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PRACTICAL Fishkeeping

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Above: Cichlasoma Nicaraguense - see page 8.
Below: Vagabond Butterflyfish - see page 86.
Bottom: Contented summer Koi despite the heat - see page 117.

• Cover pic shows a Siamese Tiger (see page 4). Pic by Max Gibbs, The Goldfish Bowl, Oxford.

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Tank care

Well, now that you've found your fish, and you know which it is, what's next? The chances are, the ones offered for sale will be under the 10cm mark, usually around 5 or 6cm, and you can expect to pay a tenner or more for this size.

Although predatory by nature, they are not an aggressive species and will remain sociable towards any companions that will not fit into their mouths easily.

They are happy kept in groups and also perfectly contented when on their own. Although shy by nature, *Datnioides* are remarkably intelligent, soon coming to recognise their owner and apparently enjoying attention, feeding happily from the hand.

I like fish that prefer a well-planted aquarium and the Siamese Tigers are no exception.

Feeding

Even when well fed, Tigers will grow slowly. They are by nature a predator, feeding on fish, aquatic insects and shrimps, but will readily adapt to a varied diet with no need for an endless supply of live fish.

Worms are eagerly taken, but the usual variety of beef heart, strips of fish, and feeder shrimps will also be eaten quite happily. If feeding beef and fish pieces (to any piscivore, not just these) please remember that they do not contain the calcium and other minerals found in the bones of their natural diets and therefore it is essential to provide prawns or feeder shrimps fairly regularly.

Right: Datnioides microlepis, the ultimate spawning challenge?

Below: The dark line over the gill plate will be unknown on Datnioides microlepis.

Choose the larger leaved plants, such as Amazon Sword, Crypts and Vallis which will provide shelter as well as being aesthetically pleasing.

A large *Datnioides* lurking among giant Vallis is remarkably well camouflaged with its vertical bars, simulating the natural habitat where they lie in wait for prey.

The plants are also safe, these fish exhibiting none of the JCB habits of our old friends, the cichlids.

Apart from plants and bogwood for shelter, the major requirement is for clean, well-filtered water. I am not just trying to extol the virtues of a well-managed filtration system, nor should I need to, but this is an actual necessity to maintain Siamese Tigers at their best.

Power filtration is essential, preferably a combination of internal and external, but avoid setting up a strong current as they will try to shy away from any flow.

Water should be moderately hard, with a pH of 7 to 8 heated at around 23 to 27°C, with the addition of one teaspoonful of salt per gallon in the case of *D. quadrifasciatus*.

Breeding challenge?

You have a very attractive fish, relatively valuable and with the potential to become very popular. The next question must be, 'What about sex?'

The first problem is identifying a pair and with no external differences, this may provide at least you with the proverbial headache.

If you do manage to overcome this one, the next problem is to simulate the migratory tendencies of moving upstream to fresher waters where they are reported to be pelagic egg-layers. That is, they are open water spawners, the female scattering vast quantities of eggs immediately fertilised by the male, which are then left to their own devices.

The surviving fry seek refuge among dense plant growth, taking on a leaf-like appearance and remaining entirely motionless, except to feed, and drifting lifelessly with the flow of water if shelter is lost.

I think we are on to a loser with this one, but good luck....

Growing on

You will probably purchase these fish at under 10cm and at this size they are really still only fry, but with a potential to reach up to 50cm.

However, don't be too alarmed by this for, these are VERY slow growers. In fact, you could quite happily keep four specimens in a 4' tank for up to a couple of years, before having to step up to more comfortable accommodation.

Having said that though, it's the old case of 'the bigger the better', and I doubt there are many more impressive sights than a pair of contented 30cm examples in a five foot tank.

Bearing in mind the rate of growth, these are not a fish to be fattened up and passed on quickly, living well in excess of ten years and hopefully being given the respect during this time that any animal deserves.

Problems

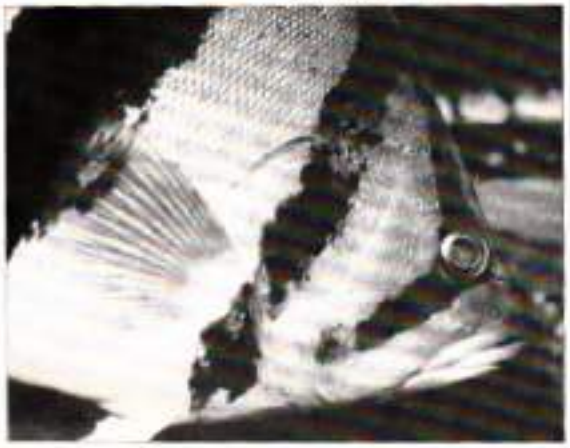
Other than their requirement for clean water, the Siamese Tigers are quite hardy fish, resilient to most infections - except one.

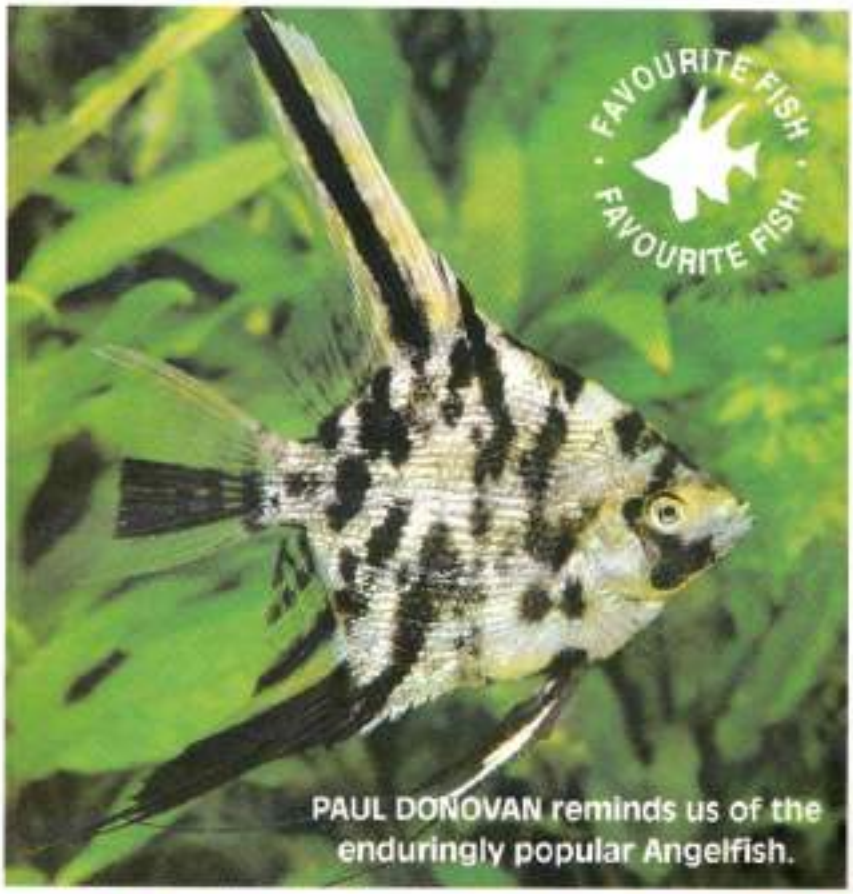
In particular, *D. microlepis* appears susceptible to white spot, but don't rush out to buy gallons of 'the perfect cure' the second you see one spot appear.

If the symptoms should start to show following an unavoidable change, say a power failure or similar, the fish will normally be able to rid itself swiftly upon return to normal conditions.

Keep an eye on it though, and only administer treatments carefully if necessary. Their preference for cleanliness extends to a marked dislike of the chemicals that we may chose to check in. Once any treatment has been completed, partial water changes should be carried out every three days on three consecutive occasions, before returning to a fortnightly change of about 20%, with water that must be as near as possible to that already in the aquarium, (but hopefully that goes without saying these days). ■

■ I would be delighted to hear from any readers, whether it be about these or any other non-community species. So, if you have any problems, observations, general conversation or polite suggestions, please put pen to paper, preferably with an SAE enclosed. Address all letters care of the Editor, Bretton Court, Bretton, Peterborough, PE3 8DZ.





PAUL DONOVAN reminds us of the enduringly popular Angelfish.

The Angelfish

I am sure none of you will require any formal introduction to this fish. Several colour strains have been bred since the original black and silver variety came on the market many moons ago. Colour forms such as lace, marble, silver, black, blushing, gold, plus a host of other varieties are now available to the fishkeeper.

Angelfish are chosen by many beginners because of their hardiness and attractive appearance, they are certainly one of the hardiest fish I know.

Several years ago, my tropical fish tank suffered the dreaded overnight powercut, and while all the other fish perished, the angelfish was still swimming around, somewhat lethargically, as though nothing had happened.

When the Angelfish first came onto the market, it was an aggressive fish which showed its intolerance towards other tank mates. Although much of this aggression has now been bred out of the fish, they are still relatively 'boisterous', and have few qualms about eating fish smaller than themselves.

Take this into account, though, and angelfish make a good community fish when housed with other hardy species - certainly none which have a timid nature.

Breeding in captivity is eminently possible, although distinguishing features between the sexes are limited. Experienced angel breeders look at the length difference of the finnage - males have slightly longer fins and sometimes show a marginally lumpy head, though these are not reliable features.

At breeding times there is an obvious difference between the sexes, that is the small tube which extends from the vent down which the eggs and sperm are transferred. In the female this tube is broader than in the male.

The female deposits a line of eggs on a vertical surface, usually a broad leaf, though anything vertical will suffice, which the pair clean beforehand by pecking at it. As the eggs are laid, the male follows behind and fertilises them.

Both parents, like all good cichlids, guard the eggs and keep them clean and well-oxygenated by fanning them with their fins. The parents stand guard on the eggs until they hatch and the fry reach, within a week, the free-swimming stage.

A minimum tank of 60 cm is the basic requirement for this fish. The tank should be well planted but have areas of open water for swimming.

Tank-bred specimens are hardy fish that will thrive in soft or hard water between pH 6.2 and 7.2. Wild caught specimens prefer a soft neutral to slightly acidic water of pH 7 to 7.2. Ask your dealer if the species you are purchasing is captive bred or wild caught.

Captive bred angelfish are voracious feeders that are almost constantly on the look-out for food, and are generally first in and last out when the food is being dished out. They will become tame enough after a relatively short period of time, to take food from your fingers.

In contrast to this, wild-caught specimens tend to be finnicky feeders and require a diet of live food - tubifex, bloodworms etc.

It is easy to see why the Angelfish makes such a popular addition to a community fish tank.

An attractive fish to look at, and hardy to keep. What more could you ask for? ■

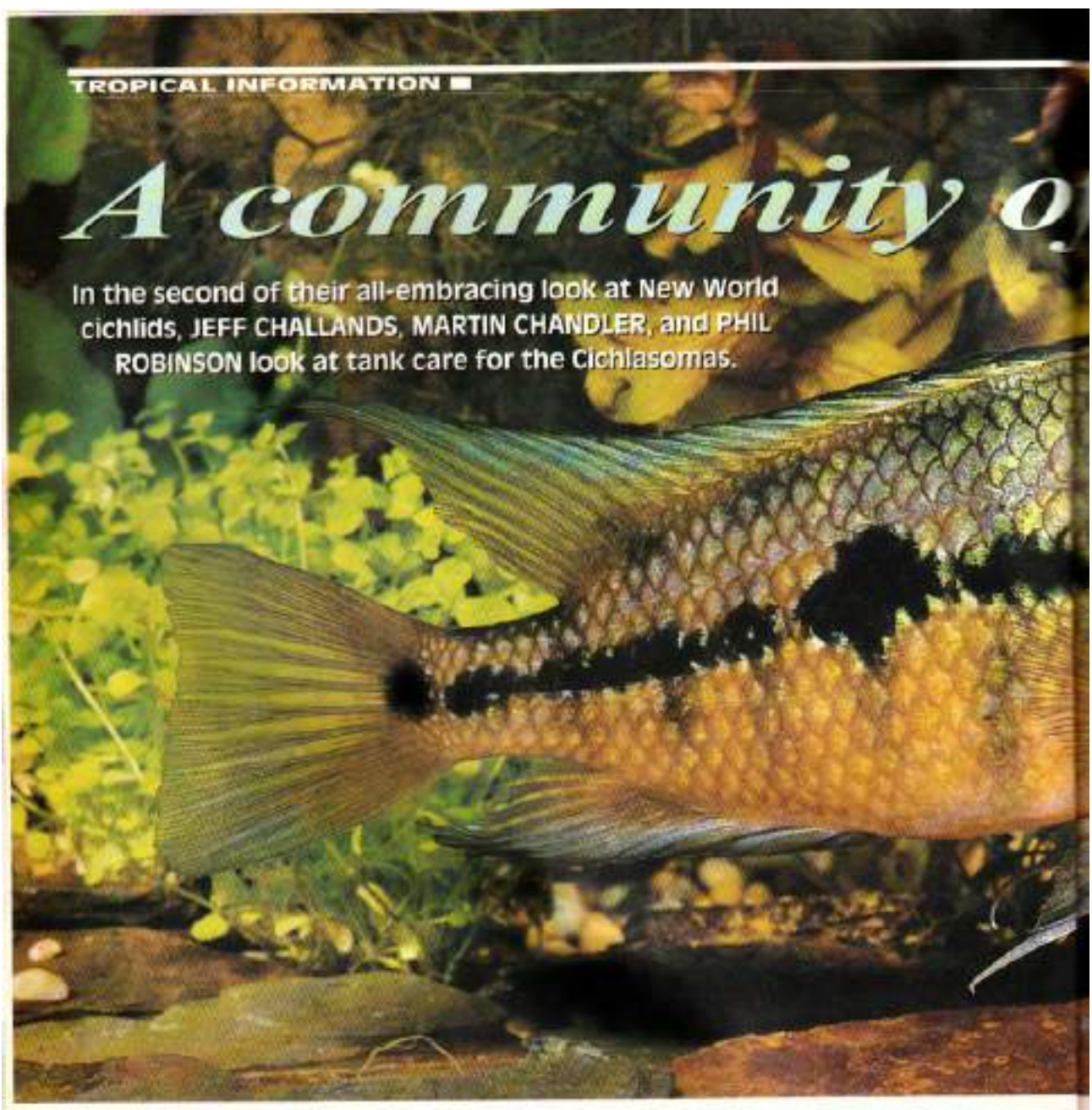
Main picture shows a Marbled Diamond Angelfish. Above: Silver Angel.

ANGELFISH *Pterophyllum scalare*

Family: Cichlidae
Feeding: Active and bossy. Community fish
Tank position: All over
Temperature: 2°C
Distribution: South America
Size: To 6" (length)
Diet: Flake food, plant matter, whiteworms, bloodworms, daphnia, tubifex, and mosquito larvae

A community o

In the second of their all-embracing look at New World cichlids, JEFF CHALLANDS, MARTIN CHANDLER, and PHIL ROBINSON look at tank care for the Cichlasomas.



Main pic: Cichlasoma nicaraguense.
Far right: Juvenile Cichlasoma salvini.

It is quite possible to establish a cichlid community tank containing cichlids of the *Cichlasoma* genus, not only the larger ones, without too many problems. To set up such a tank containing only the larger species so that they live in a harmonious group requires careful thought.

For example a tank of at least 48" x 18" x 18" would be the minimum required in which to keep three specimens, with a 72" x 24" x 24" being required for double that number.

Space

Harmony is dependent on the species being considered, but with fish that have a potential size of 12" these stocking levels could be thought of as being rather high.

From experience, and depending on the species selected, it has been found that with these numbers of large cichlids all present in the same tank, there is not the space for any of them to be able to establish a permanent territory and fight off all invaders.

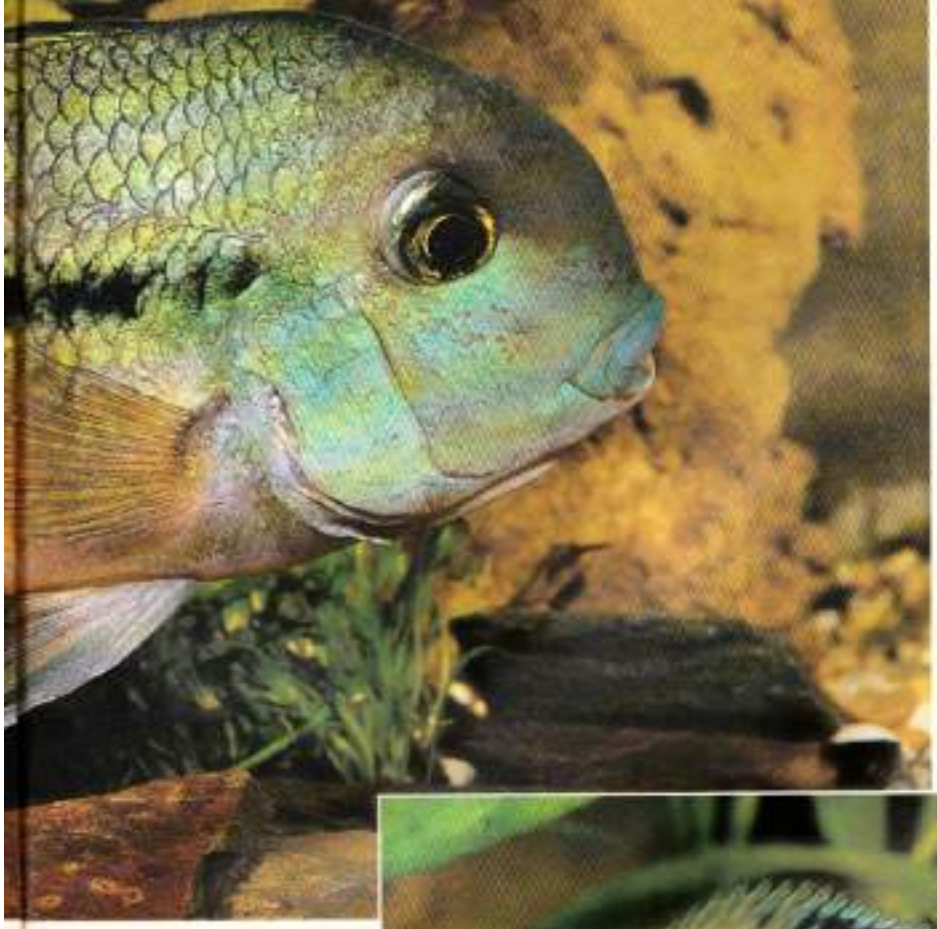
If, for example, only a couple of fish are kept in a large tank that are not established pairs, one will want to rule the whole tank and will pick on the other fish continually. This does not occur in a crowded tank that often.

