets can be purchased from angling shops. The triangular ones are best. Pond nets can be used, but for regular use the stronger prawn nets are to be recommended. The flimsy butterfly nets on sale are a waste of time. Aquarium nets from the largest to medium-sized are useful.

Drop nets can also be bought or made yourself from netting available to repair prawn nets. These nets are about the diameter of a bicycle wheel and are attached to a rope so that they can be lowered over the edge of jetties and into deep pools.

They are baited with fish skeleton or mussel. Shore crabs may predominate in the catch in estuaries and harbours, and sometimes better results can be obtained after dark.

Battery lamps can be purchased for night use (from angling or camping shops) with elastic to tie around your forehead, to keep both hands free when you rapidly haul up the net.

Although fish traps have been designed, I have not yet undertaken field tests.

The only other net that is in widespread use is the plankton net, of fine denier stocking material which is trailed along to capture minute creatures to examine under the microscope, or to supplement the diet of filter feeders.

Groups

Rockpooling tends to be a hobby undertaken by individuals or small groups. Parents should ensure that young children do not go rockpooling unaccompanied, because there are dangers even on innocuous shores.

Organised adult education groups can be found, and the local library may have details of organised parties and expeditions. The collective name is a 'glaucus' of rockpoolers. ■

'Glaucus' the quarterly journal of the British Marine Life Study Society explores the British marine world in greater detail. The Vernal 1991 issue contains a Marine Aquarium Supplement. For further details write to:

Andy Horton (Secretary),
14 Corbyn Crescent,
Shoreham-by-Sea, Sussex.

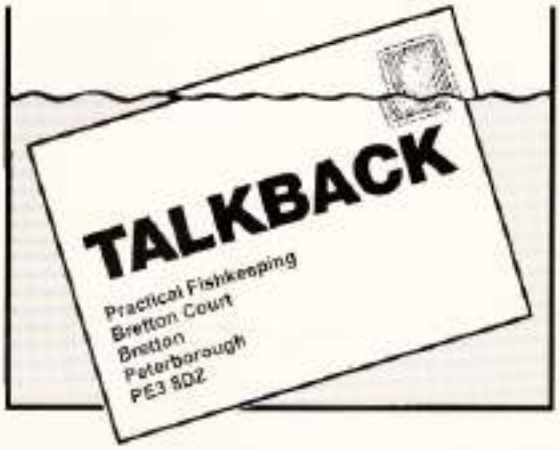
Membership for 1992 is £12, entitling the member to the 32 page (A4) journal which is sent out four times during the year. A few field trips are also arranged.

A juvenile Blenny basking on a rock – [illegible] above the water [illegible]

Europe's biggest aquarium?

Last year my husband and I visited the Aquarium Vannes, Southern Britany. It was described as the second largest in Europe. As it was so worthwhile a visit, we would like to know where the largest Aquarium is - can you help please?
• S. Biggar, Bolton

Ed's comment: **Can any reader help Mrs Biggar?**



Customer service

I had a Lotus Mermaid 350 pond pump for 2½ years, and recently it stopped working. I cleaned it out but couldn't get it going. I wrote to Lotus Water Products in Burnley asking if anything could be done and was advised by the company to send them the pump - they would send me an estimate for the repair.

I didn't receive an estimate. I received a new pump - a Mermaid 400 - free of charge. I was totally overwhelmed because the guarantee for the original pump was two years. With the recession in this country, it's the last thing I expected. It's very reassuring that some companies can be relied upon to give good customer service and satisfaction. **• A. D. Brinkley, Swindon**

■ I cannot see why P. Harris (April issue) is so "staggered" at paying £9.50 for twenty-six plants for his tank. I have to pay 80p for one piece of Vallis, Cabomba etc at any of the fish centres in this part of the world and £1.50 each if I was to buy them in the little pots. He was lucky.
• J. Cowap, Clwyd

Sorry plight

It was a hot sunny day when we visited a local DIY centre. My husband wandered off to do his own thing, and I thought I'd see what Koi and Goldfish were on offer outdoors.

Unfortunately the fish appeared to be in rather a sorry state. Some were hanging near the surface, while others lay on their sides on the bottom motionless, looking quite dead.

I commented on their apparent demise to a fellow visitor. He grinned and pointed to a hand-written notice pinned to a nearby post. It read "These fish are not dead. They are lying dormant because of the cold weather."

Perhaps the 'dormant' ones were half-price!
• Julie French, Plymouth.

Hatchets are not problem fish

I must take issue with your article on *Fish to begin with* in June. You say that Hatchetfish are not suitable for a beginner, nor should they be sold to someone who is setting up an aquarium for the first time. I am a hobbyist of some years standing and I have had my Hatchetfish for over two years since they were no bigger than 1p pieces. I live in Greater London where tap water is hardly suitable for a dog's bowl, let alone an aquarium. My Hatchets have always been healthy and add charm to the upper layer of the water. They don't interfere with other species, and my Neons, danios and gouramis leave them alone.

I have had no problems with them - nor did I when I originally starting keeping fish when I kept three that lived to a ripe old age.

Not so orrible?

In a recent *PFK*, one of your Tropical answers was headed "Orrible Oscars". I have to write and defend them.

I have kept them for two years, and found them naturally inquisitive and great characters. To house even a single fish in a 3' tank is wrong, 4' being the minimum tank size for these fish I feel.

My two Oscars are large active fish that share a purpose-built tank, with a large 12" pleco, a 7" Black Shark, and a pair of Blue Acaras. The only time my Oscars show a behavioural change is when they are separated from the shark, when they sulk and retreat into the pleco's cave. When the fish are reunited, their mood changes back. The shark also sulked when it was separated (by a leakage problem in their tank).

When my hands are in the tank they constantly nudge my hands never attempting to bite. I liken this action to a cat's attention-seeking display (though in the Oscar's case food is the motivator as they are always hungry).

So how about a bit of praise for this endearing fish?
• P.J. Bull, Whitworth


Lovable or orrible – the Oscar.

I wouldn't quibble with any of the other species you say are not suitable but please avoid this blight on the poor Hatchet which to my mind is a rewarding and unusual species in any community.

• G.P. Askey, Isleworth

Tropical water lilies

I note in the June *PFK* that you would like to hear from anyone who grows tropical water lilies. I have been growing them for ten years, and for the past two years I have been hybridising. I have produced seed from several plants, and have seedlings approximately eight weeks from sowing with floating leaves. I hope these will flower about late September.

I would be very pleased to exchange seed with other growers.

• R.J. King, 41 Meadowcroft Drive, Kingsteignton, Newton Abbot, Devon TQ12 3PR.

Algae not cured by straw

I noticed in your article on using straw to control algae.

I tried straw about two years ago, approx half a bale in a 1500 gallon pond, although I do not know if it was barley or wheat straw.

It was wrapped in netting and sunk to the bottom. Unfortunately it had no effect in controlling algae, and after six months was itself covered in algae.

I hope this may be of some use, and look forward to reading more on the subject in future edtions.

• R. Stevenson, Darlington.

Tang intervention

The April issue contained a letter from R.W. Salem describing his Regal Tang scratching itself against rocks and gulping air from the surface. I would like to reassure him that this is not unusual behaviour for this fish.

Several months ago I introduced a small Regal into my tank which behaved this way. I was concerned, but as I could see no sign of disease I decided not to interfere.

This fish is now three times the size when purchased and appears to be thriving. Although I have not seen it scratch against rocks recently, it does still occasionally gulp air from the surface.