Growing on

No matter what species are chosen, it is always wise to buy a few small juveniles, or sub-adults, depending on the fish's eventual size, and to let them grow-up together.

A pecking order will soon develop and if the fish are allowed to grow up together, they are less likely to fight when fully-grown.

f characters



tackwork and then put them back into the tank, including the new one, and they should then soon settle down and establish the pecking order, which should also include the newcomer.

Companions

You can also include other species of fish in the community tank, that is non-cichlids. In fact it may be a good idea to introduce a large catfish, for example, and one of the sucker-mouth catfish, like *Hypostomus* to clean up any of the uneaten food that finds its way to the bottom of the tank. Other fish that can be considered are large barbs, like the Tinfoil, as their continuous swimming back and forth can act as a distraction for the aggression of the cichlids. They may also prove to be useful when it comes to breeding, a point that will be covered later in the series.

No golden rules

Something to remember, no matter what species of *Cichlasoma* you decide to keep in a community set-up. Cichlids are individuals and have a character of their own and this can show in the aquarium.

While we can suggest the basic steps in keeping these fish and the best ways to start, cichlids can be unpredictable. For instance, once the tank is set up and the fish installed, they will form a pecking order.

Establishing adults

It is very difficult to introduce a single specimen into an established tank, especially with a tank that contains adults, but it can be achieved with a little care.

One of two possible methods is to divide off one end of the tank using a clear divider and install the new fish into the smaller section, after a few days when the other occupants of the tank have accepted the newcomer then remove the divider and let all of the fish mix.

The second is to remove all of the fish, totally rearrange the

Tips for fish selection

1) Find out as much as possible about the fish that you are going to keep before buying them. Read as much as you can, see if there are any other cichlid keepers in your area, or a local aquatic society where you could ask questions and get advice.
2) Have as large a tank as is possible. A little forward planning at the outset can save you a lot of expense, and headaches later, especially if the fish you have bought outgrow their initial home.
3) Avoid similar looking or closely related species.
4) Slightly overcrowd your tank, but not to the extremes otherwise your filtration system may not be able to cope with the extra loading placed upon it.
5) Use scavenger fish to clear up any leftover food, large catfish offer the best solution.
6) Consider other fish, like large barbs, especially to reduce aggression.
7) Introduce all the fish into the tank in one go, especially where sub-adult or fully-grown specimens are concerned.
8) Buy young or sub adults at the outset where possible.
9) Have an emergency tank on hand.
10) Decorate the tank to the needs of the fish.

Right: Cichlasoma festae.

Below left: Rivermouth cichlid, Cichlasoma meeki.

This will not really become apparent until the fish are sub-adults but there is always the more dominant fish, usually a male, with the others taking their place in the hierarchy below him.

You should watch out for any fish that may harass all of the other inmates to the point of serious damage; or for one particular fish being harassed by the rest of its companions to the point of being shoved into a corner. In either case remove them.

One instance where this can arise is if there are two males of the same, or closely-related, species and they are of about the same size. Fighting will probably break out and so the fish that becomes the sub-dominant one should be removed, not the dominant fish. Should the latter be removed then the second fish will become the dominant one. Really it is a case of keeping a careful watch on the tank and making the right choices.

Cichlids for the community

While the main purpose of this article is to deal with the larger of the *Cichlasoma* species, advice on the basics of establishing a cichlid community can be applied to any of the species, even the smallest ones. It follows that with small species tank size can be reduced, or larger stocking levels can be achieved with a large tank, but the basic criteria still apply.

There can be several reasons why a community tank can have its uses, one being as a mixture of different species for display purposes.

The second, and the one usually chosen by the authors, is to grow up a mixture of different species in variable numbers until they show signs of pairing and wanting to breed.

You can even let newly-established pairs breed in the community tank at the outset.

Thirdly the community tank can be used to house a potential pair of large and aggressive cichlids where the male will badly attack the female if they are kept together. In a busy community the chances for concerted aggression by one fish on another of its own species are greatly reduced.

Of course care has to be taken that the aggressive male does not

turn his attentions to other occupants and if this is the case then he will have to be removed and if it is still the intention to breed the pair, then the divided tank method, with one fish in either half, will have to be considered.

From the authors' experiences there are many possibilities for a successful community aquarium. A large *Theraps* species is a must for the community and they would recommend *C. synspilus* or *C.nicaraguense* as they are both relatively peaceful when kept as a single specimen.

A large *C. bifasciatum* or *C. maculicauda* would also look good, but could possibly prove to be more boisterous. It often depends on the actual size of the specimens selected as sub-adults are often more agreeable than fully grown ones.

As we are considering a community tank for its aesthetic value, then a species with prominent vertical stripes would look very appealing. Those worth considering, as they also have a variety of reds and greens over the base coloration as well as stripes, include *C. festae*, *C. urophthalmus* or *trimaculatum*.

The larger *C. macracanthus* can even be considered as it is relatively peaceful for its size. It is unlike the three previously named fish with regards to its overall physical shape and colours.

One of the larger, more predatory species should also possibly be considered as they should mix in quite well. *C. managuense*, *motaguense*, *labridens*, *octofasciatum*, *kantoni* and *friedrichsthalii* are all well worth considering if for nothing else, because of their elongated, torpedo-shaped bodies, especially the *C. managuense*.

Finally to add a bit of orange or red colours to the tank, and rather than include the aggressive *C. citrinellum* or *C. labiatum*, which might cause problems for the beginner, you could add the orange-yellow form of *Petenia splendida* which, while not being a *Cichlasoma*, would make a good addition to the community tank as they are very peaceful despite their large size.

As you can see, we have only mentioned a few fish that are possible to keep in a community set up, but the options are vast as there are a large number of species of fish to choose from. Often as not you should be able to find what you are looking for without too much trouble.

While we have tried to offer suggestions for possible mixtures of cichlids, often as not it is a case of trial and error. One author maintains several cichlid community aquariums containing some of the most unlikely mixtures.

In fact if the books are anything to go by then he is doing everything wrong. It is often circumstances that dictate what fish have been put together.

Emergency tank

No matter what fish you keep or how many aquariums, it is always wise to have at least one tank set up that can be put into use in an emergency. Usually a small tank will suffice like a 24" x 12" x 12", and it can be used in which to put a fish that has been badly injured, or picked on.

It can also be used to quarantine fish, use for breeding, rearing young or whatever.

Should circumstances dictate that a spare tank is not available then you can divide off one end of a community tank in an emergency and use this in which to keep a single fish or a breeding pair or whatever.

Single species tank

A single species tank can be taken to mean one of two things; a tank in which is kept a number of specimens of the same species, a breeding pair, or a single specimen. As we will be dealing with breeding in a later article, this can be taken as a tank for a single specimen.

Often as not many cichlids keepers, especially those of us who keep large fish, will end up with one fish in particular that becomes a pet.

We often hear of people who keep the Oscar, *Astronotus ocellatus*, as a pet as this cichlid is really a big softie when kept on its own. This can also be said of many of the larger species of *Cichlasoma* which often end up as pets for a number of reasons.

The authors have often had this situation occur, usually by sheer accident. A particular fish either ends up on its own because it has been badly injured, or has lost its mate, or may have been bought on impulse, the reasons are many and varied.

Should you just want one large fish as a pet then provide as large an aquarium as is possible, with a 36" x 15" x 15" being recommended as the smallest.

In fact some of the easier cichlids make ideal pets, like the "Red Devil" or "Midas" cichlid as once on their own they have no competition and often end up being very tame. Feeding them by hand is not uncommon indeed.

Conclusion

This article has tried to give the reader an insight into starting with large cichlids regarding fish and their selection. We hope, in following articles, to cover tanks, decoration, feeding, breeding and filtration in more detail. The authors have taken the basic concepts of keeping cichlids of all sizes and often adapted them to suit the best requirements of the species being kept. We will try to impart suggestions, tips and hints that we have found useful, but which, if ever, are rarely to be found in books. ■

■ All of the authors are members of the British Cichlid Association, an organisation that is run by the cichlid keeper for the cichlid keeper.

For details of membership contact: BCA, 5 Winding Shot, Hemel Hempstead, Hertfordshire HP1 3QP.

Right: Jack Dempsey, Cichlasoma octofasciatum.

Above: The Black belt cichlid, Cichlasoma maculicauda.

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

The WORLD in a tank?

MICHAEL ROBSON sets up a tank with an educational angle.

I have been keeping tropical fish for around 20 years and in all that time I have always had not just one, but a number of aquaria. My two daughters - Danielle aged 10, and Nicola aged 6, they have grown up surrounded by them and have developed an interest in the fish. One day they asked if they could have an aquarium of their own.

What luck - the chance for another tank. Their aquarium, I decided, was going to be an example of the diverse shapes, colours, reproductive behaviour and feeding - an example of nature at its best.

The fish I chose were:

4 Merry Widows *Phallichthys (Poecilia) amates amates*
10 Neon tetras
4 Emperor Tetras
4 Skunk Corydoras *Corydoras arcuatus*
4 Marbled Hatchetfish
4 *Ancistrus hoplogenys*

All the above fish were chosen to represent a specific example in nature.

The Merry Widows would teach about reproduction and sexual dimorphism.

The Neon Tetras would show bright colours as would the Emperor Tetras with in their case sexual dimorphism.

The *Corydoras arcuatus* would demonstrate bottom dwelling and feeding behaviour.

The Marbled Hatchetfish is an interesting example of specific evolution developments (shape etc.)

Lastly the "new man" of the team, the *Ancistrus hoplogenys* would demonstrate the brood care of the male.

Stocking

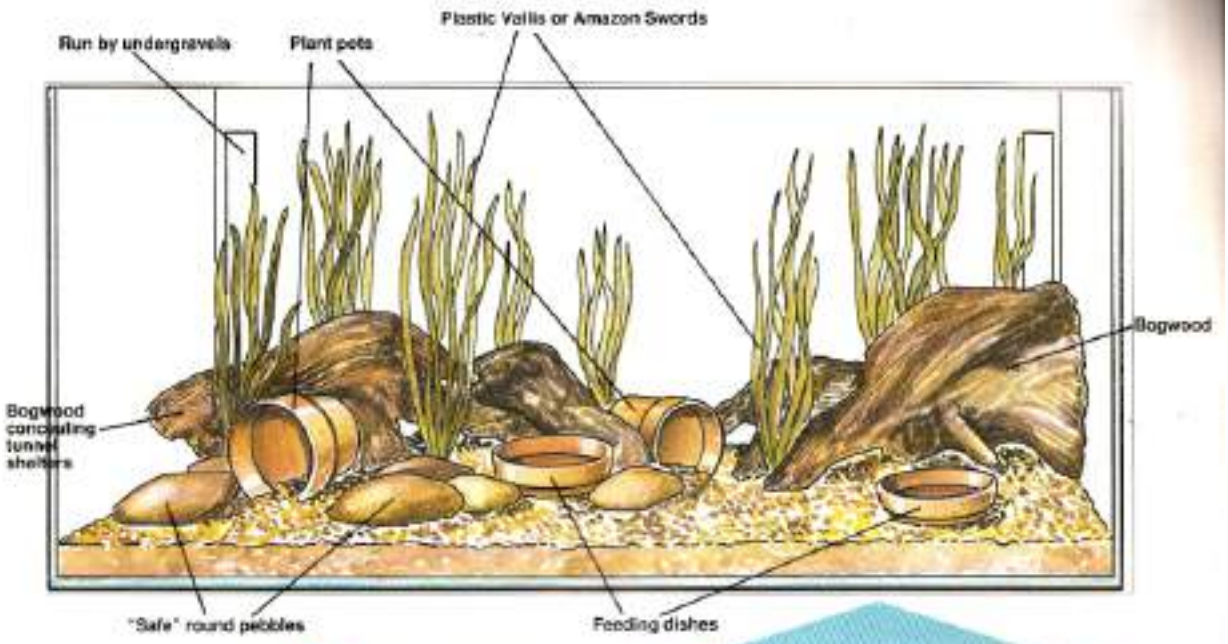
The first fish purchased were the Corydoras Arcuatus, the **Skunk Cory**, called this because of the black stripe running along the arch of the back. They come from Peruvian and Brazilian rivers and grow to a size of about 2".

An old favourite it is sometimes available, if not seen as often as *Corydoras aeneus* and *Corydoras paleatus*. This will take most readily-available food.

Ancistrus hoplogenys were added at the same time as the Corys. These were purchased young but the beautiful colouring could be seen, black body and fins with bluey-white dots on them, with bluey-white edging to the dorsal and caudal fin.

Fish for the FAMILY

Emperor Tetras are a quiet, peaceful fish and not as delicate as is sometimes thought.



Four were purchased as I hoped a pair would form and they would breed, so the paternal instincts of the father could be seen in practice.

The male, as it reaches maturity, develops stag-like antlers on and around the front of the head. *Anclistrus* are widespread in South American rivers and accept most readily available food with the emphasis on some vegetable intake.

These fish were left a couple of weeks for the tank and filter to mature.

■ The next fish added were the **Emperor Tetra**, another Tetra from South America. They are a quiet, peaceful fish and some say delicate but I have never found that to be the case.

The overall colour of the fish is purple, with a strong black line running along the middle of the body from head to tail, below this line the belly of the fish is from beige to a light salmon pink.

The male fish develops extended filaments on the dorsal fin, while the caudal fin develops elongated filaments at both tips and in the middle of the tail, giving a forked appearance (this also happens in the female but not to such a degree).

I have found that the male also has electric blue eyes. Most of the fins on both sexes have a dull black edging.

They accept most readily-available fish foods.

■ **Merry Widows** were added because I wanted a live-bearer that wasn't the standard Guppy, Molly or Swordtail.

These fish are found in Guatemala and Honduras areas of South America. The fish are Platy-shaped, the body silvery grey in colour but covered in a blue translucence.

All the fins are clear except the dorsal fin which has black at the base moving up into light yellow with a dark black edging to the dorsal fin tipped with yellow. The male is smaller than the female and has a gonopodium which he uses to fertilise the female. It's easy to feed.

I have found that it is not as tolerant of tank conditions as the more readily available Guppies, Platys, or Mollys.

■ After another wait of a couple of weeks I decided to add the **Neon Tetras**. As the the number of Neons added was to be quite high, I decided to add them alone. I didn't want the heavier introduction stressing the relatively-new filtration.

I think just about everyone knows the Neon Tetra and it has hit the top of the polls regularly as people's most favourite fish. Most of the fish seen in the trade come from the Asian fish farms but they originate from South America.

The male of the species tends to be slightly smaller and more slender than the female.

They will accept the usual food and will grow on this to about 1½".

A word of warning here, I have seen tiny Neons for sale, but these are incredibly hard to keep alive for the newcomer to the hobby. You will be better off purchasing larger but more expensive Neons, because although the smaller ones are cheaper, the death rate is higher and the cost of replacing them will obviously increase the overall cost. Under the right conditions these fish will live for a number of years.

■ The final addition was the **Marbled Hatchetfish.** These fish are found in the Peru area of South America.

The chest of this fish is adapted to give sufficient power to the large pectoral fins so that the fish can leap and glide out of and across the surface of the water when it is necessary to escape from danger.

For this reason it is necessary to have a splash tray and close-fitting lid on the aquarium.

These are one of the smaller Hatchetfish available growing to around 1½". In my opinion they are also one of the most attractively patterned, with a

The aquarium

The aquarium chosen was a standard 36" x 15" x 12", with filtration by undergravel and two uplifts. The substrate was lime-free gravel.

Decor in the aquarium was to consist of plastic plants of Jungle Vallis and Amazon Swordplants, the Vallis going around the edges of the aquarium along with small Amazon Swords with a large one as a centre piece just placed slightly to the left of the centre.

Two large pieces of bogwood were purchased and soaked for a couple of weeks before being added to the aquarium with safe, large round pebbles. Alongside the bogwood safe plastic pipes were laid out of view (safe meaning that they would not release toxins into the water).

Also placed in the aquarium were two small terracotta flowerpots and a couple of shallow terracotta dishes for feeding purposes (food placed in the dishes if not eaten is easily removed and doesn't get in the substrate and rot in there).

The aquarium was set up like this for two weeks. The temperature range of the fish to be kept was from 70°F(21°C) to 82°F(28°C) so the temperature was set at 75°F(26°C).

Do fishkeepe prefer whiskers?

This month's gallery concentrates on the varied forms of Loricarid catfish.

The Loricariids are a large family (more than 450 species and growing) of armoured catfish found in Central and South America in rapids streams and rivers of all sizes. Their flattened bellies reflect their bottom-dwelling and fast water lifestyles, and they have rasping teeth in their suckermouths, which are designed to allow them to fasten onto the rocks and hold firm. While they do this, their gills both suck in, and blow out water, obviating the need to move or open their mouths. few fish can survive in some of the torrents they can inhabit.

Overlapping plates of bone provide the "armour" over most of their bodies, and are often backed up by sharp tooth-like projections. They have armoured bony heads, and some also have sharp spines in the gill area.

All this may be essential for a fish that would have problems turning its mouth around to defence. The Loricariids often possess beautiful eyes; and all have an "iris flap" which can adjust to limit limit the amount of light that reaches the inside of the eye.

The group includes the various Plecs and Ancistrus; whiptail cats like Farlowella, Rineloricaria and Sturisoma; and the usually small and different-looking Otocinclus group.

Feeding

Not all members of the group are easily identified. Our main picture shows an Ancistrus described as a Chubby Bristlenose. The front view clearly shows the tentacles - not as stiff as bristles; the suckermouth; and the rasping teeth used to grind away at vegetation and algae.

There is some debate as to just how vegetarian the species is - there is no doubt that they will enjoy feeding on algae or cucumber and other blanched vegetables, but most will also take varying amounts of meaty food. It has also been suggested that many of the species digest wood in their diet, particularly the often large passages.

No aquarium for Loricariids should therefore be without its bits of bogwood possibly for food and certainly to give the fish a base; if more than one cat is stocked, several pieces may be necessary to give the Loricariids a natural home. Otherwise they will sucker onto unsuitable items like your heaterstat.

The Long Nose Sturisoma or Giant Twig Catfish

The Long Nose Sturisoma or Giant Twig Catfish

(Sturisoma barbatum)

The graceful tail extensions make a tempting target for some aggressive fish, but the fish is otherwise robust despite its slender appearance. Brine shrimp make a good addition to its otherwise vegetarian diet. It can reach 12"long.

The Striped Plec

(Peckoltia pulcher) is a brightly marked little fish that reaches 4" and is therefore suitable for the community tank - but not with others of its own kind or

Above: Temminck's Bristlenose (Ancistrus temminckii) was one of the first Ancistrus species to be bred in the aquarium.

Left: The Chubby Bristlenose.
Below: The chosen attachment site once it is a rock.

Bottom: The striped Plec Peckoltia pulcher.

Chubby Bristlenose

The Chubby Bristlenose as this fish is described in the trade clearly shows the tentacle like mouth growths, the spikey gill patches and the rough denticles on the leading edge of its pectorals when viewed from below. Great care must be taken when the fish is transferred by net as the spines inevitably tangle.

So tightly can Loricariids sucker themselves with their flattened mouths that their mouths would actually be torn by attempts at removing them from the logs.

Mix water from the tank step-by-step with the water in the bags when stocking, to lessen any shock from the change of water.

introduced to high levels. Water changes, with high nitrates in your tap water, are therefore less effective than they might be.

How do I deal with the problem?

Traditionally water was stored and/or well aerated to remove the chlorine. Pouring water through a shower head or (clean) watering can rose also helps to dissipate the chlorine.

Chemical water conditioners will now deal with chlorine, (and many also claim chloramine) as well as removing or making harmless some metals. Those that remove chloramines should deal with the ammonia produced in that process too.

Others contain a coating substance (often Aloe Vera) to protect the fish's gills and skin.

The addition of a bubble-up or other filter filled with carbon, to the stored water, also removes chlorine and quite a few of the other nasties that may occur (though charcoal/carbon is far from a panacea for all ills - it DOES NOT remove ammonia, nitrites, and nitrates despite some manufacturers' claims).

Zeolite, a type of rock, will remove ammonia, and can be bought combined with charcoal in a kind of "dream ticket".

Most tap water filter units are based on carbon (be suspicious of any that aren't) and will remove many of the nasties.

To remove just about everything, and run it to waste, the ultimate is a **reverse osmosis** unit at around £250. Your water will then be so pure that the natural salts and chelates necessary for life will be removed and will need to be replaced by mixing with carbon filtered tap water.

Nitrates can be removed by biological systems, and by resins. Resins will remove phosphates, too.

Carbon, zeolite, and resins have a limited life. Carbon will be completely coated by what it has removed after six weeks and must be discarded. Zeolite and many of the resins become fully charged and must be soaked in salt water, or better still have a steady trickle of salt water running to waste through them to recharge them.

BUT DON'T BE ALARMED - most fishkeepers deal more than adequately with their tap water by adding a conditioner and/or by aerating. For those with the patience, space and time to store water, a bubble-up filter filled with charcoal will both aerate and purify your water.

Steps to success

1. Condition tap water
2. Get to right temperature
3. Aerate thoroughly
4. Use a "starter" or seed filter
5. Stock steadily to sensible limits. Feed sparingly at first
6. Make regular water changes using conditioned water and occasionally some more "starter"
7. Service and maintain filter media by cleaning regularly - gravel syphon or wash out in warm tank water
8. Clean tank regularly; remove anything that might rot
9. Don't overfeed/ overstock
10. Keep test kit for nitrite (at least) handy and use instantly if fish seem out of sorts

WHAT ON EARTH IS?

A **Ammonia:** NH_3 a combination of nitrogen and hydrogen, poisonous to fish, but more dangerous in hard water than in soft.

C **Chlorine:** Cl a gas which is added to water to reduce the bacteria content.

Chloramine: A salt which is either added to tap water, or formed by the combination of chlorine and sulphur in the water.

E **Enzymes:** There are more than 700 known enzymes. They are biological catalysts - in other words they trigger off or speed up a process such as the break down of waste in an aquarium.

F **Filter bacteria:** Almost every natural substance can be broken down by bacteria, and fish wastes are no exception. Building up a good head of the correct aerobic (air using) bacteria on the surface of your filter media is the first stage of good biological filtration.

H **Heaterstat:** A heater with built-in thermostatic control - usually adjusted with a knob on the top.

N **New tank syndrome:** A lethal combination of all the problems mentioned in this article. Can also effect stripped-down and re-started tanks.

P **Phosphates:** A salt of phosphoric acid used as fertiliser and also produced in the breakdown of once living materials in the tank.

R **Reverse osmosis:** A process of passing water along a "semi-permeable membrane" which allows water molecules through but rejects impurities - which are voided as waste.

S **Starters:** Not the first course of your evening meal, but an overused term for the various proprietary seeding compounds - which may contain bacteria, or enzymes; and sometimes the chlorine/chloramine/and other nasties removing water conditioners.

Temperatures

Some fishkeepers are more than happy to add water straight from the hot tap, and add this to cold before using a conditioner. Others fear that it will contain metals especially copper from the pipes and boiler, and choose to boil drinking water to bring up the temperature. Always do the latter if you keep marines.

TIP: Water stored in a centrally heated room will reach a near tank temperature in a few days - which means minimal addition of water from the kettle.

So how should I prepare the water for my new tank?

Perhaps the best way calls for patience.

1. Set up the tank and add the water.
2. Allow the **heaterstat** to adjust for an hour or so then turn everything on.
3. Add conditioner to the water, and aerate thoroughly for a couple of days. Add a bubble-up

filter filled with carbon if you can run to it (it could cost as little as £5 plus charcoal and makes a useful back-up unit).

4. By now your heater will have brought the water to temperature and should have been adjusted to ensure that it's spot on.

5. Now add a filter starter solution as the chlorine that might kill the **filter bacteria** is gone - there are several on the market. Leave for a few days, then add just one or two hardy fish.

IN-TANK FILTRATION

■ Once I've got the water ready, can more problems strike in the tank itself?

You've started with well-prepared tapwater, which should give your fish the best possible chance. But it will also give the bacteria in your tank a better chance to multiply, which is important too.

Your filter, whatever the type, needs these bacteria to work successfully.

We have already covered the various methods of filtration. Our concern here is that whatever system you choose you must "run it in" properly.

Fish excrete both from their vents and through the gills in the form of **ammonia.** Uneaten food, and anything once living that dies or lies in the tank will break down in a similar fashion.

Even with everything mechanical working and at the right temperature, you can still unbalance the biological and most important part of the system very easily. Many filter systems will quickly clear suspended matter in the water (which will appear clean but may not be), and of course, the addition of charcoal or zeolite as will remove some of the nasties that build-up. But for everyday down-to-earth filtration, the simple aerobic bacteria that break down ammonia, to nitrite, and thence to nitrates are vital. (This process was explained in this series in April *PFK* page 4. *Understanding filtration*.)

■ How do I build up bacteria?

These will appear spontaneously in the water, airborne, or can be added in the form of proprietary **"starters".** (Some of these only contain **enzymes** that help to break down wastes making them more accessible to the bacteria.)

Apart from adding a starter, you can add bacteria and "seed" the tank by adding water from an already sound tank; by adding media (say gravel from the undergravel or half a filter sponge) to the filter; and by washing out a mature in-use filter in the new tank.

Or you can add a little food to the unstocked tank, and by regularly testing for nitrites, monitor the gradual increase of the bacteria as they "feed" on the wastes and multiply.

PFK TIP: It's often a good idea to buy small - young fish which should live longer in your tank. Their growth rate or lack of it often reflects the quality of your tank care and water.

The fish

■ If my fish are the main cause of pollution, how do I minimise the problems and still have plenty of fish on show?

At least one of the new filter starting bacteria mixes claims to allow you to start your tank fully stocked. But having prepared the tank to ensure the best possible water quality and filters that have a head start, the maximum stock to begin with is two fish (though arguably this could mean two 3" Barbs or a shoal of six 1" **Tetras.** Bear in mind that some fish are happier in shoals.)

After a month feel safe to build-up to a few more fish.

The usually quoted limit for freshwater tropicals is an inch of fish to 10² inches of surface water, though if you visit many experts you'll soon see this exceeded. The answer here is usually good filtration, good aeration and regular water changes. The novice will do well to build up to around 50" of fish, no more, in the average 3' tank, and to do this over six months or so.

Beating stress

Having done everything in your tank preparations to avoid new tank syndrome, you can still set in motion some of the attendant problems if you start your new stock off on the wrong fin.

Choose your fish with care (perhaps after reading June's article on choice of fish) from a reputable local dealer who has clean tanks with no dead, dying or injured fish on show.

Check them out carefully while they're still in their bags in the shop, then convey them quickly home, keeping them warm, and in the dark. Once home, float their bag(s) in the tank, and after twenty minutes or so add a little tank water, repeating the process over the next hour or so until the fish have adjusted (if necessary) to your tank water. (It is possible to set up a system to gradually add your tank water while discarding the shop water but this should not be necessary).

Then gradually slip the open bag into the tank, and allow the fish to swim out in their own time. Keep the lights off during this process and until the next day.

If the fish are likely to require hiding places (such as flower pots) make sure that these are handy - few things can match the depressing sight of a fish desperately cowering in a corner.

It's probably best not to feed your fish for the first day or so as they settle in (though some fish will feed within a few minutes of being stocked).

Above: It's important to use test kits to check your water for early signs of pollution - and this nitrate test kit can usefully be used to test tap water before it's added to the tank.
Left: Storing water at room temperature and aerating takes up a lot of space but may be worthwhile - the bucket on the right may have had salt added, but the SG tester also incorporates a thermometer.

Watch the fish carefully for the next few hours - especially if there are other fish already in the tank. Even the most peaceful fish can act aggressively to newcomers in their territory. ■

■ All these moves are aimed at beating the stress which can weaken new stock and make them more susceptible to the other little problems of a new tank.

HAGEN

PRACTICAL Fishkeeping COMPETITION

WIN ONE OF THREE BIOLIFE FILTERS FROM HAGEN

We have three of the new wet/dry BioLife filtration systems to give away this month. Winners will have the choice of a 35 or a 55 system, which come complete with a 100 or 200 watt heaterstat and are suitable for three foot and four foot tanks respectively.

These remarkable new systems combine balanced mechanical, chemical and biological wet and dry filtration into one tidy unit which also holds the heater, and are available at a remarkably economical price.

■ For full details of the system, see this month's **What's New** pages or contact **Rolf C. Hagen Ltd., California Drive, Whitwood Industrial Estate, Castleford, W. Yorkshire WF10 5QH**

■ This month's competition begins on **JUNE 13** 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 filter system, the 35 for 30 gallon tanks, or the 55 for 46 gallon tanks 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 **JULY 13.** The first three names drawn will win the tank.

Above: Winners have the choice of a 35 or a 55 unit.

QUESTIONS

1. Which feature of the BioLife filter has an internal surface area of 10m²?
- **a) The Hex-Nodes**
- **b) The ceramic sponge**
- **c) The Duo-Density carbon pad**

2. The carbon pad needs replacing?
- **a) Every six months**
- **b) Every two to four weeks**
- **c) Every two to four months**

3. There are two sizes of Bio-Life filter. The 35 is suitable for tanks to 35 US gallons - but what is this in UK gallons?
- **a) 29.5**
- **b) 46.5**
- **c) 35**

■ **The answers to all these questions can be found in the What's New pages of this month's *Practical Fishkeeping*.**

• DIAL 0891 600 067 •

Tropical *Answers*

No need for screen

I would like to introduce a male *Betta splendens* into both my tanks. Would I have to place a screen between the two tanks so that the fish cannot see each other?
R. Davies, Surrey.

You can quite happily introduce a male *Betta splendens* into both of your community aquariums without the need for a partitioning screen. Only when these fish are placed together do they cause trouble (to say the least).

The fins of these fish make ideal targets for fin nippers, so be careful what other fish you introduce into the aquarium. **PD**

Sharing space with a Shark

How large does the Red Tailed Black Shark grow, and which fish can share a tank with them?
Terry Foley, Bristol.

The Red Tailed Black Shark, *Labeo Bicolor*, has an attractive blood-red tail contrasting with its black body, and is a popular community fish. It originates from Thailand and can reach a length of up to 12cm. It needs a diet of worms, insects, plant matter and dried food, and should be kept in a water temperature of 20-27°C.

Sexing is determined by the female being significantly plumper than the male. Although captive breeding is not common, optimum breeding temperature seems to be 28°C. Where a batch of 30-40 eggs are laid. The eggs hatch in 48 to 72 hours and the young should be fed nauplii.

Like all freshwater 'sharks', they are extremely territorial and antagonistic towards their own kind, which is why they should be kept singly or in small groups — and not in pairs.

Most community fish, so long as they are not 'shark-snaped', can be kept with them. Mine live quite happily with Silver Dollars, small Tetra Barbs, Blind Cave Fish, Nasos, Spinner Barbs, Glass Catfish, Sucking Loach and Pearl Gouramis. **PD**

Stunning – but this young Chana micropeltes may fade as it grows to a duller red

Snakehead needs a large friend

Q **I have acquired a beautiful Red Snakehead. It was about five inches long when I bought it a month ago, and now it is approaching 10 inches. I feed it on a diet of earthworms, cooked chicken, prawns and slices of raw cod.**

It is housed in a 6' x 2' x 2' aquarium with UGs powered by powerheads. Lighting is subdued, water temperature is 79°F, and the tank includes a combination of plastic and aquatic plants. The fish seem perfectly happy in this set-up. Would you recommend any changes?

I would dearly love to add a Catfish as a tank companion. Which would you recommend, as I would not want any harm to come to either fish? If not a Catfish, could you recommend any other robust tankmate? How large will my Snakehead grow in the present set-up, and what is its life expectancy?

My fish is quite tame and I hand feed him, although as he (or she) gets larger I will stop this practice as I value my fingers.
• Danny Skillin, Margate.

A The Red Snakehead, *Chana micropeltes*, is certainly a beautiful fish. The fact that your fish has doubled in size since you bought it should speak for itself. The only change I would perhaps make is to increase the lighting level slightly.

Given a large aquarium, a varied diet and a lot of it, you could expect your Snakehead to reach almost its full length of about 100cm. It is difficult to say how long this species lives in captivity, but I had an African Snakehead, which I acquired at a similar size to yours, and I kept him or her (there are no external sex differences) for 13 years.

When thinking about introducing other fish into the aquarium, you must remember that Snakeheads are predatory fish and will try to swallow any other fish they can get into their mouths. Any other fish therefore has to be either large or armour-plated. The most obvious choice of Catfish, which is both of these, would be a large Pleco. Other suitable non-Catfish species include Giant Gouramis, Oscars, or large Tinfoil Barbs.

Good luck with a great fish. **PD**

No stocking level worries

Q **Have I overstocked my tank too soon? I recently bought a 4ft aquarium, which I have set up as a community tank. On the advice of the aquatic dealer, I allowed the tank to settle for two days, then added five Zebra Danios, five Leopard Danios and five White Clouds. Now I have added four Platy's, two Clown Loaches and two Albino Corys.**

What are the maximum stocking levels for a tank of 48" x 12" x 15" with a Fluval 4 internal filter, and will I eventually need additional filtration? Also my plants seem to be disappearing in large chunks — am I underfeeding my fish?
• Simon Clawson, Milton Keynes.

A You should have few worries about initial high stocking levels. The fish you first introduced were small species, and the aquarium is quite large. Just be careful not to overfeed. Excluding tail, the tank could hold around 48" of fish (water surface area of 576 square inches — 48" x 12" — divided by 12).

As you suspect, your plants are probably disappearing because they are being eaten by your fish (Platy's, Clown Loach). Try using lettuce leaves.

A Fluval 4 is more than adequate for your aquarium. Best to have too much than not enough. **PD**

Size significant in sexing

Q **I have two six-inch Temporales, which I bought as a pair when they were three inches long, and lately they have been showing signs of breeding, such as locking their jaws and tail slapping. Can you shed some light on the sexing of these fish, and tell me what size they should be before they breed.**
• Simon Groenet, Tyne and Wear

A If your Temporales are still about the same size then I am afraid it is extremely likely that you have two of the same sex, as size is a major sexual difference in this species, with males around 50 per cent bigger in all directions than females. Females can grow to six inches or more, so I do not rule out the fishes being female, but if you had had both sexes, then by the time one was six inches the size differential should have shown up.

Other differences are that males have much longer finnage, and also a much more humped forehead. Breeding can take place when males are six inches plus, females four inches plus; S.E.

The species has been bred fairly often in captivity, and is often known as *C. heliabroni*, or the Chocolate Cichlid. Because it is a large fish, it is not kept as often as it should be, as it is a very peaceful fish for its size. **MB**

Choose companions with care

Q **I have recently added two *Pimelodus pictus* Catfish to my 3ft community tank, which has a pH of 7. How big do these fish grow, what do they prefer to eat, and what general conditions do they need? My other fish are three Clown Loaches, two Blue Gourami, two Kissing Gourami, two Pearl Gourami, three Silver Sharks and two Angelfish.**
• C. Ellicott, Plymouth.

A *Pimelodus pictus* is very popular in the hobby. It is found in the rivers of Colombia and Peru, and in the aquarium it can be expected to grow to about 120mm. Although it is fairly peaceful, take care in selecting companion fish as it will eat smaller fish, for example Neon Tetra, if the opportunity arises. However, from your list of fish you should not experience any problems in this respect.