Unless his fish exhibits some other sign of disease (white spot etc.) I would advise against using copper. This is especially relevant with his tank containing Tufa rock, as there is evidence that this rock absorbs copper, endangering any inverts that may be added in the future, should they sit on the rock.

• Dean Bisscker, Bradford

Little Angels

I'm a 14 year-old, who usually breeds livebearers, but wanted to try something different. When I heard a friend was willing to part with some of his things, I swapped my Game Boy, games, light and case for 3' tank, internal filter, two heaters, and, most important of all, a breeding pair of Angels.

I set the tank up with two gallons of my friend's water and ten gallons from my other tanks, topped up with new water. I used a Biofilter at each end, a heater and a sheet of slate. pH was 7. In went the pair of Angels. I expected to wait a while for a spawning, but within two weeks they surprised me. For two days they tended the eggs - then ate them! After they did this four more times I decided to try to outdo them, and got a sheet of glass ready. Next spawning I placed the glass between the adults and the eggs. In the morning they'd knocked the glass down and scoffed the lot.

On the seventh spawning they knocked the glass down again, while I was at school, but my Dad put it up again before all the eggs were eaten. Two more days went by and my little Angels left the slate. I went to school leaving Mum keeping an eye on them. I came home to find the adults in a different tank (called for Medusa - but they're fine!) as the wee Angels were slipping through a "no" gap at the bottom of the divider, to get eaten.

Above: Angels are sometimes tricky to breed. Below left: Angels spawning

As I write this the survivors are eight days old, and being fed Brineshrimp once a day, and powdered flake or powdered High Protein once a day. I have 40 baby Angels. Only 40 some may say, but I've enjoyed it and learned a lot. Hopefully my next spawning will be a smoother operation.

My reason for writing was to let you know the most important thing I've learned - **never admit defeat!**

• Gavin Cowan, Greenlea.

Regal Tangs sometimes behave strangely

Practical Fishkeeping's A to Z OF FISH HEALTH

Lionfish can be weaned onto non-living foods

JERZY GAWOR comes to F in his A to Z - and brings us tips on feeding, filter media, fin-rot and fungus.

F

Feeding

Feeding your fish is probably the most important aspect of the hobby, but one which in terms of technical and specific advice seems to me a very grey area indeed, not helped particularly by product-leaflets/literature or indeed product labels as designed by the fish food manufacturers.

Let me qualify this statement. We often see the words 'feed sparingly several times a day' or 'feed as much as the fish will eat', but frankly this is very ambiguous.

What is sparingly, for example, when taken in the context of feeding an animal? Is a 'sparing amount' given to a community of thirty small tropical fish also adequate for a dozen hungry Rift Cichlids in a larger aquarium?

How many feeds per day does 'several' imply? Two, four, five, ten or more?

It is all very confusing with the result, in my experience, that in many instances the fishkeeper has to find the right feed level by trial and error, which invariably involves water quality problems, as well as compromising the health of the fish until the correct balance is achieved.

This may all seem trivial, but I wonder how many fishkeepers have possibly given up the hobby at an early stage because they were unaware their fish were dying from nothing more sinister than overfeeding, with resultant ammonia/nitrite stress - and nobody told them.

Manufacturers might like to take note and perhaps prepare 'feeding' schedules or other informative literature on this subject that I am sure would be greatly appreciated by novice and advanced fishkeepers alike. I am sure this would help many fishkeepers not only to provide the right amounts for their fish but also to use the correct food types/varieties of which there must be several dozens on the market.

KEY FACTS

- **In general fish tend to be overfed. Do not feed one large amount per day. This wastes food and pollutes the water. Feed more frequently with smaller amounts. Use of an automatic feeder is recommended for this.**
- **Find out as much about the food requirements of your fish *before* you purchase them in case you cannot provide the special diets required. This is especially true for coral fish**
- **Feed your fish with a staple flake diet (if they will accept this) but do provide other 'treat' foods regularly to provide nutritional balance and variety.**
- **Please try to avoid feeding aggressive, predatory fish such as Piranha or Lionfish with other live fish. This is unnecessary as in my experience most of these species will quickly adapt to dead fish or meat if you allow them.**

Blackmoors may appear to have fungus, when producing excess mucus (see opposite page).

Filter media

There seems to be a failing in getting yet another important message across from manufacturer to fishkeeper, and that is in the field of filtration. I still see fishkeepers purchasing 'state of the art' power filters such as Eheim, Shark, Fluval etc. and stuffing them full of little other than filter-wool. I see Tunze systems where the Bioglass have not been changed for years, and even undergravel filters with less than one inch of gravel covering their surface!

These same fishkeepers then wonder why their aquarium water is forever murky and their fish losses high.

To be fair to the manufacturers I can say that most of the better filter units available have very comprehensive instructions, either on the packaging, or contained inside the box as a leaflet. It is vital that to get the best performance from your newly-purchased system you read AND follow the information provided, and if necessary contact the supplier or manufacturer if you do not understand any particular point.

Many fishkeepers purchase an external power filter and use it for years with the same media. They do not realise the filtration potential they are wasting.

In the majority of the better systems your filter has been carefully designed to provide you with a means of cleaning the aquarium (or pond) water mechanically, chemically and biologically.

Allow your filter media to become clogged or fail to pay attention to the use of correct media inside the filter and the worst case scenario of toxic water and dead fish can be the end result!

A wide range of filter media is available.

KEY FACTS

- **When you purchase your new filter ensure you have all the necessary filtration media to maintain water quality as required by the fish you keep or intend to keep. If in doubt consult your dealer.**
- **Ceramic cylinders in my view are the preferred 'pre-filter' medium in the bottom of the filter canister. Alternatively large open cell foam or plastic fibres will do. Polymer wool is too fine as a pre-filter, clogging rapidly and causing 'channelling' of input water.**
- **Do change activated carbon or charcoal frequently (at least once per month or as soon as water appears yellowed or aged). Check, recharge and/or change as required any ion exchange media that you may be using on a frequent and routine basis.**
- **Although you may find these items expensive I would recommend purchasing hose taps for external power filters. These make life easier when attending to the filter. Some filters have these included as part of the 'package deal'. Remember, these are your fish relying upon you 100% for maintaining their water quality and health.**

Fin-rot

This rather distressing form of fish disease is easily recognised. Typical symptoms are shown by affected fish. Initially the edges of the fins take on a greyish or opaque look, which then progresses to a level where the fin tissues, often including the bony fin rays, break up and fall away.

This leaves the fish looking in a very sorry state with ragged fins, sometimes accompanied by haemorrhaging around the edges. The stress caused to the fish often leads on to a multipathogen infection and death. All fish species can be affected, freshwater and marine.

In many cases the onset of symptoms is found in situations where water quality has deteriorated, where aggressive fish are constantly battling for territory or where opportunist parasites find a weakened fish and multiply rapidly.

All the above situations involve a stressed and weakened fish which is the prime target for the bacteria implicated in this disease - *Myxobacteria* (*Cytophaga*).

These organisms will invade fish tissues and multiply when conditions suit them. Given that the weakened fish has a low immune response, deterioration is usually quite rapid.

Once the fish is affected, other pathogens, bacteria as well as protozoal parasites and fungi, will compound the overall situation. Obviously prevention is better than cure, and sensible aquarium/pond management is the key. However if you do suspect the problem in your fish the following are recommended.