The barbels are long and are a great temptation to other fish which sometimes pick at them and damage them. *P. pictus* is sensitive to poor water conditions and this often manifests itself in the degeneration of the barbels and the membrane between the fin rays. This is easily cured by a water change. Needless to say, regular water changes are important to the well-being of this creature.

Food flake and tablet foods, frozen bloodworm and live aquatic invertebrates. Temperature should be 22-25°C, with clean, well-filtered water — 8-12° dH, and pH 6.6-7.4.

To see them at their best, keep a small shoal. Nothing is known of their breeding habits. **GS**

Keep Pim. pictus in a shoal.

How often should you spring clean your tank?

Is a spring clean necessary?

Q **Should I thoroughly clean out my tank by removing fish, plants, rocks and substrate? Opinions among fishkeepers seem to vary.**

Will the tank floor be that dirty underneath the substrate, and if it is left could this affect the health of my fish? If I do need to remove the fish can you give me suggestions on housing them temporarily while the tank is cleaned as I only have one tank.

I started fishkeeping almost a year ago and I have a 3ft community tank, which is filtered by a Fluval 203 external filter. After a bad start with the dreaded new tank syndrome, the tank has settled down and the fish are thriving in their surroundings.

I have completed 25 per cent water changes and I vacuum the substrate fortnightly, together with regular changes of filter media. The test for ammonia and nitrite shows perfect conditions every time, and disease and fish fatalities are rare.
• Darren Kerby, Essex.

A Opinions do differ on the complete dismantling and cleaning of an aquarium. Whether or not yours will require this will really depend on the size and number of fish you keep, and how good your general maintenance is.

As you use an external filter and regularly vacuum the substrate, you are removing a great deal of the waste material from the system. When using an external filter, only a shallow depth of gravel will be required, and in this respect your substrate should remain clean. Problems can arise if the substrate is too deep and not regularly vacuumed when using external filtration, which could affect the health of your fishes.

From time to time it may be necessary to remove some of the rockwork, and plastic plants if you have them, and give them a scrub beneath a tap to remove excessive algal growth. This can be carried out with the fish in situ.

If there comes a time when it is necessary to completely dismantle your aquarium, the fish can be temporarily house in a smaller aquarium, provided there is a good supply of oxygen.

Regular maintenance of the aquarium will keep it healthy and looking clean. Try to get into a routine. Neglecting the most boring jobs can result in more work later on — thick algae on the glass can be stubborn to remove, whereas daily scraping can prevent it building up. **PD**

■ Fish cannot eat healthy plants

Can you advise me how to stop stem rot on Water Wisteria, or is it the nibbling of the Platies and Swords that causes this? Water temperature is 84°F, pH is 7.0, and lighting is by a Grolux tube.
G. G. Brown, Essex.

The reason for your plant stems rotting is very probably lack of light. One tube is not enough. For a tank up to 15" high you need at least two tubes, and for a tank 18" high at least three tubes. These tubes have to be fitted with high polish reflectors, and should not be tubes that peak strongly in the blue colour spectrum.

You probably have deficiencies in minerals and trace elements as well as carbon dioxide. Water temperature of 84°F is too high for lush plant growth — many plants will not tolerate such high temperatures — and should be reduced to 78 or 80°F.

With few exceptions, aquarium fish will not and cannot eat plants, since healthy plants are far too tough for the fish to eat. What actually happens is that the fish eat the tiny algae spores on the margins of the leaves. By the same token, fish can only eat dead or decaying plants, as they are then soft enough to be eaten. **SG**

■ Coming out of its Schell

I have a 48" x 12" x 18" tank housing what I am led to believe is a *Synodontis schall* Catfish of about six inches. Can you tell me about diet, age expectancy, social behaviour and land of origin?
Neil Fox, York.

Synodontis schall is a widespread Catfish found in the rivers and lakes of West, Central and East Africa. Wild specimens are known to feed predominantly on insect larvae but will also take algae and detritus. In the aquarium offer just about anything it can fit into its mouth!

S. schall will tolerate a wide range of water conditions and is easy to keep, although it has a reputation for aggression.

Growing in excess of 400mm, *Synodontis schall* can be expected to be quite long lived, provided it is well cared for in the aquarium. Specimens have been known to live for 10 years and more. **GS**

■ Unhappy underwater

I am puzzled by the aquatic use of what I assume are terrestrial plants. In several advertisements by dealers I have noticed the following genera, which I have always thought were mostly known as houseplants:

Aglaonema, Caladium, Croton, Dieffenbachia, Dracaena, Lysimachia nummularia (garden plant), *Ophiopogon, Spathiphyllum, Syngonium.*

Am I right in believing these are of terrestrial origin, and if so, how long do they survive in an aquatic environment?

Has anyone considered the harmful effects of these plants or their sap on aquatic life? I am thinking of *Dieffenbachia* in particular due to its common name of Dumb Cane.

Are these plants really safe for long term aquarium use, as I am considering propagating several of my houseplants for this purpose?

R Tyldesley, Hull

You are absolutely right. All the plants you have listed are terrestrial, respectively swamp plants. Most of them survive under water only for one to four months, apart from *Ophiopogon* (up to 12 months) and *Spathiphyllum* (several years). None of the plants will grow to their normal size and will therefore never be able to function under water.

The true aquatic plant is not simply for decoration but functions as a partner to the fish. Just as we need the rain forests, the fish need the plants, and only healthy, assimilating plants can do the job nature has designed them for. A terrestrial plant will always be stunted in growth and assimilation and can never be a match for a true aquarium plant.

Many aquarium shops will sell these terrestrial plants, but they are meant to be used as marginals outside the tank or in a paludarium. I would not recommend them for submersed cultivation and I do not believe that a reputable aquarium dealer would sell you these plants as aquarium plants.

Such terrestrial plants could certainly cause harm the water quality. As well as not functioning in a submersed situation, dying cells releasing adverse substances will pollute the water. **BG**

Be patient with Oscars

Q I have a pair of Oscars housed in a 30-gallon tank and I would like to know if conditions are right for spawning. Water temperature is 82°F, pH is about 8, and all other fish have been removed.

Three weeks ago they made a large hole in the gravel and dragged a piece of slate across the tank, placing it in the hole. Since then they have regularly cleaned the slate and have been laying over the slate side by side.

They have been jaw locking, tail shaking and they always move around the tank together. The ovipositor has been visible for about 10 days, and is more prominent in one fish than the other. I have been feeding with Gamma Fish, Lance Fish and earthworms.

The tank is beovered and cleaned regularly, all leftover food is removed, and the filter is cleaned every two weeks. Can you please advise me:

- Are tank conditions correct?
- Is their diet correct?
- As they haven't spawned, should they be separated?

• Paul Reed, Essex.

When Oscars do spawn the eggs are large, plentiful and carefully guarded.

A The tank sounds a bit on the small side to me, which may prove a long term problem, though it doesn't seem to be causing any difficulties at present.

Oscars come from water with a low pH, and so you may have problems with the viability of the eggs/sperm unless you can get it down to 6 or less. To do this you will need to remove anything buffering the pH to alkaline — check your gravel, for example — and if your water is naturally hard then you will need to soften it.

Once your water is soft it is easily acidified using peat filtration. I suggest you avoid chemical pH buffers as these often have extremely undesirable side effects, the most common being milky water and dead fish.

Diet is fine, but you could also try mussels, prawns, beef heart and good quality pellets to ensure correct vitamin balance.

Please do not separate them, as it sounds as if action is imminent. It often takes ages for a pair to get down to spawning for the first time and if you were to separate them now it would be extremely difficult to get them back together again. One of the most important things the Cichlid keeper must learn is patience! Should things get rough to the point of serious injury then separate with a clear divider so they can still see each other, but do this only if it is absolutely necessary. **MB**

Raising the Flags

Q I have just bought a pair of Flag Cichlids, which are almost two inches long. How can I breed them and when? I have read they are open water layers, so what type of stones do I need?

• Stephen Lovel, Stafford.

A The Flag or Festive Cichlid, *Mesonauta festivus*, is one of the most peaceful Cichlids I can think of. Eventually they become quite large, reaching six inches or more, so you will need rather a large tank for them.

They are Amazonian fish, and although they have been in captivity for a very long time, they will appreciate the soft acid water that nature designed them for, and this may prove essential for breeding. The tank should be well planted with pieces of bogwood to provide cover, and with a few largish smooth flat stones in clearings among the plants, preferably away from the front so as to be private.

I don't want to put a damper on your ambitions, but this species is very difficult to sex, and it may be more accurate to say you have two fish rather than a pair. I would obtain three or more the same size and allow them to grow up and pair off naturally. Your chances of the two being male and female are not very good, but with five or six you should be sure of a pair, unless you are very unlucky.

I would not expect them to pair and breed until they are at least four inches long, so you will have to be patient. Given the right water conditions and set-up they should be reasonably easy to breed, and a protein rich diet should help bring them into spawning condition. Earthworms are excellent for this purpose.

If a further trigger is required, do a large water change (40 per cent) and top up with cold, simulating the rainy season. Then gradually raise the temperature from the normal 78-80°F to about 85°F. This temperature should be gradually reduced back to normal after spawning. **MB**

Under a different name

Q I would like to use these tropical plants in my 30" x 12" x 12" community tank: *Alternanthera rosaefolia, A. sessilis, A. reineckii,* or *A. lilacina*. Can you recommend the best one for me to choose, and offer any cultural instructions?

• B. Coombes, Merseyside.

A It is most annoying and frustrating that plant names tend to change, particularly in recent years, and *Alternanthera* is a typical example. Whatever you find an *A. sessilis* or *A. reineckii* you are looking at the same plant: *A. rosaefolia*.

It is a stem plant with opposite 10cm long and 3cm wide leaves, and under sufficient light the leaves assume a deep red colour. Relatively undemanding, it needs plenty of light and iron fertilisation.

Alternanthera lilacina (former *Telanthera lilacina*) is a very attractive, red leafed stem plant of the same family, but is far more demanding in respect of light, iron and carbon dioxide. For the beginner I would recommend the *A. rosaefolia*. **BG**

A spot of confusion

Q **I am confused by the difference between *Plecostomus* and *Ancistrus*. I recently bought what was described in the shop as a Spotted Plec, but a picture in *Practical Fishkeeping* shows it is actually a Spotted *Ancistrus*.**

My set-up seems to suit these fish — my last Plec lived apparently quite happily for 15 years, and the latest arrival has soon settled down and is growing very quickly. Would three or four *Plecs* or *Ancistrus* live happily together?

• M. Fry, Middlesex.

Ancistrus or Hypostomus?

A The difference between the genera *Hypostomus* and *Ancistrus* is that *Ancistrus* have interopercular spines, which they can erect. You will probably have noticed these when trying to catch your fish as the structures become entangled in the net, therefore it is better to catch these creatures by hand.

Hypostomus, on the other hand, do not usually have these spines, but if they are present they are not moveable.

The number of these creatures you can keep together will depend on the size of your aquarium. Some *Hypostomus* species grow in excess of 25cm and are very boisterous fish. They can also be territorial.

Ancistrus species, although smaller than *Hypostomus*, show aggression when kept in confined spaces. It is better to keep a pair — adult males have long 'bristles' on their heads, while females have only a fringe of very short tentacles around the snout. Males will fight to defend their territory, especially when breeding, and use their interopecular spines to inflict damage on each each other. GS

Off colour Ram fades and dies

Q **Two months ago I noticed one of my Rams had lost all its colour. It was still very active and fed on live foods, although it did lose a lot of weight. The colour returned twice, only to fade again, and now the fish has died. What could the problem have been?**

Water chemistry is excellent in my 4ft community tank housing Tetras and Dwarf Cichlids. The fish and plants are thriving.

• Steve Woodward, Merseyside

A I'm afraid it is impossible for me to guess what was wrong with your Ram. The loss of colour does not denote any particular condition. This is a symptom of the fish feeling low, but nothing specific. Loss of colour can even be related to its status or even its mood.

Loss of weight could signify a variety of conditions, from worms to a tumour, and again I can't point to anything specific.

The good news is that as none of your other fishes have shown any signs of disease it sounds as if it was something non-infectious, so that you should have nothing to worry about regarding their health.

Unfortunately fish, like us all, do not live for ever, and some have shorter life spans than others. A single death should always be regarded as a possible cause for concern, but unless further cases occur you can regard it as just one of those things. MB

Growing the Indian Fern

Q **I would like to grow the beautiful Indian fern but so far I have been unsuccessful. I have a 36" x 12" x 15" community tank containing Tetras, Barbs, Corys, Plecs and a Weather Loach. I have an Atlantis F240 powr filter and a 30" Triton bulb. The pH of the water is about 7.0 — is this suitable?**

• Steven Wadsworth, Lancs.

A Your problem with the Indian Fern, *Ceratopteris thalictroides*, is caused by three different reasons....

1. Over filtration. Aquarium plants in general, and the fern in particular, do not grow in roaring torrents but in swamp-like waters with hardly any current at all. Therefore the total water volume of your aquarium (100 litres) should be turned over a maximum of once every hour, and the water should flow very gently back into the aquarium, avoiding strong currents and surface turbulence.

2. Starvation, lack of food. Plants are living things and have certain requirements which we have to meet. They do not feed on fish excreta and waste matter. They need a nutritious substrate, rich in nutrient iron, minerals and trace elements, and they need a constant and sufficient supply of carbon dioxide. Nothing on earth can grow without CO_2. Add some liquid plant food and iron fertiliser to the aquarium water and cultivate the Indian fern as a floating plant. It can then take the vital CO_2 on the water surface out of the air.

3. Light deficiency. The plant needs bright light. One tube is not enough to provide the necessary light energy for photosynthesis. Fit two fluorescent tubes in tank length, together with two high-polish clip-on aluminium reflectors. Do not use a Triton tube, but try a white or warm-white colour, such as Sun-glo. BG

Heating the fish house

I am thinking of starting up a fish house to breed Central American Cichlids as the water in my area is quite hard — pH 7.8, GH16. I already have a breeding pair of convicts, which seem happy in this water.

I will use a wooden shed lined with polystyrene, possibly with one double-glazed window in the roof. I am hoping to start with about seven tanks. What would be the best type of heating — heater/stats or to heat the room with a wall-mounted convector? Which would be the cheapest to run?

If you are using electricity as your method of heating, then it is obviously cheaper to heat the volume of the tanks than the volume of the fish house! You might effect a saving by heating the entire fish house with paraffin or Calor gas, but if you do you will need to take professional advice about ventilation.

You must also take into consideration your own comfort. A fish house tends to warm up with heat loss from the tanks — mine is generally about 80°F — and can be rather humid. If you space heat then you will have an ambient temperature of 75-80°F and even higher humidity.

I can live with my fish house, though those not used to it can find it oppressive, but after about two minutes in a space-heated one I start to wilt visibly. Remember that you will be spending quite a lot of time out there working and probably some time observing. If you space heat you cannot leave the door open for your own comfort as you will be heating the garden and your tanks will chill.

It can be an advantage to have a low background heat if you can do so cheaply (some people run an extra radiator off the domestic boiler) as this will reduce heat-loss from the tanks and thus reduce the electricity cost. But unless the cost of installation and running is minimal I doubt that it is worth the effort.

If you do use an electric convector heater, make sure you get one suited to humid atmospheres — possibly a greenhouse heater. MB

New jewel of the Nile

I recently acquired four young Rift Valley Cichlids, with the name *Pseudocrenilabrus nicholsi*. I was told their common name is the Purple Nile Mouthbrooder. Do you have any information on these fish?
M. Duffill, Cleveland.

P. nicholsi is one of three valid species of the genus, the others being *philander* and *multicolor*. It is not a Rift Valley Cichlid, but derives from Central Africa, in particular Zaire. It is small, attaining a total length of about three inches. Males are a mixture of blue and rusty brown in colour, and females are rather colourless.

Like other *Pseudocrenilabrus*, males have an orange tip to the anal fin, which is apparently some sort of egg dummy, akin to the anal coloration in most haplochromines. The fish is a maternal mouthbrooder.

Now whether or not your fish is *nicholsi* is another matter entirely! The fact that they are being sold as Rifts is suspicious. I believe one of the forms of *philander* does occur in the Rift Valley, but it is not *nicholsi*. I am told that there are some very well coloured *philander* being sold at present, so it may be that there is a mistake in identity here.

Ps. philander and *Ps. multicolor* are easy to keep, and there is every reason to assume that this would apply to *nicholsi* too. If what you have are true *nicholsi* then you are breaking new ground, as the species is new to the hobby.

I would try to provide fairly soft, slight acid to neutral water with a temperature of about 78°F, and a mixture of plants and rocks to see what they like. I would imagine the natural food is small aquatic organisms, so pond foods, live or frozen, would fit the bill. But there is no reason why you should not try other foods, although I advise against a diet of all dried food.

If they are anything like *philander*, which I have kept and bred, then the males are not very aggressive or hard on females, and breeding will follow easily once the female is mature. *Philander* incubates eggs/fry for about 18 days. The fry are rather small for a mouthbrooder, but can take newly hatched brine shrimp. **MB**

Calming the Green Terrors

Q **I would like to buy a breeding pair of Green Terrors but cannot find any information on them. Can you help?**
• C. Rourke, London.

A The Green Terror, or *Aequidens rivulatus*, is a South American species, but unlike most of those we keep in our tanks it is not an Amazonian fish and comes from more neutral waters. It is a far more aggressive species than its cousin the Blue Acara, hence the common name. However, it was given its name before many of today's really agressive species were introduced to the hobby, and it is not that violent a fish!

It is not a difficult species to maintain: it should do well enough in your tapwater at a temperature of about 78-80°F. Feed a varied diet which includes plenty of earthworms, prawns, mussels, fish and heart. The tank should be decorated with several caves, and pieces of bogwood, if desired. Plants too will not come amiss if these are well rooted between stones so they cannot be dug up.

The main problem is coping with the aggression. At least you are starting with a breeding pair, but even so you may experience some disharmony. So I would arrange the tank decor so that a divider can be inserted if necessary, and have a suitably sized piece of glass or clear plastic ready just in case. If possible, introduce the female a few hours before the male, so she can explore and settle in in peace and quiet.

If you are buying from a friend, rather than a shop, then try to move them when the female is almost ripe to spawn, since if you can get them breeding again quickly in your tank this will help them to settle without too much aggro. **MB**

S. nigroventris will fix on a safe home – and stay there.

What are the lumps on my Gourami?

Treating lumps on the skin

Q **My male Dwarf Gourami has developed some small lumps on his caudal and anal fin. What are these lumps and will they go away in time?**
• Alex Prisco, Surrey.

A Small lumps on the skin and fins are usually associated with either tumours or lymphocystis. Infection by lymphocystis first appears as cauliflower-like growths which gradually increase in size over a period of several weeks or months. The disease may remain dormant and undetected until it is transmitted to other fish through abrasions to the skin. Although not fatal, these are unsightly.

Treatment is to isolate the fish, and identify the lumps should be surgically removed — some vets will do this — if the fish is badly affected. Treat the water with Myxazin. Even when removed, the growths may return, and any badly affected fish should be painlessly destroyed.

If the lumps are tumours, these are rarely infectious, and the reason why they appear is poorly understood. They seldom cause any discomfort and the fish may live quite happily with them. There is no treatment for tumours, but it is best, if possible, to isolate the fish and keep an eye on them. As with lymphocystis, any seriously affected fish should be destroyed. **PD**

Castle is an Upside Down home

Q **I never see my Upside Down Catfish during the day, not even when I feed the other fish. Only when it is very dark will he come out to feed on tablet food.**

He lives in a little castle, where he spends the whole day. I have tried taking the castle out, but this only makes him unhappy, so he goes over to the heater and swims underneath it. There are plenty of other places for him to go, such as a flowerpot, but he is only ever happy in the castle.

Can you suggest anything I can do without making him feel unhappy or threatened?
• Graham Baker, Brighton.

A Your Upside Down Catfish *Synodontis nigriventris* is behaving perfectly normally. Many Catfish are crepuscular, that is to say they are most active during the hours of twilight around dawn and dusk. At this time they can be observed rummaging around in search of food. Other species continue their forays well into the night.

In the aquarium, twilight is when you turn the tank lights out and the only light entering the tank is from the room lights. Now is the time to feed your Catfish and observe it.

If your Upside Down Catfish is happy living in his castle, so be it. Other fish may already have staked their claim to other hiding places in your aquarium. If you remove the castle and the only place left for the *Synodontis* is under the heater, it may burn itself — something to be avoided at all costs. **GS**

Is Igor a Red-bellied record?

Q In a previous reply to a question on Red-bellied Piranhas, you say that in a 4ft tank this species should reach its maximum length of 12 inches. Yet in *'The Piranas Book'* by Dr George S. Myers, a noted authority on Pirhana, he states the largest measured example to be the 27cm (10½ inch) example in the British Museum. Writings by Dr Herbert R. Axelrod, and also by the late Harald Schultz, probably the world authority on this species, also bear out this fact.

Should they be incorrect and your figure of 12 inches be correct for *Serrasalmus nattereri*, I must coerce my Pirhana to eat more heartily in future. It exceeds the 10½ inches, but not the 12 inches, and I was rather hoping it may be a record size.

Currently housed in a 36" tank and shortly to be installed in a 48" tank, my Piranha, affectionately known as Igor, has lost none of his brilliantly coloured red belly in the four years I have had it. There is no sign of colour fade as yet.

• David Bell, Cambridge.

A I know *S. nattereri* does attain 12 inches because I have kept one of that size. I measured it when it died and confirmed it was the correct species by carrying out various ichthyological classification data, such as scale counts and fin ray counts. I know of at least two other examples which exceed 10½ inches.

In his mini edition of *'Freshwater Aquarium Fishes,'* Dr Axelrod states that this species does reach 30cm (12 inches), and all references I can find bear out this length.

And after all your own Pirhana does exceed the 10½ inch maximum quoted by your references! **PD**

Better luck with Brown Scats

Q For 15 months I have successfully kept Monos, a Silver Scat, a Bumble Bee Goby,

Mono success – but not with Scats.

and even a Golden Sucking Loach in my brackish tank. However I have had no such success with Brown Scats.

These fish tend to settle in well, feeding on daphnia, bloodworm, flake and lettuce, but after a couple of months they go off their food, become very thin and white along the bottom, swim on their heads and eventually die. Have you any idea what may be wrong?

The tank is 30" x 18" x 12" and water temperature is a steady 80°F. Salt mix is two teaspoons per gallon of water, but I have added some extra salt (about two tablespoons) for the last two months.

• Peter Hodgson, Herts.

A There could be many reasons why you are experiencing difficulty in keeping Brown Scats. You do not indicate the filtration system you use, but the tank may benefit from either an external power filter or a reverse flow undergravel system. Because salt is added to the water, you must keep an eye on high ammonia and nitrite levels. Neither will be tolerated by the Scats and both must be maintained at zero readings.

Do not use coral sand as a filter bed substrate as this will gradually dissolve and affect the calcium level. The pH levels can be adjusted manually with a commercial adjuster.

It is also important to carry out regular water changes — don't forget to make adjustments with additional salt. I assume you are using a proper aquarium sea salt mix, as other salts, while providing the correct specific gravity (1.002), will only give a neutral pH, whereas you need 7.6-8.0. Aim for a water temperature of 20-28°C.

Scats need enormous amounts of live food and vegetable matter. Make sure lettuce is available all the time and in sufficient quantity. Good lighting is also necessary.

If you set up the water to the right parameters, there is no reason why you should not be able to keep this species successfully. **PD**

Pairing off Discus

Q I have four Discus in a 6ft tank, which is heavily-planted with Vallis and Amazon Swords. The Discus are about 15 months old and about four to five inches long. How long will it be before they pair off — if in fact I have a pair?

They are fed on frozen bloodworm, flake and Tetra Ruby. I bought the fish from a local breeder when they were about an inch long.

• M. Holt, Gwent.

A Discus would normally begin to display courtship at the age of nine months, so it is possible that all your Discus are of the same sex. If you notice a couple that prefer their own company and appear to "bow" to each other frequently, then you can assume they are a pair.

If two Discus lock their back quarters against each other, then you can assume these are of the same sex. Males normally show this kind of behaviour to test for weakness in each other. You may have noticed this when the fish were quite small, as one always dominates the clump of food at feeding time. **SD**

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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.

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Above: Left side, showing tentacle, eye, operculum and syphon.
Left: Feeding from surface.

The APPLE of your eye?

IAN LUCAS offers some tips on keeping and breeding Apple Snails.

For many freshwater hobbyists, invertebrates are a whole new departure; we know little about many species, but one with a longer history of captive care is the Apple Snail. Introduced to European fishkeepers in the early 1930s, it is once again popular due to the appearance of a golden variety.

Ampullaria, golden or brown, thrive in the aquarium and make few demands. They tolerate temperatures from the upper 60s to the mid 80s° F, and enjoy the hard water most of us have on tap. Very soft water is not suitable, as there is not enough dissolved calcium carbonate, the main material of the shell.

In freshwater, with little dissolved minerals compared to the sea, molluscs need to be very efficient at calcium uptake, and while some do live successfully in soft water, others are restricted to hard water. *Ampullaria* can live and grow in fairly soft waters with calcium levels of 100ppm, and probably even lower.

Not with the plants

The average planted community tank is not suitable. *Ampullaria*, like most snails, eat vegetation. A few small specimens will soon clear a tank of unsightly algae, but when it is all gone, and the snails have grown, the plants will suffer.

Algae is preferred, followed by dead or rotting plants; then soft-leaved plants, such as Water Wisteria (*Hygrophila difformis*) - but hungry Apple Snails will eat even the toughest of plants.

...and not with some fish

My Apple Snails are happy in unplanted tanks of large barbs, where they share the fish's diet; and in my cichlid tanks - even big Oscars do not harm large Apple Snails.

Among the few fish which do not mix well with *Ampullaria* are *Leporinus* and puffers, both of which may bite pieces out of the snail.

Inquisitive fish, like Tiger Barbs, may nibble at the snails tentacles, but do not seem to cause any damage. Usually the fish soon desist, their curiousity satisfied, but the fish or the snail should be moved if a snail is unduly stressed; inactive and, literally, withdrawn.

Seal them in

Cover the tank well, as Apple Snails like to climb right out of the water; the eggs are also laid out of water.

Introduce Apple Snails into ▶

A closer look...

Apple Snails are often called *Ampullaria gigas* or sometimes *A. cuprina*; which, if either, is correct is unsure. Detailed, expert, internal, examination would be required.

The most striking feature of the Apple Snail is its size; three inches across the shell is not uncommon, hence the common name.

The shell of Ampullaria is naturally dark brown, mottled in some species; in the golden variety it is golden yellow.

Its spiral is dextral, like a right-hand thread; the opposite is referred to as sinistral, which would be very unusual for *Ampullaria*, although normal in some snails, such as the Bladder Snail, *Physa fontinalis*.

The shell surface, or *periostracum*, is a thin layer of horn-like conchyolin, and is often partially worn away, especially in an older snail.

The bulk of the shell, or prismatic layer, consists of calcite, a form of calcium carbonate, on a conchyolin base. The inner layer of shell is of nacre, or Mother-of-pearl. This is calcium carbonate, in a different form, aragonite.

During growth the shell is enlarged at its margin. A horny operculum closes the opening when the snail withdraws into its shell.

Lines may often be seen parallel to the edge; these represent periods of rapid and slow growth, but not necessarily annual seasons.

The body of *Ampullaria* is pale grey. The head bears two long and two short tentacles, well supplied with chemo-receptors, allowing the snail to taste and smell food in the water. Two more protuberances bear the eyes.

There is also an extensible breathing tube, to take air from above the surface, as an alternative to using the gill. This inhalant siphon, as long as the body, leads to a simple lung, the pulmonary chamber.

The retained air also regulates the snail's buoyancy; adjustments to the chamber volume let the snail rise or sink. The position of the chamber also keeps the floating snail upright. If danger is sensed air can be expelled from the lung, and the snail, releasing any grip on an object, drops to the bottom, its operculum closing the shell.

The air is later renewed by approaching the surface, the snail now carrying its weight unassisted. Thanks to this quick getaway aquarium heaters need not be shielded to protect *Ampullaria* from burns.

Ampullaria glides along on the muscular foot, by means of muscular waves passing along its under surface. This same technique can be used by a snail floating upside-down at the surface; the foot gains sufficient purchase on the surface film to make steady progress.

Top: Head-on view, showing tentacles and eyes.

Above left: Underside of foot.

Left: Left and right sides, showing operculum.

their new home in the same way as fish; float the bag to equalise the temperatures, and gradually mixed the water to accustom the snails to the new conditions.

Health

The health of snails is difficult to judge, but generally, healthy Apple Snails are lively and active. Do not buy snails from a tank containing empty shells or dead snails. Disease may have infected the others, or the conditions may be unsuitable. In this case the survivors may have been weakened beyond recovery.

Foaming at the mouth?

One item not suitable for an Apple Snail tank is a filter with exposed foam. The snails will eat the foam, presumably for the microflora living on it, or perhaps by mistake. This does not appear to harm the snails - just the bank balance.

If a large Apple Snail appears to be sick, or dying, isolate it in a small tank. A dead snail decomposes very rapidly, fouling the water badly.

As with fish, most health problems can be attributed to water conditions, or to stress.

Feeding

Feeding Apple Snails presents no problems; algae and duckweed cleared from other tanks are rapidly disposed of, and lettuce, cucumber, and kitchen scraps of a vegetable nature are all eagerly taken.

They can eat a staggering amount, although the minimum required for health is much less. Apple Snails will enjoy a holiday in any tank over-run with algae, or unwanted plants.

They can be moved when the tank is cleaned, or before too much defoliation occurs.

Breeding Apples

Ampullaria, unlike some snails have separate sexes. The male is easily identified during mating by his long penis, which is kept retracted at other times. For breeding, then, at least two snails are necessary, but I (and others) have found that they are more inclined to breed if a group is kept. This also gives a good chance of having both sexes present.

The eggs are usually laid in the evening or early morning, in a salmon-pink mass, about two to three inches long and half to three-quarters of an inch in diameter. Irregularly shaped masses are often also laid, especially in restricted spaces. Each spherical egg measures about a tenth of an inch.

The egg-mass is attached to surfaces above the water level. The eggs will adhere to a coarse-textured surface until hatching; if a smooth surface is used they may fall into the water, where they will not hatch.

Eggs can be removed for hatching; they should be kept in a humid place to avoid drying out, but kept clear of the water. Condensation must not drip onto them.

I find that only eggs on the outside of the mass are likely to hatch, and have developed a way of maximising the hatching rate. Within a few days of laying I place the egg-mass in a dish, and squirt it with tank water from a pipette. This separates the individual eggs from the clump, and I spread them out in a layer one egg thick. Air can then circulate round the eggs until they hatch. This roughly doubles the number of young from a spawning. The incubation period is very long, quoted elsewhere as from ten days to three weeks, and I have known it as long as six weeks.

Instinct leads newly-hatched snails to move downwards; support the eggs, over water, on a narrow strip of material and they will easily find their target, water. No fish should be kept in this tank, as they will snap up the fragile-shelled baby snails.

Parent Apple Snails show no signs of cannibalism, however, and I keep young and adults together, as the young graze the algae from the adults' shells.

Growth is rapid if the young are well fed; a diet similar to that of the adults is suitable, but with any tough leaves softened by boiling.

Enthusiastic about infusoria?

Ampullaria were once known as Infusoria Snails, and kept as a source of fry food. Housed on their own, and heavily-fed, they produce a lot of waste, giving rise to swarms of infusoria. Fry were simply fed jugfuls of snail tank water as required. Some fishkeepers still prefer this 'natural' way over more modern techniques.

Even large Apple Snails will not harm free-swimming fry, so *Ampullaria* may be used in fry tanks as scavengers, also providing some infusoria between meals. Unlike other snail species the population can be easily controlled. ■

Top: These Apple Snails are not mating - they are, in fact, merely grazing each others' shell.

Left: An Apple Snail feeding - the lettuce leaf shows approximate scale.

■ IAN LUCAS has a longer booklet on an Apple Snail methods at £2 including p&p from **Ian Lucas, Aquarist, 36 Osmaston Road, Leicester LE5 2JF**

Star ratings

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

WHAT'S

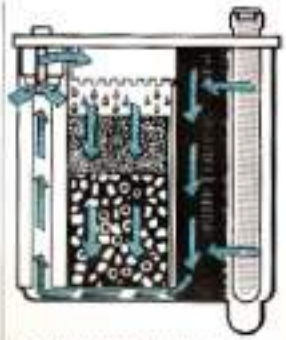
Self contained aquarium system

Many of our beginners' prices are at pains to point out that there are three main types of filtration - **mechanical** - the straining of loose debris from the water; **chemical** - the adsorption of chemicals from the water onto another media or a resin; and **biological** - the breakdown of ammonia to nitrites to nitrates.

Many 'systemised' tanks combine all three (as do external filters if you choose to load them that way) but now in the BioLife unit Hagen have put together what is virtually the filter unit from a small systemised tank, complete with self-contained heaterstat, added the sort of wet-and-dry trickle filtration usually only available in under the tank units, and made the whole thing suitable for a three foot tank.

The step-by-step pictures show the unit's assembly and features (incidentally this is a demonstration model, and standard units come in black not "clear" plastic as shown). The unit incorporates two particularly interesting media - ceramic Hex Nodes and two ceramic sponges.

All units come with excellent instructions and maintenance details which are particularly honest about replacement times. this information suggests that though the initial cost is reasonable, the maintenance of the unit will be more expensive than some others with media that are more easily cleaned and re-used.



How water flows through the BioLife.

Basically, water passes through a coarse strainer which needs a weekly rinse; through foam that needs a weekly rinse and changing every four months; through a carbon that has only a two week life; through two ceramic sponges that need rinsing and one discarding every six months; through the reusable Hex-Nodes and through a final polishing screen.

Other media could be used in place of the ceramic sponges and Hex-Nodes if required (though I'm sure Hagen wouldn't recommend this), but all other media sections come in standard units to fit the Bio Life.

Ceramic Sponge

The ceramic sponges offer an internal and external surface area of 107^2 which Hagen claim is equivalent to as much as 10 gallons of plastic ball media

■ BioLife units come in two sizes the 35 (US gallons) suitable for 10 gallon tanks and the 55 suitable for 47 gallon tanks. R.R.P. is around £69.95 and £89.95 respectively.

• More details from Rolf C. Hagen (UK) Ltd, California Drive, Whitwood Industrial Estate, Castleford, West Yorkshire WF10 5QH. Tel 0977 556622

Star rating

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

Clear and healthy water

The Aquarium Pharmaceuticals range, marketed in the UK by Independence, includes a large number of tank treatments newly available in the UK.

Accu-clear is a water clarifier which will cause bacteria, algae and loose dirt to clump together in your tank water making them removable by the filter, where they will usually be broken down.

Would it work on a pond, I wonder? In tonight - in one bottle (R.R.P. £2.20) will treat 250 gallons, a small 6' x 8' x 3' pond would cost around £8 to dose.

Also available in a combination pack at £6.99 is Doc Wellfish's Aquarium Starter Kit, which unlike other "starters" does not seed the water, but offers two bottles with not dissimilar actions. Both remove chlorine. They differ in that **Ammo Lock** removes chlorine and "locks up" chloramine and toxic ammonia. **Stress Coat** contains Aloe Vera and is aimed more directly at the fish itself, coating the gills and skin to protect them.

Noone has yet explained to me what happens to your filter if you set up an aquarium and lock up the ammonia that forms the first stage of the nitrogen cycle as Ammo Lock claims to do. Does it set back the filter bacteria, denied of the first stage of the nitrogen equation?