KEY FACTS

- **Check water quality and improve with partial change, extra filtration and extra aeration as necessary.**
- **Check that overfeeding is not a contributory factor.**
- **Check for aggressive behaviour.**
- **Remove affected fish to a small, clean tank or bucket containing aquarium water and treat as per manufacturer's instruction with general antiparasite solution. Return fish to aquarium and treat entire system with general antibacterial such as New Technology Bactecide, Tetra General Tonic, KW General Medication.**

Fungus (external - saprolegniasis)

Although the term 'fungus' is often used by fishkeepers and it appears regularly in all the books, it is still in my experience a disease organism that falls fairly low in the 'Top Ten' fish disease ratings.

Fungus is rarely a primary invader of fish, only occurring in the later stages of disease when fish are already heavily infected by protozoa, flukes and bacteria. The inference is therefore that the fish is either dead or cured by the time fungus gets around to colonising it.

In the wild, fungi are part of the 'death and decay' complex whereby tissues of animal and plant origin are broken down biologically to their component nitrogenous and other chemical constituents. ■

KEY FACTS

- **If you suspect fungus in your fish, check first that this isn't an excessive coating of mucus due to some water quality factor or a protozoal/fluke infestation.**
- **This mistake is commonly made, especially in the case of Black Mollies (remember they do prefer saline conditions) and commonly also with Blackmoors in which case protozoal parasites or skin flukes are usually the culprits.**
- **If you suspect a true external fungus infection treat with proprietary brand of fungus cure.**

■ **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.

Coldwater Answers

Floating Fantail

Q **My White Fantail spends most of its time either floating at the surface, or lying on the bottom. Sometimes he is upside-down.**

He has been like this for around 10 months, and feeds normally.

•J. March, Orpington.

Short-bodied varieties can be prone to swimbladder disorders.

A Your Fantail has the classic symptoms of swimbladder disorder. The swimbladder normally controls its position in the water, but has now failed. This is quite common in short-bodied Goldfish, whose organs are compressed. It sometimes cures itself, or sometimes goes on for years. It does not distress the fish, as it is eating normally. Provide the best food and water quality, and watch out for the others attacking it. **NF**

Going green

Q **My garden pond holds approximately 800 gallons, and is serviced by a Pegasus-Flotec Bio-Filter (suitable for a 1000 gallon pond) fed by a pump with an output of 900 gallons per hour.**

I have a green water problem, and do not wish to add chemicals to the water if there is a more natural solution available.

Is Siporax a suitable replacement medium?

Does it complete the nitrogen cycle, ie. convert nitrate into nitrogen?

How much would I need, and what flow rate is suitable?

•D. Clayden, Essex.

A Many above ground filters make outrageous claims about the size of pond they can treat. You are putting the full volume of your pond through your filter every hour, but still have a water clarity problem. Clearly the single-celled algae are slipping through the net (or foam).

The practical answer is to fit a U.V. steriliser, an 8W model being sufficient.

Siporax requires a much lower flow rate than yours, and is best suited to sitting in plant baskets in an upflow chamber.

Used correctly Siporax does complete the nitrogen cycle, but if your pond is planted, the plants will absorb nitrates. **NF**

Are water changes essential?

Q **I have five Goldfish and three Shubunkins, in a 36" x 15" x 12" tank.**

Filtration is by a Fluval 3 internal power filter, but I would like your opinion on a system which requires no water changes, but where all the waste is dealt with by the equipment.

•C. Goodall, Portsmouth.

A I do not accept that a home aquarium system can be devised which requires no water changes at all.

Changes can be reduced by good filtration, which will remove ammonia and nitrite, and even nitrate. Trickle filtration is best for minimising water changes.

However, no system will remove sulphur compounds, which cause yellowing if the water, and evaporation loss concentrates all dissolved substances.

This is especially true in the coldwater tank, as Goldfish are very dirty feeders. **DF**

Are Leatherjackets the problem?

Q **Over a few months all the Goldfish, Comets, Orfe and Shubunkins in my pond have died, although tadpoles seem to survive. When I emptied the pond there were Slugs, Leatherjackets and Worms in the bottom. Could they be the cause of the problem, by contaminating the water?**

There is a fountain to aerate the pond, as well as plants.

•L. Martin-Smith, Barnsley.

A It would be an idea to test the pond water for ammonia and nitrite when you restock with fish.

Ammonia is produced as waste by the fish, and in new or unfiltered ponds, this can accumulate to a level which causes their death. Poor water quality kills more fish than any genuine disease problem.

It is unlikely that the Slugs and Leatherjackets are killing the fish, other than that their decomposition will contribute to the poor water quality.

Consider adding a filtration system to your pond. **BB**

■ Recharging resin

I am trying ammonia remover in my filter instead of carbon to see if it is cheaper to run.

How often should the ammonia remover be recharged?

How much salt should be used?

Is cooking salt suitable?

F.J. Field, Milford Haven.

I would suggest you monitor the water very closely for ammonia, as it is difficult to give a precise 'life' for ion exchange resins. It will probably be worthwhile recharging it about every six weeks.

A 12% salt solution is recommended for recharging, and cooking salt is certainly acceptable. **BB**

■ Don't mess with Pop-eye

I have a 22" 'Kujacku' Koi. A month ago this fish developed pop-eye, but eats well and seems to be in good health otherwise.

I have been advised to leave it alone and see if it gets better. Others advise antibiotics. What do you suggest?

J. Fisher, Doncaster.

As the fish is still feeding, and appears to be otherwise healthy, I would suggest leaving it alone. In many cases the fish's immune system can deal with the problem, saving the problem. If the fish ceases to feed or shows signs of distress I would recommend you to seek the advice of your vet concerning antibiotics. **BB**

■ More on straw

This year I've used barley straw for green water control. It works brilliantly.

My queries are:

Is it removed in winter?

Why does it work?

J.G. Masters, Leicester.

Barley straw can be an effective treatment for green water, but you must monitor the water at least weekly for ammonia and nitrite, as these are the by-products of its decomposition.

There should be no necessity to remove the straw, as it should gradually decompose over the summer.

Barley straw works by changing the pH of the water, making it acidic and unsuitable for algal growth. **BB**

Leeches feed on blood

Leech infestation

Q **I have a problem with leeches in my pond. I have lost a number of fish, which were completely covered with them.**

Removing all I can with a salt bath, and using various proprietary parasite treatments have had no effect, the leeches just keep coming back.

•C.R. Beane, Norfolk.

A The Fish Leech, *Piscicola geometra*, can cause serious damage, or even death in large numbers.

They bite into the fish, preferring soft areas, such as mouth, fins, and belly, where they feed on blood.

Adults can be removed physically or with salt baths, but the eggs are laid in tough leathery cocoons, which are resistant to chemicals and drying.

It may be necessary to remove all the fish from the pond, and treat them individually, then treat the pond with lime to kill the cocoons.

The pond must be carefully scrubbed and rinsed several times before putting the fish back. BB

New pond filter

Q **My pond contains 10 Golden Orfe, around 10" long, 1 Koi, 8" long, and 1 Golden Tench, 10" long.**

I am building a new pond in an L shape. It will be 8' wide and 3' deep, with the arms 17' and 16' long.

I would like a pump and filter system, but there are so many on the market, and the information from dealers has left me confused.

•David Noble, Guildford.

A As you are building a new pond, you have the opportunity to put in the best filtration system, without paying a fortune.

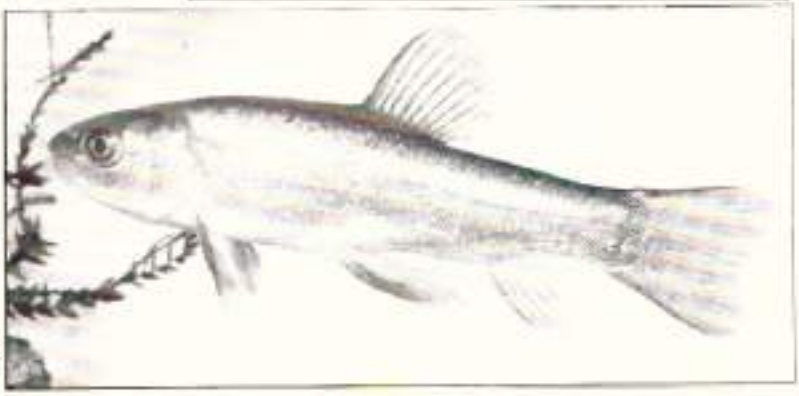
Read up on pond building and filtration (try *The Practical Encyclopaedia of Koi* Salamander £19.95), then, I suggest, build an in-ground, gravity-fed system - as large as space permits.

Power it with one or more Grundfos central heating pumps, and return the water via a UV sterilizer and venturi.

For the filter body, you can either use domestic water header tanks, connected by PVC pipework, or make a partitioned, rendered blockwork filter with transfer ports.

A bottom drain is something which has stood the test of time, too.

Some of these words may sound foreign, but will soon slot into place. NF



The Tench should enjoy its new, filtered pond.

Young Koi grow quickly, so don't overcrowd

How many Koi?

Q **I have got a new pond, 4' x 4' x 3' deep. I have six small Koi, about 1½" long, which I hope to breed when they are bigger. How many more should I put in, or should I stick with the six?**

What is the best food for them?

• Stephen O'Neill, Manchester.

A Six fish are just right for your pond, bearing in mind that they will grow quickly. Your Koi will probably take at least 2-3 years before they are old enough to breed.

The ideal foods are the manufactured foods or floating sticks, which you can supplement with treats such as pieces of lettuce, mussels, shrimps, prawns or cocktail in small pieces.

Buy feed that is suitable for the smallest fish in the pond. BB

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Everything you wanted to know

KOI


In the net for closer inspection ... Pic: Gordon Rigers.

Whether you are starting a pond from scratch, or looking for fish to supplement existing stock, buying Koi is one of the most challenging and exciting moments of the hobby.

A good choice could give you years of pleasure: the oldest authenticated Koi was a **Higoi** owned by Dr Kemei Koshihara which, at the time of its death in 1968, weighed 16½ lb and had clocked up 217 years.

The Japanese treat valuable fish much like Bonsai, handing them down the generations as living heirlooms. But, considering the amount of money **you** may lay out, buying Koi can also be a risky business.

There will be no equivalent of the Kennel Club pedigree certificate, certainly no guarantee of survival, and no assurance that a high-priced small fish will continue to improve over the years.

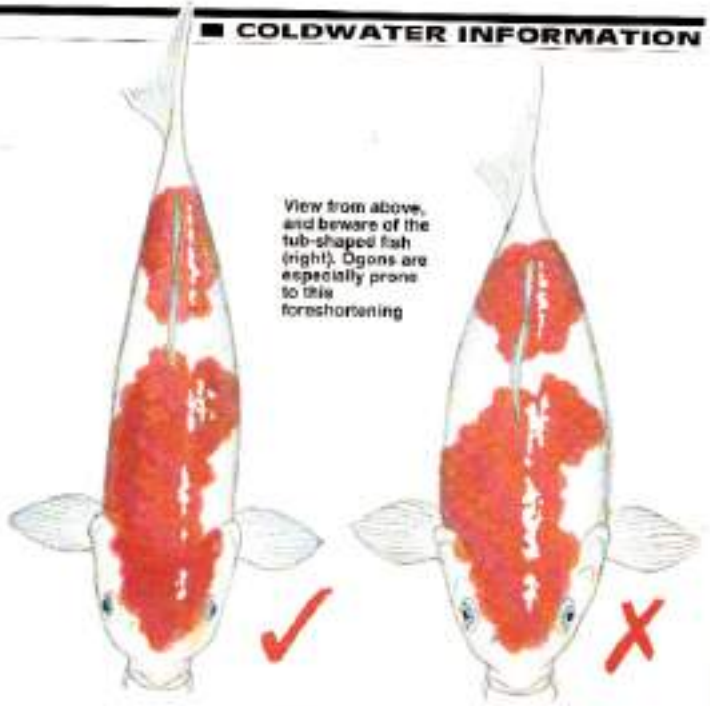
The nearest thing to a promise of future excellence (paid for handsomely!) is with **Tategoi.** These Koi may not look much at the time you part with your cash, but then, certain varieties never show their full potential until they are mature.

This is not, however, intended as a guide for the connoisseur, but rather as a plain man's helpmate to getting the best possible fish for the least outlay.

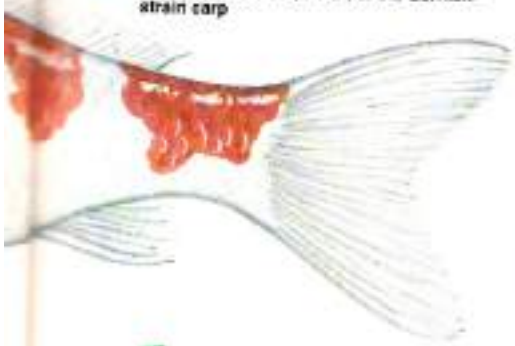
Size

Rather than start by discussing the finer points of the various varieties (covered in an earlier

2 Minor splits will heal but beware of damage to leading hard rays of dorsal fin



View from above, and beware of the tub-shaped fish (right). Ogons are especially prone to this foreshortening



3 Viewed sideways, a good koi should be plump, but streamlined. Beware the 'humped' shoulder, a trait of the German-strain carp

5 For small fish in transit, tape up corners of polybag

...about...

article), let's approach the subject literally: a good starting point is the size of Koi to aim for.

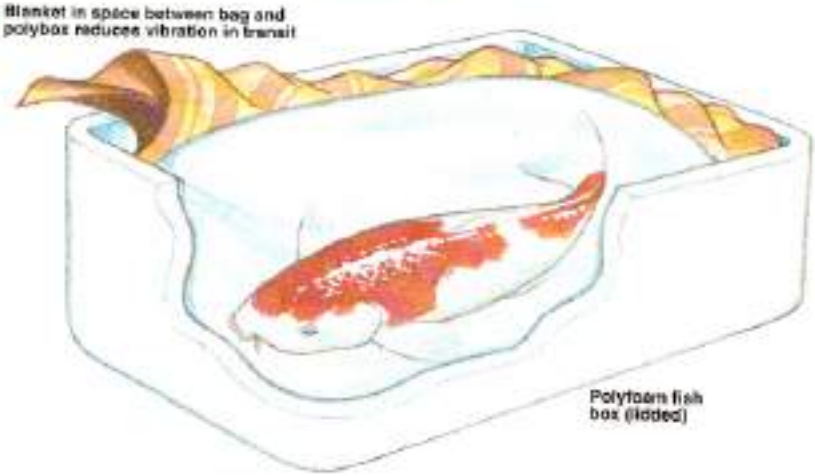
The usual advice is to buy small and grow on. That may still be prudent if your fish are in the top-quality bracket, but otherwise it may pay in the long run to be looking at 12" Koi upwards.