They are recommended mainly for setting up new aquaria, and for every water change. But another place that the two treatments are very helpful, is in transporting fish where they will minimise any chemical stress. Our tests on moving fish around to correctly dosed water brought impressive results.

Chemi-zorb is a mixture of charcoals, resins and other chemicals that comes slightly moist in a 10oz pouch inside a sealed jar. You rinse the media, and add one bag per 55 gallons to your filter (or directly in path of water flow as it says on the packet) remembering to replace it every 3 to 6 months. In practice it performs a number of miraculous deeds (such as "promoting ravenous appetite") though, in the end, nothing that a good charcoal doesn't claim to do.

We found nothing very remarkable when we tested a zeolite product on an earlier occasion, but we'll test Chemi-Zorb long term and report back. It costs £8.80 a bag.

Star rating

ACCU-CLEAR	
Quality	Unratable
Practicality	*****
Efficiency	***
Price	*****
AQUARIUM STARTER KIT	
Quality	Unratable
Practicality	*****
Efficiency	*****
Price	***

NEW?

The latest equipment to improve your filtration reviewed by Editor STEVE WINDSOR.

The Bio-Life filter system

1. The various parts of the Bio-Life filter system. To the rear is the casing; on left Hex Nodes in container and Ceramic Sponges, in centre is Dual Density carbon Pad, lying on the coarse strainer unit beside it the white trickle tray; in front of that the heaterstat unit and on the far right the pump unit.

2. The heater unit is safely contained inside, clear of aggressive fish - use both the brackets supplied.

3. In goes the coarse strainer, and the charcoal pad with the white side facing the foam.

4. Rinse the Hex Nodes and the ceramic sponges (preferably in tank water) then fill the hopper with hex nodes and insert.

5. The ceramic sponges fit neatly on top.

6. Add the all-important drip tray.

7. The filter bracket has four suckers - two more fit onto the actual unit - but install the bracket first.

8. The unit slides onto the bracket and is held in place with extra suckers. Once in place a flow deflector and venturi unit can be set to ensure the required flow and aeration. The unit should fit under any hood without cut outs and as it's less than 12" wide it will fit on the side or back of virtually any tank. The minimum water depth over the unit is marked clearly on the casing.

When it all went WRONG

DEREK LAMBERT breeds fish for a living - but even he has his failures - as his frustrations with Aspidoras catfish show.

My story begins with a visit to a great friend of mine, John Blackwell. John is a fishkeeper who works primarily with livebearers these days, but has an interest in just about all groups of fish.

On this occasion John had been breeding from a group of *Aspidoras fuloi* and kindly offered me a couple of pairs to try. Since a success with *Corydoras pygmaeus* I have been on the lookout for other species of catfish to work with so I gratefully headed home with my new charges.

Sexing and pairs

Sexing *Aspidoras fuloi* is easy. Males are about half the size of females and are much slimmer. The pectoral fins are also longer and all the fins are more pointed.

The two pairs were placed in a 12" x 8" tank for quarantining (I quarantine all fish even when they come from fellow fishkeepers as opposed to shops).

They were fed on a diet of live baby brine shrimp and grindal worm twice a day and a large partial water change was done each week. On this diet it was not long before spawning activity was underway.

Courtship

The courtship followed typical corydoras behaviour with lots of nudging and caressing. During mating the female holds her pelvic fins together to form a pouch into which the eggs are laid. Sperm, which the female had collected in her mouth from the males vent, is then released onto the side of the aquarium and the eggs pushed on top of it.

At the end of spawning I had over 20 eggs plastered to the sides of the aquarium, so I took a razor blade and carefully scraped them off and placed them in a margarine tub in their own aquarium water.

Problems begin

Time passed and the eggs fungused. Eggs fungusing is a problem which may have a number of causes. My first choice for the source of this problem was water conditions. Since my water is very, very hard and alkaline, I decided this was the source of the problem and added rainwater to soften it down to something closer to John's conditions.

By the time I had finished, the tank water was down to a hardness 180 p.p.m. with a pH of 6.8. That should solve the problem - I thought.

The fish loved the change in water conditions and spawned again almost immediately. This time they produced over 40 eggs.

Once again I scraped them off and placed them in a margarine tub. Time passed and they fungused.

I now decided it must be my messing about with the eggs that was causing the problem, even though John had told me this was the method he was using.

Therefore, next time they spawned I left the eggs where they were until I had a new tank prepared for the adults. Since this meant warming up some freshly collected rain water, it was early evening when everything was ready by which time the adults had eaten all the eggs.

When the next spawning took place, I was ready with a new tank for the adults, so I could remove them straight away. This time I knew everything was going to be alright. I was even planning which tank I would be moving my 43 babies (I had carefully counted the eggs) to when they had grown up enough to go into a larger tank.

Well... time passed and they fungused.

The months rolled by and despite everything I did all my two pairs of fish ever produced were eggs which fungused. Then my adults died off, so that was the end of my chances - this time.

Above: Female Aspidoras fuloi.

Left: Eggs two hours after laying.

What caused the problem?

The most probable cause of the problem was the males being infertile. This does happen occasionally and when all else fails it is as good an excuse as any, since it puts the blame firmly where it belongs, on the fish's shoulders not the fishkeepers.

At a temperature of 73 - 74°F John's fish's eggs hatch in about 2½ - 3 days, but the fry are another day or so before becoming free-swimming. He feeds them on newly-hatched brine shrimp right from the start and achieves a size of half an inch within a month.

Looking back on it now, I should have taken a group of youngsters to grow on and not the adults. Young fish adapt better to new conditions and while you may not be able to start breeding from them next week they will often produce better results in the long term. This would also have reproduced John's set-up more closely as well, since he had a large group of about 20 adults.

Well I hope this article clearly shows how to one fishkeeper a species can seem so easy he/she cannot stop them breeding, while for another it can seem to be the most difficult fish in the world.

Personally, I get the greatest kick out of succeeding with those species which have caused me real problems like *Aspidoras fuloi*. **For, never fear, I shall be trying again in the near future to succeed with this frustrating catfish.** ■

Young fis

KIT TIP

No 6. The Internal Power Filter

How does it work?
Water is drawn in through slats by a powerhead (pump) at the top of the filter. It passes through a sponge where mechanical and biological filtration takes place, and is then passed back onto the water. Some filters have aeration features to break the surface as the water returns. Others can be "aimed" in a particular direction. Some internal filters incorporate integral spray bar systems to trickle water along the length of the tank.

What extra equipment do you need?
It is possible to load the filters with other media than the sponges with which they are usually supplied. In most cases the spray bar attachment will be bought separately. Some filters allow the addition of extra "modules" of foam.

How do I use it?
The filter has two functions, the main one being to polish and biologically filter the water. The second is to create, where wanted, currents in the water and turbulence at the surface. The filter will usually come with suckers for attachment to the side of the tank. The direction of the outflow and the amount of turbulence can be adjusted by the positioning of the filter, though it should be mainly submerged to prevent burning out.

Good features
Easily maintained and cleaned, very efficient at removing loose detritus, very quick and easy to fit.

Are there any drawbacks?
Virtually none. Suckers tend to come loose with age. Small fry may be sucked into the filter and find the current produced too powerful. There is limited space for media as the filter is inside the tank.

Underwater Safari

This month we look at the Great Diving Beetle.

The Great Diving Dytiscus Beetle is a huge beast in aquatic insect terms, reaching 4cm long. It's also sensitively long-lived with specimens of five years old not uncommon.

The beetle is an all rounder capable of flight, and sudden descents into a likely puddle (which may turn out to be a reflective window). The eggs are laid underwater in the autumn and hatch in the spring. The larvae is a savage predator, and after a pupating spell on dry land, hatches into an equally predatory adult. Both will attack and eat quite large fry and amphibians.

Equally tricky to keep successfully as a larvae in a small aquarium.

●Pic of Dytiscus Marginalis by Phil Millams.

BLASTS *from the past*

Four years ago in PFK

■ **MARY BAILEY revealed that she had kept an Oscar that was terrified by earthworms.**
She also reminded readers that the Oscar can get hooked on one type of food and refuse all others - so that offering a varied diet was important.

■ Dr DAVID FORD celebrated ten years of answering queries on fishkeeping. By far the most problematical fish were Black Mollies afflicted by White Spot and Fungus and shimmying (swimming on the spot) in unsalted water; and fancy Goldfish with swimbladder problems.

■ **Described as an innovation were little packs (or growbags) of planting soil that could be used under gravel to improve your results.**

■ PFK discovered an outstanding fish breeding project in the maximum security jail at Wakefield

DID YOU KNOW...?

by Ian Lucas

■ The fastest spreading plant in the world is one you may be growing in your tropical tank. *Salvinia auriculata* is one of a number of species of *Salvinia* available to fishkeepers.

Lake Kariba was formed by the building of the Kariba dam, and filled with water in May 1958. By April 1957 some 77 square miles of surface were choked with this floating plant and six years later this had become 387 square miles.

In the aquarium its roots provide shelter for new-born livebearers and if it grows too rampantly, it's still easier to prune it in your tank than in a huge lake...

■ The smallest flowering plant in the world is a kind of Duckweed from Australia, *Wolffia angusta*. It grows to .6mm long and is .35mm across. It also bears the world's smallest fruit, weighing .15 milligrams.

It too is sometimes available from aquarium plant suppliers, though not as commonly as the lesser Duckweed *Lemna minor*, which is the smallest British flowering plant. Many fishkeepers can't get rid of this plant and are happy to give it away.

Both species grow well in a tropical tank, and lesser Duckweed thrives in coldwater too, where many coldwater fish, including Goldfish will eat it. In tropical tanks vegetarian fish, like the larger barbs will also find it a useful supplement to their diet.

■ **Quick tip**

Want soft water water for your fish? Try collecting rainwater - but filter it through charcoal before using it.

shkeeper

Quick tip

Got a hungry catfish? If your bottom dweller hides all day and feeds when you're in bed, ensure a supply of food by sliding pellet or tablet food down a tube into his lair -which will stop other greedy fish getting it.

SEA-ING STARS

Two great marine aquarium books to be won this month in our wordsquare contest

This month's prize is one of two great books. First prize is Dr Dick Mill's book *Interpet Guide to Marine Fishes*, which outlines 50 marine species and is full of colour. It also helps you to set up your own marine aquarium.

Second prize (for no particular reason) is Graham F. Cox's *Tropical Marine Aquaria* published by Hamlyn, an equally colourful book. The author who runs Waterlife Research Ltd., takes you carefully through the establishment of a marine set up, and gives full details of all the fish.

To win one of these great books:

Just find ten words or groups of words on the square. They can read diagonally , vertically, horizontally, up and down and backwards or forwards. The words are: **Graham Cox; Mills; interpet; Marines; Hamlyn; Waterlife; Tang; Clown; Salt; and Wrasse.**

Clearly mark their position and cut out the wordsquare. Send it to: **Book Wordsquare (July), Young PFK, Bretton Court, Bretton, Peterborough, PE3 8DZ.** The closing date is July 14. You must be 17 or under to enter.

D	W	R	A	S	S	E	E	J	R
X	A	W	Y	G	A	Y	R	L	G
Q	T	E	P	R	E	T	N	I	F
J	E	S	M	A	R	I	N	E	S
K	R	B	U	H	T	U	N	K	L
T	L	A	S	A	A	O	W	H	L
M	I	Z	N	M	P	M	O	F	I
B	F	G	I	C	U	Y	L	T	M
C	E	P	A	O	S	D	C	Y	R
X	Z	A	S	X	F	Q	W	E	N

Name.....

Address.....

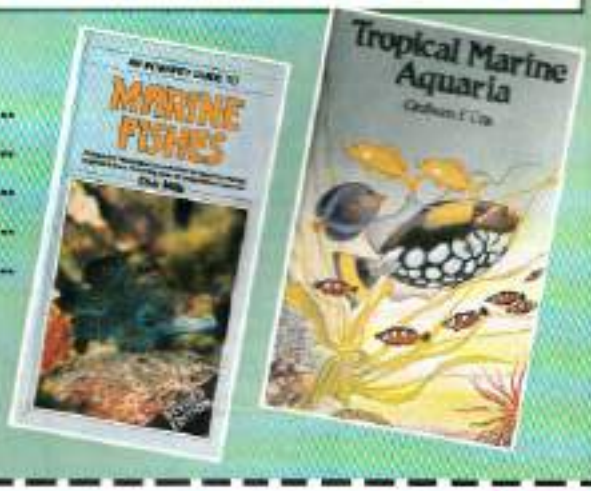
.....

.....

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

WINNERS

The winner of the April Competition was **James Coyne of Hants**. First prize in May went to **Ben Granville of Kent**; three runners-up were **Sharon Lloyd, W. Mids; Nicola Harper, Renfrewshire;** and **Mark Warren, Somerset.**



Floyd **by fran**

Polished performer

Making the most your free gift.

Pre-packaged filtration systems, and the growing emphasis on high tech media are both in danger of making us forget the very important role that floss, and better still a properly bonded filter mat can play in filtration.

Traditionally such a media filters out loose particles before they reach the main biological area. But quite a lot of biological activity takes place in the pre-filter mat too.

Your filter mat has been heat bonded to ensure that it retains its shape and that loose fibres don't slip through to jam power heads.

It can be torn up and stuffed into awkward shapes; cut to size and layered; and used on the horizontal or held vertically in a grid.

Benefits

Because of its shaped construction it's less liable to be crushed as water passes through, and debris builds up.

Even quite small debris is removed - even more so if the material is folded or doubled.

Some chemical treatments can affect foam media, but a filter pad is immune. It can be rinsed and re-used two or three times.

Uses

The material is suitable in all filters, especially as a pre-filter over a more claggable media. A thin cheap filter pad can be used as a disposable pre-filter pad, particularly in pond filters and large trickle set-ups with a thicker pad below if required. The thin pad can be rolled up and discarded with its coat of mulm, saving you a great deal of maintenance to the main filter.

When keeping sensitive fish it can pay to regularly syphon off mulm and detritus through a filter pad in a colliander or sieve and re-use the water rather than introduce new untreated water.

The pads can be inserted into an undergravel set up as a gravel tidy without interrupting the free flow of water. At *PFK* we've also used them under gravel and growing media (where they maintain a lot of their thickness depth despite the pressure) to encourage good plant rooting.

Use them, too, to line planting baskets in ponds.

By lining a perforated box with filter matting, covering with a layer of gravel, and filling with planting media and bog plants it's possible to set up a vegetable filter over the back of a tank. ■

Springy, difficult to crush, and easy to use - your free filter mat.

Win 500 feet of Crystal Clear airline.

Great ideas rewarded....

We've got what amounts to a lifetime's supply of Crystal Clear airline to give away to the best idea for making the most of your free filter matting. It could be an original use of the material or a successful project completed with its help. Send your ideas to: **Filter Matting, PFK, Bretton Court, Bretton, Peterborough PE3 8DZ.**

To give you a chance to experiment the closing date is **August 15, 1992.**

Where to get more filter matting

Your filter mat comes from **Crystal Clear** of Bolton. Bob Tomlinson designed the material 24 years ago and has used it ever since. It was the material that first started Crystal Clear off as a company. It's available in a wide range of sizes and thicknesses, including a 3" thick pond matting which can be chopped into cubes to make a filter media in its own right; and a carbon impregnated version which will remove impurities.

More details from Crystal Clear Products (Bolton) Ltd., Regan Street Works, Halliwell, Bolton, Lancs Tel: 0204 842901.

PRACTICAL Fishkeeping

WRITE-IN COMPETITION

WIN A 5' TANK & MAHOGANY VENEER CABINET & HOOD WORTH £595 FROM AQUARIUMS, CABINETS & HOODS

This month's prize is a 5' x 2' x 15" aquarium in 10mm glass; a matching cabinet (with two doors and a shelf) and crown in mahogany wood veneer finish; sliding cover glass and undertank polystyrene with a retail value of £595.

All aquaria from A. C. and H. are built to order from top quality materials, in a wide variety of sizes and colours, with odd sizes and personal designs catered for.

Matching furniture is also available. Aquaria and cabinets can be supplied separately. Prices range from £200 for a 24" x 20" x 12" tank cabinet and hood to around £800 for a six foot tank. Aquaria and cabinets can be sent anywhere in the UK for a small extra cost.

■ **For more details ring 0689 832 792** (trade and public supplied)

THE RULES

In the wordsquare on the right **ten** words or groups of words are hidden. They may read diagonally, horizontally, vertically and up or down.

■ The words are: **Six foot; aquarium; shelf; cabinet; hood; cover; glass; veneer; design;** and **doors.**

■ Clearly mark the position of the words, then cut out the form, and add your name and address.

Send your entry to: **Cabinets Competition, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ** to arrive by first post on **Monday July 13, 1992.**

■ All the entries will be placed into a "hat" and the first correct entry drawn will win the tank and cabinet.

Above right: A sample tank from Aquariums, Cabinets and Hoods

S	I	X	F	O	O	T	L	M	D
S	H	E	L	F	P	C	U	K	S
A	X	R	D	E	S	I	G	N	J
L	C	X	Q	U	R	B	P	V	Y
G	L	O	C	A	B	I	N	E	T
J	A	Z	U	D	D	P	O	N	R
N	V	Q	X	O	D	R	T	E	U
I	A	L	O	G	O	K	S	E	N
W	S	R	K	C	O	V	E	R	F
P	S	T	Y	D	H	K	F	P	Q

Name .....

Address .....

.....

Would you be willing to receive details of any further promotions?

Find out how one pond became two in this month's project. All pictures by the author unless stated otherwise.

My original pond (9' x 6' x 4.5' deep) was constructed two years ago and up until recently contained a mixture of Koi and goldfish. I spent many hours contemplating (as we fishkeepers do) the fact that I would like an extra pond to separate my goldfish from the Koi.

Eventually, I contemplated myself into making a decision that would build another pond on part of my patio. This pond would be linked to the present pond through the header pools, so effectively would be an extension and not a separate stand-alone pond.