It takes approximately four years in the British climate for a fish to attain that length (and equivalent weight of about 1lb dan).

So, if you buy a yearling fish it will have consumed three years' pellet rations and, hopefully, survived three merry-go-rounds of hazards.

Some of these, such as gill and skin flukes, can be medicated, but there are others that not even the world's greatest pessimist would credit. To **predation** by cats/herons (small Koi being the most vulnerable), you might add **jumping out of the pond,**

6 Blanket in space between bag and polybox reduces vibration in transit



Polyfoam fish box (lidded)

pollution from the mains supply, **theft**...although what carries off most small fish is common ailments, undiagnosed until too late to treat.

Except in cases of oxygen starvation, when the biggest fish in a pond are the first to succumb, it is the fiddlers that react worst to poor water quality, bacterial or parasitic problems.

'Ask yourself how the fish trade continues to flourish?

It does so by continually replacing losses, and not necessarily from incompetent pondkeepers. Statistically, most Koi that shuffle off the mortal coil do so within two or three years of existence. So what makes more sense - buying two at £15 each and losing one, or buying one at £30 and seeing it thrive?

This does not mean you should buy huge Koi, simply the biggest your budget will stand...assuming your pond is up to housing them properly, of course. A mature fish should have a stabilised pattern and colour, although a change in water chemistry or even temperature can have dramatic effects on its appearance. Generally, though, large fish may not improve all that much, except in further impressive growth, but nor will they regress.

If a **Showa's Doitsu** scales are going to turn greyish black, rather than sky blue, or if a **Kumonryu** is going to lose all its black and turn into a valueless **Doitsu Shiro-muji**, it will have done so in adolescence.

Nice fish - shame about the shape...

In the beginning, all carp were streamlined, torpedo-shaped fish, and any variation in girth relative to length (apart from the difference between mature males and females) could be put down to the quality of the food supply.

Even when the Oriental carp began to be farmed for the table, and then selectively-bred to develop the various colour strains, the basic shape stayed the same.

It was the Europeans who cultivated fish that may have satisfied culinary requirements, but at the expense of what some would consider to be the aesthetic qualities of a 'typical' carp.

Scale-less (leather) or partially scaled (mirror) varieties made it easier to prepare such fish for the table, while 'pot-bellied pigs' were encouraged for their high weight-to-length ratio.

In stew ponds, carp with these characteristics spawned with the true 'wild' carp to produce intermediate progeny - commons with the thickset build of mirror carp, or even fish known as 'fully-scaled mirrors', where enlarged, reflective scales cover the whole body.

When such 'table carp' entered the genetic pool of Japanese Koi, it was these reflective scales, usually either side of the dorsal fin, that gave rise to the term **'Doitsu'** - a corruption of the word 'Deutsch', meaning 'German'.

It was a dramatic development, but not without its problems. For it is unlikely that many Koi on the market today are without some **Doitsu** genes. These may not result in typical Doitsu scalation, but they can affect the body shape.

So, avoid Koi with a pronounced 'hump' at the shoulder, or a tendency to rotundity. Look at the fins - are they in proportion to the fish as a whole?

First impressions

The soundest way of selecting Koi is to follow your first impressions BUT then ensure that the fish you have selected measures up to them.

First, though, watch how the Koi swims in the company of other fish (any 'loners' should automatically be avoided).

- Does it move effortlessly and gracefully, or seem to 'push' itself through the water in a series of jerks?
- Is it using all its fins, and are those fins held out proudly from the body or clamped?
- Are there any tremors of dorsal or pectorals that could signify irritation from parasites?

If the department of the Koi is okay, next step is to ask the dealer to bowl the fish.

Ideally the Koi should be coaxed, not chased into the net and then transferred gently to a blue plastic bowl or baby bath, never having left the water.

- Now you can confirm at close range the patterning and colour

Getting a bargain

There are several sources of fish you may care to explore:

1) RECOGNISED MAJOR KOI DEALER

This man specialises, probably in Japanese fish, and certainly in named varieties. He tends to deal with one or more Japanese breeders, and will perhaps have visited Japan himself to select choice fish.

He will have quarantined new stock for at least three weeks.

Advantages:

- Likely to have wide knowledge of both the fish and their requirements.
- Unlikely to sell you indifferent fish, as his reputation will be spread by word of mouth.
- Will have full range of pond hardware, foods and medications.
- Will possibly offer an aftercare service.
- Is likely to be able to obtain antibiotics via a vet.

Disadvantages:

- His fish will be pricey (although, in a recession, it's always worth haggling - and if you are a member of a recognised Koi society such as the BKKS, he may offer you discounts).

2) GENERAL AQUATIC OUTLET

Some of these have quite good displays of Koi alongside other pond fish, though their quality will not be as good.

Advantages:

- Cheaper than going to the specialist, and you may still benefit from some after-sales service.

Disadvantages:

- Because such a dealer's knowledge has to be broadbased, he is unlikely to be a true Koi expert.
- Less scrupulous outlets may palm off Israeli Koi as Japanese.

3) PART-TIME KOI DEALER

Usually a Koi-keeper who decides to turn his hobby into a profitable sideline.

Advantages:

- Low overheads, so likely to offer competitive prices.
- May be extremely knowledgeable.
- Cannot afford national advertising, so relies on verbal testimonials to expand business, so eager to please.

Disadvantages:

- Some part-timers regard Koi dealing as a way of making easy money. When profit fails to come up to the mark, corners may be cut.
- May not be there next time if you have a problem with fish you bought from him!

4) GARDEN CENTRES

Okay for plants and fertiliser, but if you go to such places you will probably be served by a weekend youngster on slave wages, who wouldn't know a Koi from a goldfish.

Advantages:

- I know, because I once bought a bargain fish on that basis.

5) AUCTIONS

Can be either private affairs, or organised by dealers. Auction sales of individual collections, perhaps brought about by the death of the owner, can be a marvellous way of acquiring mature fish of high quality at a bargain price.

Advantages:

- You will be buying fish that have been fully acclimatised to the British seasons, and which are long past the ailments associated with new imports.
- You can set yourself a maximum bid, having viewed the fish beforehand, and can congratulate yourself if you get it for less.
- Even dealer auctions will have 'private' lots, usually with a reserve price. Take along an expert friend before you bid, and remember that the best bargains come at the end of an auction.

Disadvantages:

- Fish may be stressed from prolonged bagging.
- No come-back, once you have purchased.
- Easy to get carried away if someone is bidding against you for a particular fish.

6) DEALERS AT SHOWS

More and more Koi dealers refuse to take livestock to trade shows, relying on dry goods and pond hardware instead. It's not hard to see why: fish will be stressed by different water chemistry to that of their home patch, and the showground may not offer adequate supplies for water changing, to offset fairly basic temporary filtration.

Advantages:

- Because dealers will be in competition on a single site, prices will be kept down.
- There will be good choice of varieties, as each dealer has his or her own favourites aside from the usual Kohaku/Sanke/Ogon mix.
- You can browse and compare price and quality, without pressure to buy.
- At the end of the day, because no dealer wants to give a fish and its water a return trip up the motorway, there is opportunity to haggle.

Practical Pond

A tale of a weird wedding present, a subterranean mass of builders' rubble, two toilets, Monica Seles first serve, and a half finished love letter. Confused? So was NICK FLETCHER....

The site – crazy paving over an existing, shed-in concrete pool.

Builder's sand over chipboard, base and sides, solves the problems of sealing water and rough projections.

Fletcher's FOLLY

When sister Lou finally tied the knot, she did it in style: the full church wedding.

At the reception, there was the usual pile of presents but, with typical pragmatism, Lou and Ian had sent out a list some weeks before of what they did (and didn't) want.

Air miles to Australia were suggested to the richer members of both clans; why couldn't the happy couple honeymoon in Brighton?

But I had neither stumped up for a bale of fluffy bathroom towels, nor chipped in to the Qantas ticket. Against my name on the gift list was the mysterious phrase: **'Hard labour'.**

It turned out that Lou wanted a garden pond of the wildlife variety - no fish, she stipulated, just a place where garden birds could come to drink, and where frogs and newts could frolic. Could I come down one weekend and build such a pond for her? I should have known not to pick Wimbledon fortnight but, up until Ladies' Singles finals, I thought the rain gods had been caught napping. Perhaps Monica Seles wakened them with her grunting: did you know she fakes her first service?... At eight on the Saturday morning, I piled two disco-bleared daughters, a pick, shovel and lump hammer into the car and drove through the drizzle to Lou's home base of Barkway - a village which can't help being close to Royston, the place where cuffs shut in the lunch hour.

Nearly ready for the liner.

The previous owner of Lou's place was a builder, and had used his craft to improve both cottage and garden. Outside is a triumph of properly-laid crazy paving

An 8' x 12' Aztec liner is a perfect size for this small, shallow pool.

pathways and terraces, in great several levels. It was on one such pavé area that Lou decided she wanted her pond. But here's the rub - there had been one here before! Clearly, outlined was the oval shape of the perimeter of what I suspected had been a professionally-built concrete pool, now filled in - for what reason I can't imagine.

So, in one sense I was not starting from scratch. It was surely going to be a doddle, taking up the slabs, using part of the profile of the old pond to define the layout of the new, then some easy digging, smoothing, measuring and down to the aquatic shop for a liner. Fill... trim... replace some slabs, then hoots off to watch Seles demolish Graf.

Nothing, but nothing went to plan. The crazy paving slabs came up easily enough. The drought had caused them to settle, cracking the mortar - though I was still glad of the welding goggles when I wielded the pick and sledge. Beneath the slabs was the first indication of how thorough the builder of pond mark one had been. Six inches of concrete, luckily not too dense, had been used to top off whatever he had used to fill in the excavation. And, by now, it had started to rain.

The kids helped me pile up the slabs, and we 'borrowed' a ▶

barrow from the house-renovators next door to transport the broken lumps of concrete, via some wobbly ramps, to a spoil heap up the garden. By now, it was raining enough for the covers to go on over at Wimbledon. And I began to discover some recent local history as I delved deeper into this pit of Hell.

My friend the builder (I met him, once, and he was ever such a nice bloke) had been most creative in his choice of rubble. There were the usual bricks, of course, but how do you explain a steel-capped boot, or a marmalade jar, or a complete, if rusty, electrical junction box?

Worse was to come, as my spade hit something solid that wouldn't respond to leverage. Scraping away the yellow clay, I discovered a metal drainage pipe, and the damn thing proved to be eight feet long when I finally wrested it away from its niche.

It was raining harder than ever by now, but could all the water in my excavation have come from above? It seemed to be seeping in from all sides, but how? It couldn't be the water table, because the site was higher than the rest of the garden.

A sage person appeared by the hole. Holes in the ground always attract amateur philosophers, and Old Peter was following the tradition. "I know why there's water," he said slowly.

I awaited his revelation. "Oh, and why?"

"Because there used to be a pond there, and that had water in it." I mentally signed him up for the STBO (Stating the B____ng Obvious) Club. But the annoying thing was, he was quite right.

All this wet stuff was a legacy from a very solid, very watertight concrete pool of yore. This water had been there a very long time, and smelled no better than it should. By now, the scene resembled something from Flanders and, for the first time, I stared possible failure in the face.

Even if I could get down to the required, modest depth, what could I possibly do about the swamp? And would I ever get the sides and base of the hole smooth enough to take a liner?

Pessimism was fuelled by the discovery of not one, but two items of bathroom porcelain in peach and pink. Broken in pieces and razor-sharp, they seemed to go on for ever.

A desperate mix of pride and masochism would have kept me wallowing around until dark, but I was forcefully persuaded to call it a day. We put on the covers, ate a large spaghetti and watched Seles, in between showers, demolished by the Graf Zeppelin. I know just how Monica felt...

Above: Stand liner makes a 'bog pocket' – a slab is taken out, the liner is filled with compost and trimmed to just below ground level. Right: Completed 'bog pocket'.

One returns to a half-dug hole as to a part-written love-letter, wondering why you started it in the first place and doubting whether it will ever be completed.

But next morning I was shovelling away anew, soon to discover the concrete base of the original pool. Well, not exactly, because what my spade jarred upon was obviously the "shallow end". To my right was still a morass of broken glass, brickbats and son-of-metal-pipe (good things always happen in pairs, don't you find?), all under three inches of water.

By now I was down to about 15". Hopelessly inadequate if a pond is to contain fish but, Lou insisted, quite enough to cover the shins of a bathing nathaich. The books tell you that this is the point where you *"remove all sharp stones from the sides and base of the excavation, so as not to damage the liner, and then, if necessary, use an underlay... sand, old carpet, newspaper or a purpose-made polyester sheet."*

Pardon my smiles, white-collar pondies, but no way would this ragged gash in the ground be mollified by last week's Sun.

Then Lou had a brainwave (she's a teacher, and paid to have brainwaves). Up by where we had been tipping the spoil was an area of hard-standing for a car, and some benevolent genius (probably our builder friend) had laid down sheets of open-weave chipboard over the soil, so the wheels wouldn't sink in.

Why didn't he lay concrete, you ask? He used it all on the pond, I reckon.

This chipboard was, by now, quite elderly and soft. In lifting it, we deprived many woodlice and delightful grey slugs of a home. But it was the ideal stuff to lay up against the sides of the hole and tamp down into the base, where it soaked up water like a loofah. At least it covered all the sharp projections, and we discovered it could be cut ridiculously easily with a saw, to something like level with the surrounding crazy paving.

It became like putting together a manic jigsaw puzzle on the grand scale: "What bit will go in there?"

"Try that triangular piece, no, not that way, turn it round..."

With the boarding in place, and back-filled with clay for support, the inner contours of the pool were now very angular, and not a bit wildlifey.

But that could be put right, now, with the traditional builders' sand. Luckily, traditionally, builders don't work Sundays, and there was a huge pile of the stuff next door, where Old Peter was having his gaff done up by a lad with an earring and a purple Escort (traditional tools of the trade).

Old Peter was off on a STBO Club trip to Warwick Castle and besides, we'd pay for the two barrowloads we liberated. Did I mention, by the way, that my money was on the Croat to win the Men's Singles?

The sand laid up a dream against the pond walls, and it was time to go and get a pool liner. I won't embarrass the shop by naming names, but they had only two in stock, it turned out. One was PVC, with a choice of two horrendous colours, blue and stone, depending which side was uppermost: the other, luckily, was black. About (the Bingham stuff) of just the size we needed.