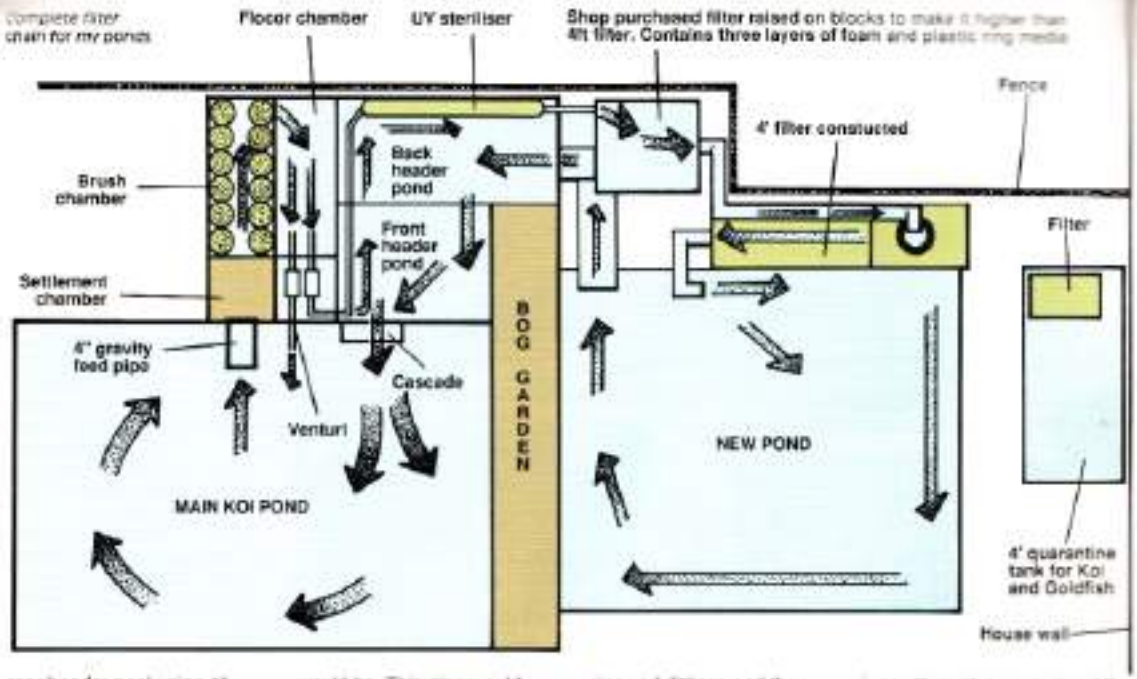
At the same time a reasonable increase in filtration would be needed because of the larger amount of water and, to be honest, I should have built my original brick filter larger than I did.

The new pond

Plans were therefore made to construct a pond measuring 6' x 6' with a minimum depth of 2' on the patio.

Construction method would be single walled using concrete blocks and bricks. This would then be rendered using Rein Fibres (Fibromix) and sealed with G4 Pond Sealant. This new pond would be connected to the present

Extendab



rear header pool using 4" pipework and the header pool itself would be raised higher because this would control the level of water in the new pond. Extra filtration would be added and to save time it was decided that a 4' water tank would be used for this purpose.

Construction

My club Chairman (who is a builder by trade) came round one Saturday morning towards the end of March and built the pond walls and put an extra course of bricks round the header pools to raise their height.

No footings were laid - the walls were built directly on the patio paving stones; they have been there for years and I thought there was little chance of them subsiding. A 4" pipe was built-in between this pond and the top header pool and a 2" pipe was added just below where the capping stones would be. This pipe would return the water to the pond from the additional filter system.

The following weekend I cemented capping stones round the top of the new pond and also round the header pools.

The next weekend at the beginning of April the inside walls of the new pond and the header pools were rendered using Rein Fibres. The mix used was two x 2 gallon buckets of building sand, one bucket of Portland cement and 250 grams of fibres - this mix is specified in the pamphlet that comes with the product.

We were (unusually) blessed with good weather over this period and the following weekend three coats of G4 were applied to the interior walls of the new pond and the header pools.

The same weekend a 4' water tank was purchased along with all the necessary pipework/fittings and the additional filter was constructed over this period.

Filtration

Up until this time the filtration had consisted of a gravity-fed brick-built filter with three compartments - settlement, brush and Floor chamber. The water was pumped back to the pond through two central heating circulators - one through a venturi and the other to the small header pools and back via a cascade. A U/V Steriliser was connected to the header pool circuit and last year I also added a shop-purchased filter to this to give more filter power and to help polish the water.

This filter contains three sheets of different grade open-cell foam on the top, with Floor filling the base.

The extra pond would separate the koi from the goldfish. Pic: C.L. Wigens

ble ponds

PETE TREVETT describes how he extended his pond and upped his filter power.

A shoal o £2?

Plymouth reader JOHN RUNDLE offers a step-by-step guide to breeding Neon Tetras.

The Neon Tetra (*Paracheirodon innesi*) is one of the most popular aquarium fish and has been topping the charts since the 1930s. This small characin can be seen in all dealers' tanks, their fluorescence guaranteed to catch the eye of fishkeepers.

Bred in vast numbers in the far east they are sold for under a £1.

An investment of £2 could bring you your own shoal of these highly coloured fish - if you breed them yourself.

I have been breeding Neons for around twenty years, and during this time I have evolved a set procedure which enables me to successfully raise the fish in sufficient numbers.

The breeding tank

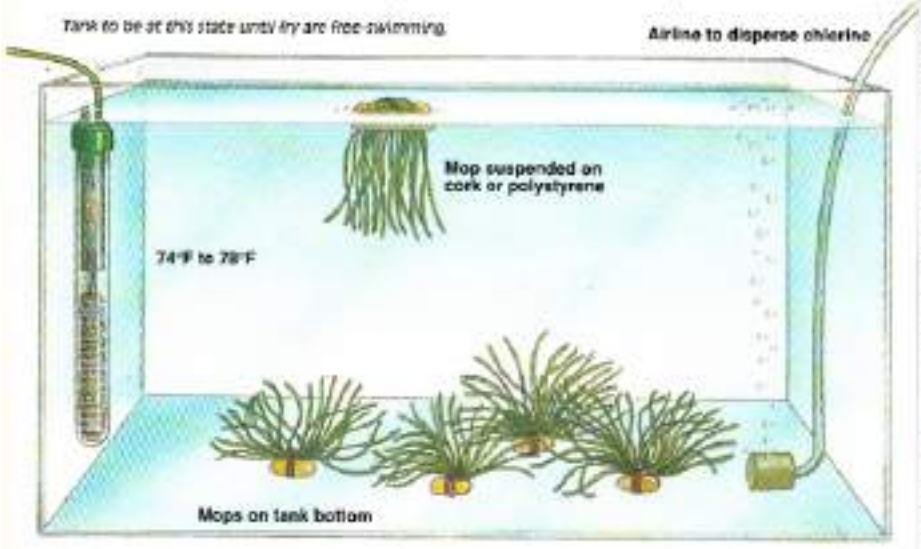
You will require a tank within the range from 12" x 8"x 6" to 18" x 12" x 10".

Clean the tank with a strong salt solution (use cooking salt or sea salt, not table salt) then rinse throughly prior to filling with water. But what water? I have found that the pH and hardness of the water can control the size of the brood, as the figures in the table on the right show.

The water in the bare tank is agitated by using an airline to disperse the chlorine in the fresh water for a period of 24 hours. Do not at this stage fit any filtration. After this the temperature should have settled within the range in the table.

Home made nylon wool spawning mops are then placed in the tank. The mops must be sterilized by boiling. Do not completely cover the tank bottom with mops, just place a few in the central region of the tank.

The spawning mop is then suspended on a cork or a strip of polystyrene placed in the centre. The tank should now look like the one in the illustration.



Sexing Neons

Sexing the Neon Tetra is a fairly simple task. The females are more robust in comparison with the male, their ventral region being markedly rounded.

The males compared to the female appear thin. It should be possible to obtain pairs straight from your dealer's tanks.

Spawning

I place the choosen pair of fish in the spawning tank in the early evening. The next day they should begin to start their spawning dance in and

# of Neons for

around the mops, the male driving the female into the spawning media scattering the non-adhesive eggs.

The tiny clear eggs can be seen using a strong eyeglass. After the spawning, which is over in couple of hours, remove the parents as they are avid egg-eaters, then cover the tank completely to protect the light sensitive eggs.

I use a small towel or newspapers. Twenty four hours after spawning, the eggs will hatch, and the minute fry can be seen wriggling on the bottom of the tank under the spawning mops. The tank must still be kept covered until the fry are free swimming. Daily inspections of the tank will indicate a few fry hanging on the tank sides and others hiding in the mops. Nourishment supplied by the yolk-sac will hold the fry in this stage for four to five days, until they are be free-swimming and ready to take their first foods.

pH	Hardness	Temp	Number of fry raised	Type of water
6.4	5GH	23°C	150 max	50% tap 50% rain water
7.2	6 GH	25°C	50 max	Plymouth tap

Above: A shoal for £2?

Right: Iridescent delights - the Neon Tetra

Pics by Max Gibbs, The Goldfish Bowl, Oxford.

Fry care

Up to this point I have only an airline with mild aeration in the tank. I have found that a build up of infusoria in the tank over this period can reduce the number of fry that reach the free swimming stage. Filtration in the tank from day one can cause the build-up of infusoria.

The time to add our filter is at the point the fry are free-swimming. Use a small sponge filter or the home made filter shown.

The first food I use is infusoria prepared prior to breeding the fish. Only a small amount is used as within three to four days of becoming free-swimming, the fry will accept freshly-hatched brine shrimp.

Do not overfeed, only place in the tank enough brine shrimp to match the size of the brood. Once a week a partial water change is carried out - with care not to remove any fry. About 25% will suffice.

Growth rate

You will find that the brood will grow at a fairly constant rate and should be around 6mm in length in about five weeks. When the fish attain this size with the neon glow just starting to shine, they will eat crushed flake food or one of the many fry foods on the market.

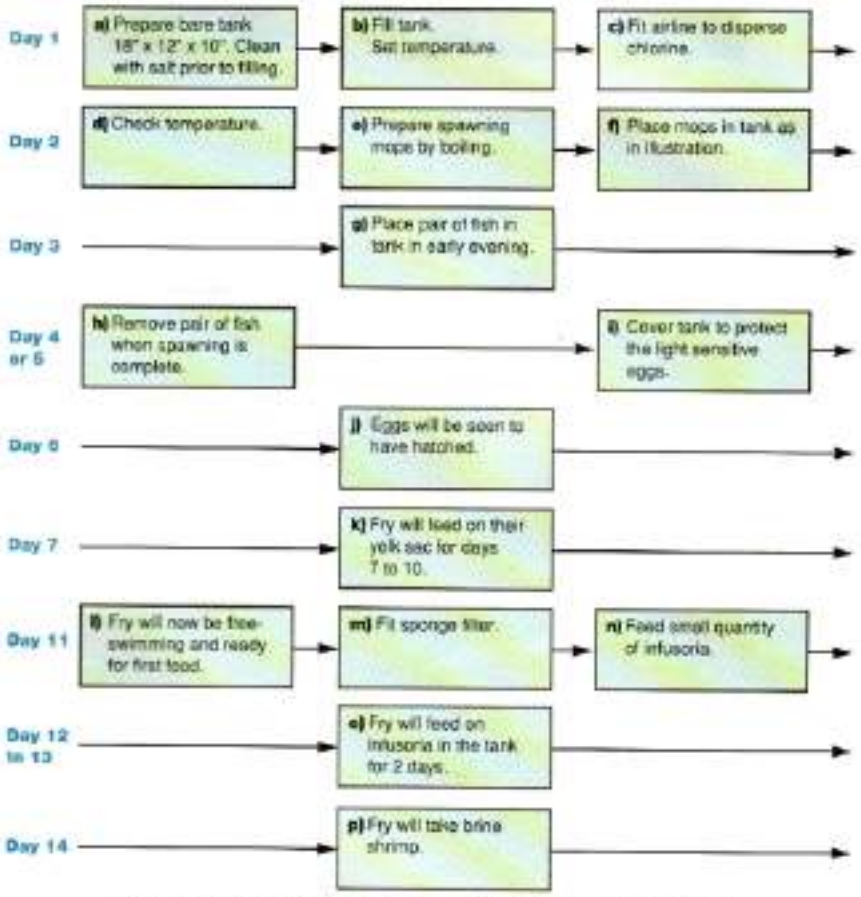
You can now think of moving your brood to a larger tank. Prepare the new home prior to moving the fish by ageing the water for at least five days. Neon Tetras when young do not take kindly to fresh water.

Brood size

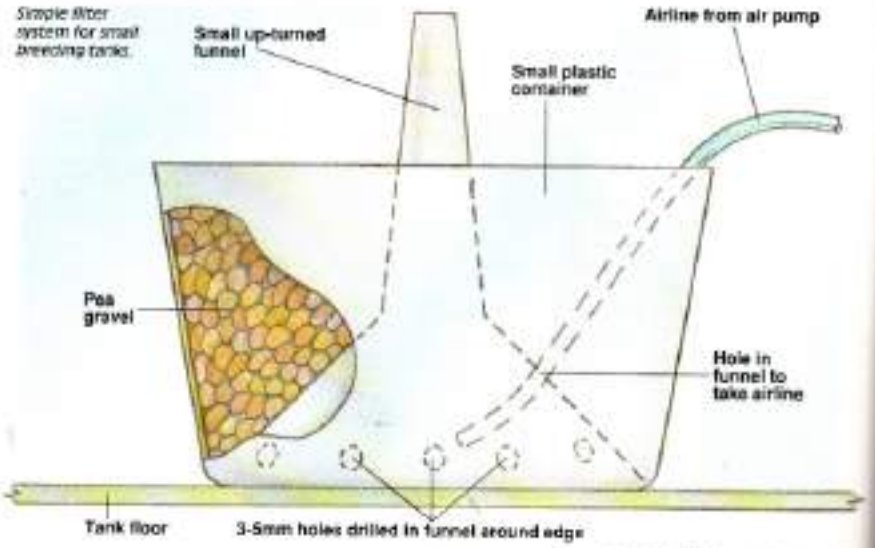
Neon Tetras are an easy fish to spawn, but it is not an easy feat to raise large broods. I have found that a pair of Neons can yield around two hundred eggs in a spawning, but the number of fry raised can vary from twenty five to over a hundred.

But even if we can't breed this beautiful little tetra in the vast numbers accounted for by the far-eastern fish farmers, we can still breed enough to have a fine shoal of Neons for our own tanks. ■

Step by step guide to breeding the Neon Tetra



From this point, partial water changes. Feed fine dry food when fry are 6mm in size. When 6mm in size, move fry to larger tank.



Quick tips

■ Before the new Spring growth of plants in the pond can give shelter, particularly to newly-introduced fish, I have devised some artificial "lily pads" cut from expanded polystyrene. It is easy to mark around a dinner plate and then cut out with a sharp knife.

As the material is almost always white I find they are not so conspicuous if they are painted black or dark green, using non-toxic paint.

■ If the rocks in your tank suffer from all-smothering algae I have found they can be kept clear by scrubbing off the algae then putting them in the oven or under the grill until they are thoroughly dry.

Prepare a solution of algae control liquid and let the cooled off rocks steep in it. The more absorbant the rocks the longer the protection will last.

Geoffrey Burton, London

***Ed's comment:* Great care must be taken to ensure that the rocks used have no hidden cavities which might cause cracking or even an explosion when overheated.**

Recycling water

May I suggest to your readers a tip to aid both fishkeeper and gardener alike. At this time of water shortage fishkeepers could offer their water to gardening friends or neighbours, which could help slightly towards the problem.

I have discovered that using the water from my tank on both my indoor and outdoor plants promotes tremendous new growth - four inches on my camellia and three inches on my rubber plant.

Patricia Manly, London

***Ed's comment:* As Patricia has found it's the nitrates in tank water that make a "natural" fertiliser.**

Efficient sucker

An idea I have found very useful for picking up unwanted food and rubbish from the bottom of a tank (such as a bare bottom isolation tank etc.) is a simple length of rigid tube about ¼" dia and three or four inches longer than the tank depth. Simply place your finger over the end of the tube, lower the other end in the tank over the rubbish, and lift your finger off for a second. Rubbish is pulled up the tube. Place finger back over end of tube and you can lift it out lift out complete with rubbish and tip away. A very simple thing which works every time and causes little or no disturbance to the fish.

S. Billington, Gwynedd

White worm

I keep marines and breed white worms which I feed to my fish about twice a week. They appear to love them and thrive. I find that few fishkeepers use white worms nowadays and I feel it is a pity.

I now use a small plastic bucket to keep the worms and feed them on bread and milk. Enough of the worms find themselves on the light-fitting lid so that when I open the bucket I merely have to lower the lid into my aquarium to feed the fish. The bucket is about four pint capacity.

I trust this will encourage others to use white worm which I think are very nutritious and easy and cheap feeding.

Don Mackay, Ross-shire

Poison plant problems

I purchased a plant in December '91 which poisoned my aquarium causing the loss of fish, a great deal of upset, financial loss and a lot of hard work. It's always tempting when visiting an aquatic outlet to buy on impulse. But before you do think of the following:

1 Is the purchase practical?
2 Is it necessary?
3 Is it suitable?
4 Is it safe?

It is very distressing to find out at a later date that you have made a mistake which can cost you dearly.

Last December I saw a plant called a Red Spotted Croton. It had a strong woody stem with many long speckled red/green and yellow lance-like leaves.

As it was in a tank with fish I assumed it was aquatic. I was wrong. Never assume. I paid for three plants (£4) and when I got home, cleaned them and put them in two of my tanks. They looked splendid. It was the only new addition to my set-ups in two months.

Within six days the Celebes Sailfins seemed to have a fit. They found swimming normally impossible and a few hours later they died. Over the next six days, 18 fish of various types died, despite water changes.

During that time I made over 45 phone calls to vets, zoos, aquariums, fishkeepers, garden centres, and local authorities - all to no avail.