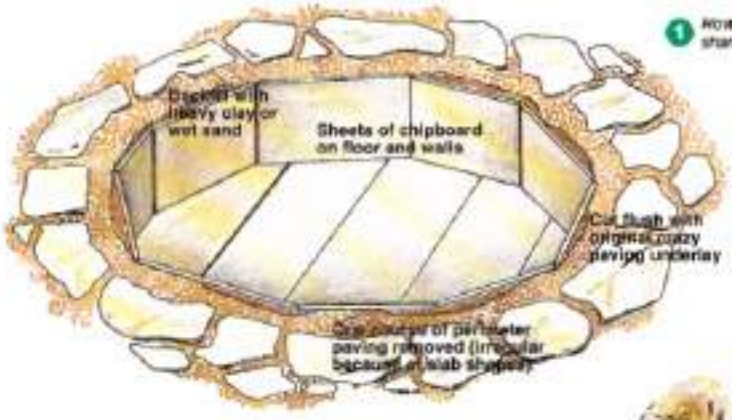
While I was choosing it, the kids vanished into a nearby pet store where they discovered a nice little iguana. They wanted it, which isn't unusual, and I said no, which is even less so.

In any case, this other one was temperamentally unsound. It bit me and scratched me, and tried to escape up a curtain, which perhaps explains why I prefer Koi any day.

The liner went in with no hassle at all, and I was grateful for Alsan's superior flexibility when the hose went on and I went into the rapidly filling hole to smooth out the creases.

If there's any subsidence later on, this make of liner will take up the strain better than Butyl, claim the makers.

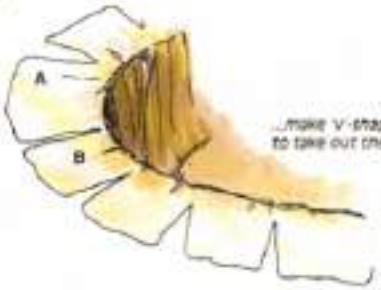
By the time the liner was installed and the pond filled, Agassi – did his ancestor discover the dwarf cichlid (**Ed's note:** If he did Mary Bailey doesn't mention it when writing about *Apistogramma agassizi* in this month's *PFK*) – was two sets up.



1 How to make good a boggy, sharp-edged excavation

2 When re-laying crazy paving (three inch overlap to pool), try and use regularly-shaped pieces (at in A), otherwise problems build up as you progress (B,C and D).

3 When a liner drapes over edge of pool, creases will form. These are difficult to tuck under subsequent paving so...



A is correct but B is dangerously close to edge, and any subsidence may lead to water seeping up and over

Fletchers are famous for their forward planning, and so it was off to another aquatic centre, this time for some mortar to bed down the perimeter slabs.

I again lost my daughters, this time to an armful of fluffy rabbits in the pet section. No chance, kiddos - you've guessed, we've got rabbits, too.

If the pond-building books fail to acknowledge Murphy's Law, it is nowhere more evident than at the point where neat diagrams demonstrate the laying of slabs over a flap of liner.

Who can believe diagrams, anyway, when there is only a neat hole surrounded by untrodden grass and no sign of the spoil taken out... where do they put it?

I had taken the slabs one course back from the edge of the hole, and Lou had arranged them neatly in order, so we would know what went where. But, of course, slabs of whatever shape must overlap the liner by a couple of inches, so our crazy paving didn't fit as it should...in the end, it was a case of another jigsaw, but these pieces couldn't be cut. To cut a long story short, Agassi won, I skinned my fingers raw by smoothing off mortar without gloves, but by six that evening - there was definitely a pond where before there had been none...well, not for some years, anyway.

A tip for oxygenating plants - slip a pair of old tights round the basket to help keep soil and stones in place

The 'wildlife' element went by the board to some degree, aiming my claim to the title by default, rather than by any positive features. In other words, it wasn't very deep, it didn't have a filter, and any informality was down to my indifferent building skills, rather than intentional.

No matter, it was a wild weekend, and some time soon I'll return to the scene of the crime and see if I can make the princely pond a home fit for a frog ■

Sister Lou with her finished pond a week on – marginals, oxygenators, floating plants and bog pockets soften the outline.

Left: Small Clearflow media.

Below left: Large Clearflow media.

Bottom left: Remanoid Aquafresh.

BOXING CL

We review a large range of the box filters currently available for the smaller pond.

Box pond filters utilise two main filtration principles to ensure the health of your fish: **mechanical** and **biological filtration.**

The very first stage of **mechanical filtration** is usually an intake filter on the pump to remove very coarse particles and protect its impeller. This filter needs to be kept clean, or the pump's flow will be reduced. One of the units featured here claims to serve as both intake filter and main filter.

Finer particles are filtered out by the mechanical filtering action inside the box - usually using foam or brushes (or both). If allowed to get through to the biological medium, dirt particles could clog it up, and possibly smother the bacterial colony. Alternatively dirt and silt could find their way back into the pond.

Brushes, like giant bottle brushes are one popular choice of mechanical medium. The water has to flow through the stiff bristles, which filter out particles and also encourage them to settle to the bottom of the chamber, by slowing the flow. Brushes should also be cleaned regularly, as should their chamber.

First chambers in these filters often feature a sump which can be drained to clear collected waste.

For **biological filtration** the function of the various media is to provide a home for the bacterial colony which actually does the job of breaking down wastes.

Box filters clockwise from top: Lotus, Cyprio, Small Trident Clearflow, Pegasus Flotec Protec 20, large Clearflow

Top: Cyprio Green Machine media

Right: Biotec media

Below: Bio Filter media

EVER

Various types of medium are suitable - plastic in various shapes which features in virtually all of the units supplied; sintered glass; foam; and others.

Surface area is the most important factor, allowing plenty of bacteria to flourish in a small space. This needs to be coupled with a physical form which does not easily clog and impede water flow. Plastic tubes are a commonly used biofiltration medium which meets all these requirements.

Foam media is also supplied in some units as the main source of biological filtration. Both brushes and foam can also take on a partial biofiltering role, but if they are intended to be a mechanical filter, they should be cleaned before they clog.

Pump feed

Pond water is supplied to the filter by a pump. The manufacturer or supplier of your chosen filter should be able to recommend a flow-rate for water passing through the filter, allowing you to choose the right pump from the wide range available. Some manufacturers recommend a particular make or model of pump or pumps.

Water returns from the filter by gravity, and can be piped direct into the pond, or routed through a cascade, stream, waterfall, or other feature as desired.

Returned water splashing onto the pond's surface will help to oxygenate the pond, giving you an extra benefit from your filter.

If your filter is to be sited a lot

higher than the pond, perhaps to feed an impressive waterfall, remember that you will need a more powerful pump to raise the water to the filter.

This does mean that your box will be on display beside the pond unless carefully disguised.

Going green - or ultra-violet

Filtration alone - however good - is not enough to prevent the dreaded 'green water'. The best treatment for this is an Ultra-Violet Clarifier. These are usually plumbed into the outflow from a filter, but some filters have them built in. Many of the units featured are designed to accept a dedicated unit. This is built into a special housing to fit the filter box, often on or replacing the lid.

Why buy a black box?

Of course, there are other ways of filtering your pond, but the great advantage of a 'black box' type filter is that you get a ready-made unit with all the design and construction taken care of for you.

Black box units are also easier to add to an existing pond than many other types of filter, which are best incorporated when building the pond.

If you want UV treatment as well as filtration, a built-in or easy-fit dedicated unit keeps installation simple throughout the whole system.

Buy a unit capable of filtering the size of pond, and match it with a pump which gives the recommended flow rate through the filter. If in doubt, get the next size up.

It could also pay to go for the next larger filter if your pond is very heavily stocked. An alternative to a large filter is to connect two small units together, and use a powerful pump. The mechanical filter in the box the water passes through first will accumulate most of the dirt particles, and will need very regular cleaning. Two small filters can be easier to hide than one large one.

Some people like to build a little pond-side 'house' to contain their filter - others prefer to disguise it with plants and shrubs.

If you camouflage your filter remember to allow easy access for regular maintenance.

Part of the C.D. Plastics range.

THE FILTERS

C.D. Plastics

These square grey units come in three basic sizes but are available in a more advanced version to bridge the gap between standard box units and larger multichamber Koi filters.

Even the standard range features chambers - the first containing 4" diameter brushes. On the standard model, water passes via a duct under and thence through the media. Outlets and inlets at 1½" are fitted as standard but variations are available on request.

Larger 3 or 4 chamber filters start at 5' long for 2,500 gallons and go to 12'. Quarantine tanks with or without filter units are also available.

• C.D. Plastics, Unit 5, Longford Industrial Estate, New town Entrance, Bridgtown, Cannock, West Midlands WS11 3DD. Tel: 0543 570717

Lotus

Lotus produce three single chamber units with the same basic set-up. Water enters through a trickle-bar from the pond through layers of foam into a biological area filled with a Flocor type plastic material. An overflow arrangement backs up the outlet pipe. The units will accept a dedicated U/V clarifier system.

• Lotus Water Garden Products Ltd. PO Box 36, Junction St., Burnley, Lancashire BB12 0NA. Tel: 0282 20771/2

Trident

The three models from Trident run on a similar system to the Lotus unit, with water trickling from a bar, through foam layers into plastic media. On smaller model this media is backed up with two "Bio-Foam" blocks (not unlike the foam sponges in internal filters) wrapped around the outlet pipe.

• Trident Water Garden Products, Carlton Rd., Foleshill, Coventry, CV6 7FL

Cyprio

Cyprio produce two models of box filter. Cyprio are great believers in the power of foam as a biological media. The Green Machine, which offers guaranteed clear water when backed with an integral Cyprio U/V, reflects this. Water passes through a spray bar, then brushes, then foam blocks (Biocartridges). The catalogue then states that the water passes through plastic media. In the case of our review unit, the final stage was a sheet of dimple foam.

The Biocarb units are back with the idea of trickle bar, layers of foam, and a plastic media - in this case Cyprio's own media. This one will also accept an integral U/V.

• Cyprio Ltd., Eastgate Mews, Eastgate, Deeping St James, Peterborough, PE6 8RB Tel: 0778 344502

Pegasus Flotec

P-F also produce two models of filter. The Biotec features the seemingly standard trickle bar, multi layer open cell foam, and Flocor plastic or Springlo embossed tape biological media. The Protec filters which can be built up by modules, feature brushes, foam cartridges and flocor. Both units have an integrated U/V option, and like Cyprio, guarantee clear water if this option is taken up.

• Pegasus Flotec, Moss Industrial Estate, Woodbine St., Rochdale, Lancs OL16 5LB Tel: 0706 55453

A1 Garden Aquaria/Siporax

A couple of recent items in *PFK* have outlined the tremendous confidence that A1 have in Siporax as a filter medium. Claims that verge on the outrageous are made for this material - but very many fishkeepers will vouch for its effectiveness.

A1 885 system.

Without going over all the ground again it's necessary to state that Siporax is a sintered glass material with a massive external and internal area for bacteria and therefore a remarkably small quantity should be able to filter a vast pond.

It should also be capable of both aerobic and anaerobic processes removing nitrite and nitrates.

To use these qualities, A1's Peter Oakes has designed two filters. The first is a pre filter to

Koi or goldfish?

Most Koi keepers will claim that their larger ponds require more advanced filtration than a box unit. Much will depend on stocking levels and the size of the pond. The units shown go to 6,000 gallons which represents a pond some 12' x 14' x 6' deep; effectively you could double or treble these up but they'd need to be stepped down in stages back to the pond, and they would be difficult to disguise.

It's here that the gravity-fed, pump-returned "underground" filter comes into its own, as it can be boarded over and hidden from view. The normal system with such filters is to dig, build and concrete your own - though you can buy large chamber boxes for such filters, and they, and home-made efforts, may well use similar media to the boxed units.

Box units – features, media, sizes and prices

Manufacturer/ Distributor	Units	Media supplied	Chambers*	Other features	Size range in gallons	Price
C.D. Plastics	Biological filters	Brushes in first chamber	Two or more		500 1000 2000 2500	£59.95 £89.95 £149.95 £292.61
Lotus	Bio-Filters	Sponges and plastic media	One	Accept dedicated UV unit	500 1500 3000	£40.95 £102.95 £160
Trident Water Garden Products	Clear Flow Bio Filters	Various types of foam and Flocor	One		500 1000 2000 3000 5000	£37.50 £49.50 £96.90 £139.90 £165
Cyprio	Green Machine	Brushes, Foam Biocartridges and Cyprpack biomedia	Two (one above the other)	Accept dedicated UV unit	1500 2500 4000 6000	£89.50 £179.50 £257.50 £374.50
Cyprio	Biozorb	Dimplefoam and plastic media	One	Accept dedicated UV unit	1000 2000 3000 5000	£44.95 £109.50 £155 £225
Pegasus-Flotec	Biotec Biological Filters	Reticulated foam and Flocor or Springflo	One	Accept dedicated UV unit	Six sizes 250 to 6000 Below 1000	£40.40
Pegasus- Flotec	Protec 20	Brushes, open cell foam cartridges and Flocor	Variable by extension tanks	Accept dedicated UV unit	N/A	
A1 Garden Aquaria/ Distributed by Trident	A1 GSM Mk2 Multifit	One litre of Siporax**	One (fitted as pre-pump filter)	Magnetic clarifier	One only to hold 3l of media. See list for compatible pumps***	£45 plus extra for additional media
A1 Garden Aquaria	N.B.S. system	Siporax	One	Magnetic clarifier	One only	£200 with media
Remanoid	Deluxe Aquafresh	Foam and plastic media	One	Built-in UV unit	To 1500	£153.21
Remanoid	Aquafresh	Plastic foam and Maxiflow plastic media	One	Available with dedicated UV unit	650 1000 With UV	£37.75 £51.04 £91.91 £112.34

*Some box filters in these ranges are effectively sectioned by the different media in use; others use actual chambers
**Additional gravel needed to pre-filter the Siporax
*** Suitable pumps, Lotus, Otter, Amphibious, Hozelock, Eheim, Gase and others.

hold up to 3l of Siporax, which it is claimed is sufficient filtration for 20 fish 12" long and obviates the need for traditional filters. Siporax is placed at the heart of gravel which pre-filters the water before it reaches the sintered glass.

The second unit is designed to remove solids utterly and to put clean water through the 5l (or more) of Siporax it will hold meaning no chance of clogging.

The original NBS was white; new models are an algae-preventing green and have a lid. Water passes up through gravel to the media. Gate valves allow back-flushing of the gravel. Both units contain magnets that are claimed to flocculate algae and prevent green water. There is nothing else like either of these models on the market.

•A1 Garden Aquaria Ltd., Cross Lane, Wilmslow, Sandbach, Cheshire CW11 0RW Tel: 0270 882733/761282

Remanoid

Remanoid's Aquafresh filters use the time honoured system of trickle bar, mechanical foam of various densities from fine to coarse, and their own Flocor type plastic media. Larger units use more foam.

With built-in UV, the units are known as the Ultraclear.

•Remanoid, Unit 44, Medomsley Rd., Consett, Co Durham. Tel: 0207 591089

A1 GSM Mk2