The plants were removed after the death of the first fish. They were rotten and slimy with an awful smell. A gardener friend recognised the plant as one common house plant called "Joseph's Coat".

Further research with the help at Kew Gardens and the local veterinary hospital and Polytechnic revealed some disturbing information. The plant was from a group of the genus 'Euphorbiaceae'. Extracts from the croton have been used as fish poisons. The sap which was emitted into the tank water as the plant broke down contains co carcinogenics, phorbyl esters and cytotoxin to name but a few poisons.

They have varying effects on humans and as I discovered disastrous effects on fish. Dermatitis is very common from contact with Crotons and as fish have permeable skin and no sterile tissue the poisoning effect was greatly increased.

With the patience and advice from my local vet we set up a recovery programme. This involved regular water changes after the tank had been completely stripped and cleaned, charcoal filtration, while the worst cases were placed in a warm (78°C) well-aerated hospital tank with an antibiotic powder (Oxytetracyclin) as a last ditch attempt to save them.

It was 78% successful. However, after combating the poisoning, the fish were vulnerable to secondary infections (fin rot, velvet etc), which took a great deal of time, patience and hard work to combat.

The result now, after over three months, is that the tanks are stable and I've lost no more fish. It goes to prove the point that you should always check exactly what you are buying. I've learnt my lesson the hard way.

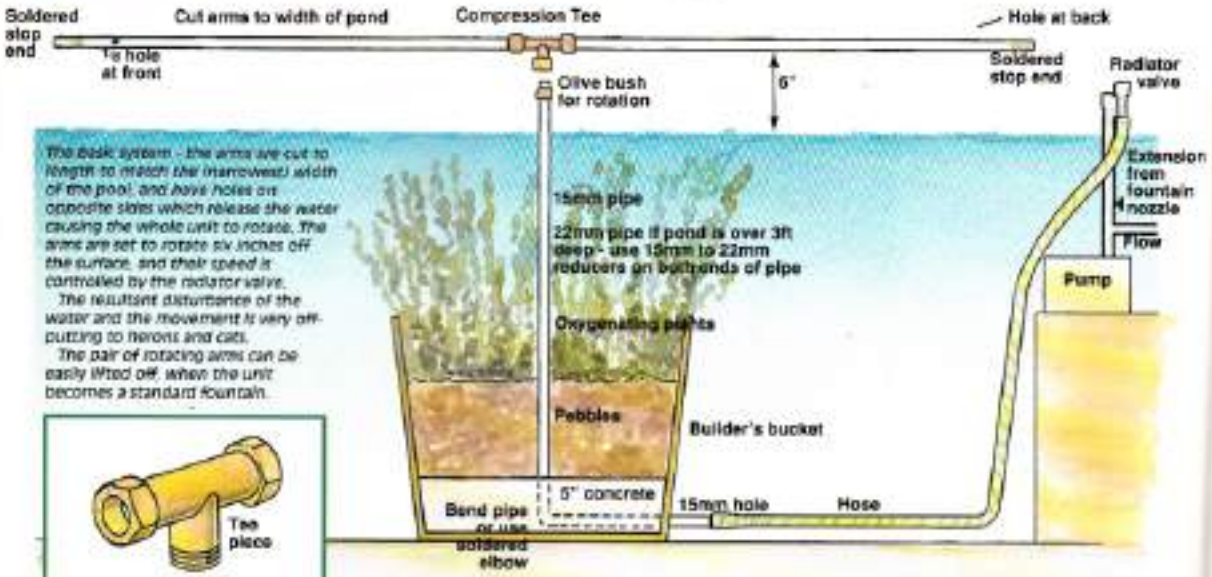
Maybe, we in the fish world need a monitoring body for quality, service, value etc. from retailers. The RAC and AA do it for garages. Perhaps one of the Aquatic Societies will take up the challenge. Until then only vigilance and informing others will help all of us to keep ahead.

David T. Jakes, Plymouth

PFK PROJECTS

WORTHY

T. MARSHALL of Totley, Sheffield, offers his solution for dusk-to-dawn heron problems; and summer evening pond oxygen starvation.



inset. Put the nut of the tee piece onto the up-pipe, followed by the olive. The tee piece then goes on top and the nut is tightened to compress the olive onto the pipe. You can now unscrew the nut and let it slide down the pipe as you don't need it now. The arm can now be lifted off or replaced as required.

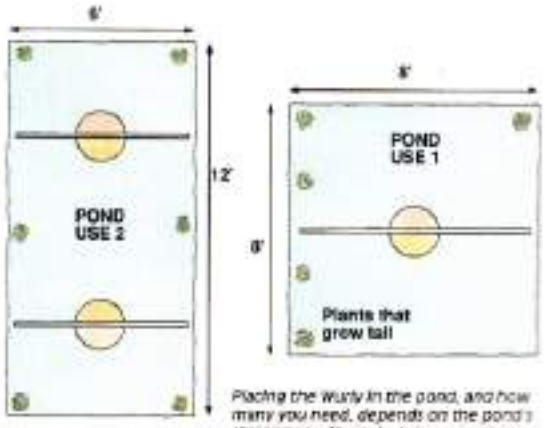
I made this device four years ago, and I now have no problems with herons or cats. I only put it on at night as my herons don't seem to come in the day. It also oxygenates the water on warm summer nights or in thundery weather at a time when the fish are competing with the plants for oxygen.

The device which I call a Wurly costs no more than a standard pump to run. As it T's off the main flow, it takes only part of the flow from the pump, and using three Wurlys from one pump you lose only 30 GPH from the main flow rate.

How to make a Wurly

The main diagram shows the construction. I use 15mm copper pipe as I have found plastic is not strong enough. Alloy would be very good but it's impossible to get the fittings.

The basic unit of bucket, up-pipe and pebbles with oxygenators in place makes a simple fountain on its own. The rotating top piece consists of two lengths of pipe to match the width of the pond, joined by a compression Tee.



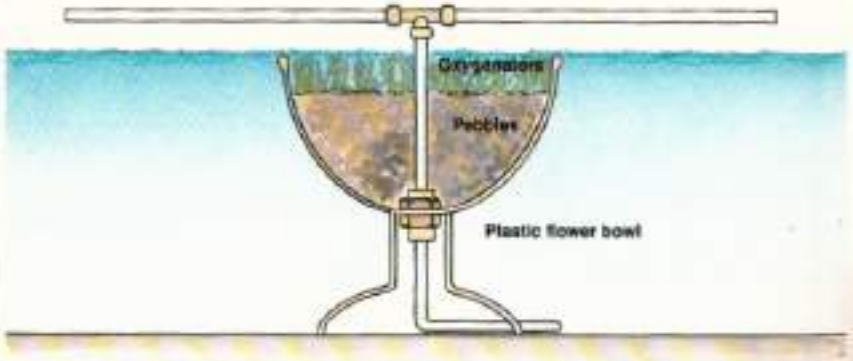
Placing the Wurly in the pond, and how many you need, depends on the pond's dimensions. Also take into account emmerse plants - those that put their tops out of the water - that don't like to be sprayed on. Place them in the corners.

Y WURLY

PFK TIP: When using the Wurly in warm and/or windy weather, you will have a high rate of water loss through evaporation and spray so be prepared to top up the pond as required.

The inset diagram shows the construction of the rotating joint. The whole top section can be removed during the day if wished, and the unit run as a fountain. The radiator valve is used to adjust the speed of rotation. ■

Price: I can make one Wurly for £5.



Right: The plastic flower bowl approach using a tank connector or similar means there is no need for the concrete to hold the pipe upright

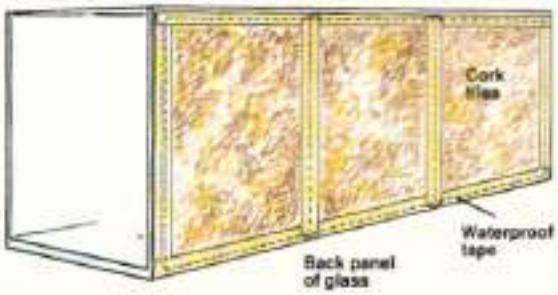
A solid backing

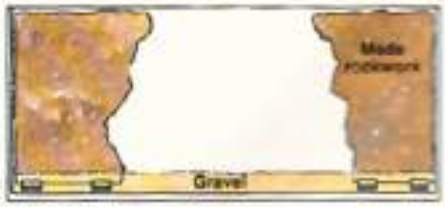
Readers P. Metcalfe; and J. Lingard of Grimsby read our recent tank decor review and request for your own ideas. There are more to come, but here are their simple and effective ideas for tank decor.

First Mr Metcalfe: The backdrop for my 36" x 12" x 16" aquarium is constructed from three square lightweight cork tiles, taped to the backglass outside the tank with clear waterproof tape. It's important to tap along each join to keep the close to the glass.

More permanent features can be made by siliconing cork tiles inside the tank.

PFK TIP: Covering the sides of the tank as well can add to the effect and reduce any algae by shutting out the unwanted sunlight.





J Lingard has made his internal "backdrop" from Isopon P38: The Isopon is mixed then shaped on a flat surface. It's easily worked, and feet can be attached to the bottom in several ways. These are then buried in the gravel to hold the features in place and to conceal the heaters and powerheads in my marine tank.

The material appears to be non-toxic as algae is already growing on it.

PFK TIP: If in doubt about any toxic seepage from a material, it may help to filter the water heavily through charcoal before stocking any fish.

Brilliant ideas from our readers

Mrs L Tiley writes from Leeds: *Just want to say what a brilliant idea from P. Burley (PFK Projects April). I don't know how many times my husband has attempted a three D backdrop effect before, but this method, with its spot-on diagrams, worked first time.*

Six of the best or pieces of eight?

The tentacles of the *Coelimorphia* are always in multiples of six, putting them into the taxonomic subclass Hexacorallia which also contains sea anemones, hard corals and zoanthids.

Soft corals such as gorgonians and leather corals belong to the other major coral family Octocorallia. As you might expect from the name, these latter animals have tentacles arranged in multiples of eight per polyp.

The Carpet Elephant Ear, a Discosoma species, can catch quite large food items.

■ **Overgrowth by filamentous algae:** This must be prevented by keeping water quality as high as possible, especially by minimising phosphate and nitrate levels, and by removal of any algae that does grow, by hand or by herbivorous fish.

■ **Calm water:** Mushroom anemones seem to fare much better if placed in quiet areas of the tank, where the current isn't strong enough to actually move the disc of the polyp. This feature is also evident in their natural habitat; they are found most often in areas which are not exposed to strong currents, except perhaps briefly when the tide turns.

Reproduction

Mushroom polyps will often reproduce in the aquarium under good conditions. They do this in two main ways, both asexual.

■ Small daughter polyps can form by budding from the base of the parent. Unlike zoanthids, where large colonies can form by a similar process, the young mushroom polyps separate from the parent completely.

They may either remain attached to the same rock, or alternatively detach themselves and float away to find another site.

In my own system, which has a coral sand substrate, I quite frequently spot small mushroom polyps on the bed of the tank; because they are unable to attach themselves securely onto sand, however, they all seem to disappear, washed away by the current from the circulation pump.

I dare say that when I strip the tank down in the future I'll find a mixed colony lurking somewhere in a corner! Those fishkeepers with reef tanks based entirely on rock will probably find small mushroom polyps appearing here and there, wherever there is a quiet spot, as they can adhere firmly to solid substrates.

■ The other method mushroom polyps use to reproduce is division. First the mouth will split, giving rise to a disc with two orifices, which gradually move apart, then the disc itself begins to divide, starting at the edges and moving inward until two polyps of approximately the same size are produced.

With a little care in their placement in the tank, the mushroom polyps can be thoroughly recommended for the reef aquarium.

They are especially good as early introductions into newly-matured systems, where their hardiness enables them to survive any initial problems.

Under good conditions they will, thrive, reproduce and live for many years. ■

Feeding

The mushroom anemones use their tentacles to trap zooplankton. However, like many of their relatives they gain much of their nourishment from symbiotic algae, zooxanthellae which live in the tissues of the polyp and photosynthesise to produce food in chemical form for the host animal.

In addition to filter feeding and photosynthesis, mushroom anemones can also absorb proteins and other food molecules directly from the water surrounding them.

The very large Mushroom polyps, often sold as elephant's ears, species are also capable of catching quite large crustaceans and fish by forcing the disc around the prey to form a ball, with the unfortunate prey trapped inside.

Fusiliers in shoals - thousands of tiny fusiliers in the Red Sea

Getting along TOGETHER

In the last few months, LES HOLLIDAY has shown us how to run the most efficent marine tank and what to keep in it. Now in a series which no serious marine fishkeeper should miss, he comes to compatibility.

It's no good having an in-depth knowledge of how to produce perfect aquarium conditions, if we mix and match the wrong fish. As we all know marine fishkeeping is a challenging hobby in so many ways. Many an enthusiast committed to achieving high standards has found that all of the painstaking preparation can be ruined if the aquarium becomes a miniature battlefield once the livestock is introduced.

Choosing fish for the aquarium should be a pleasurable experience but needs to be carefully considered.

Several factors influence our choice of subjects and we must look beyond the primary considerations of what catches the eye and how much will it cost?

Compatibility

High on the list should be to determine the aquarium compatibility (or otherwise) of the chosen marine fish species. A

Flame Angels are among the most compatible species.

[illegible] is dependent upon two questions you must ask yourself:

1. Will the fish chosen mix with other fishes already housed in the aquarium both those of the same species and members of other fish families?

2. How will the new addition affect the chance of further additions planned for later?

If the questions that come to PFK are any indication, compatibility problems with marine fish must rate as the single most difficult area to master and overcome.

This is understandable because disasters resulting from mixing together the wrong species all too often occur. Problems usually arise because many reef species are capable of more than a little antisocial behaviour - and it is difficult to lay down precise guidelines regarding their compatibility because marine fish, like people, are individuals and don't necessarily conform to generalised behaviour patterns.

There are no clear rules therefore and even the best professionals with lots of experience can easily get it wrong. It does help our chances of success however, if we can better understand why reef fish are aggressive towards each other.

Territorial aggression

There are various reasons why these aggression patterns occur. A major problem is that many reef fish depend entirely on the reef for food and protection and are therefore territorially inclined. Because the reef is such a crowded environment the competition for food and space is ever-present. In order to survive and to get the most from their surroundings reef fish are prepared to defend their territories against all competition and have developed an armoury of weapons and defence strategies.

The most common form of territorial aggression often emerges between individuals of the same or related species, as many species are unusually intolerant. This follows because in the competitive world of the coral reef, a fish of the same species represents a major threat to the food supply and refuge of the sitting tenant, simply because the interloper requires the same type of food and habitat.

Pictures clockwise from top:

The Florida Seahorse is timid with invertebrates.

Cube Boxfish can release a poisonous substance if badly handled or attacked.

Stronger in numbers - some mariners feel safe in eight shoals.

The Longnose Hawkfish is compatible with fish and virtually all inverts.

Fanworms are a tasty treat for Dorfish, Puffers, and triggerfish.

This Coral Trout is an active predator and like in wait poised to act

eventually when they mature, the most dominant individual will change sex to female and a bonded pair will be produced.

Predation

A large number of marine fish are carnivorous and predators upon other fish or invertebrates. Most reef fish, when large enough, whether herbivores or carnivores, will also hunt down and feed on small fish or fry. The delicate balance of the reef ecosystem relies upon this and cannibalism is an important means by which nature controls the numbers of fish populating coral reefs.

The major rule applying is that generally most predators will attack only fish smaller than themselves, although some large mouthed predators such as lionfish and large groupers are capable of swallowing prey of almost their own dimensions.

Large groupers, lionfish and scorpionfish, moreys, snappers, grunts, sweetlips and their allies,

The Achilles tang is a highly sensitive species

and squirrelfish are the main predatory fish family groups.

All small fish species such as damsels, blennies, small wrasse and the young of larger species are prime targets for these predators. Of the predatory carnivores which choose to feed almost exclusively on invertebrates many are selective regarding target prey. Good examples are angelfish species which browse on sponges in the wild and butterflyfish which feed on coral polyps. Small invertebrates such as polychaete worms, shrimps and other crustaceans are also fair game for most invertebrate feeders and some of the more cosmopolitan species such as boxfish, puffers and triggerfish have an appetite which may extend to shelled molluscs, fanworms and even spiny sea urchins.

The larger predators require large surroundings and as many are grown feeders, are tolerant of less than perfect water quality. In the average home sized aquarium it may prove to be necessary to isolate a particularly large specimen as the risk of losing other fish from predation and poor water quality will be high.

This form of specimen tank can be an eye catcher especially if a large moray or grouper features and such fearless creatures soon become quite tame responding enthusiastically to stroking and hand feeding.

Lionfish are the most gregarious of the large aquarium fish and respond well when kept in a small group, again providing an impressive display in a tank devoted to them exclusively.

If other fish are placed in an aquarium with lionfish they will soon exhibit their collective predatory technique, herding the quarry into a corner, by brandishing flared fins. It will be picked off when fear makes it try to flee.

Defence mechanisms and stress

1. Mandarinfish (callionymidae) have a poisonous mucus which deters predators and are not usually bothered by larger fish.

2. Boxfish (ostraciontidae) release a poisonous substance into the aquarium if badly handled or attacked by other fish sufficient to kill all fish in the same aquarium **and** itself. Some experts recommend introducing these fish into the aquarium in advance of other fish to reduce the fatal consequences.

3. Even large fish species can be sensitive and prefer quiet surroundings. These include: Filefish; Lionfish; Squirrelfish; Sweetlips.

4. Highly sensitive species such as some of the smaller angelfish, butterflyfish and the Achilles Tang (*Acanthurus achilles*) may easily become stressed if confronted with quarrelsome tank mates and will show dissatisfaction with aquarium life by refusing to feed. This can easily cause anorexia and finally the demise of the stressed subject.

Quick compatibility rating

Angelfish Boisterous • •
Dwarf Angels Peaceful •
Batfish Boisterous • •
Blennies Peaceful •
Boxfish Peaceful •
Butterflyfish Nervous • •
Cardinalfish Peaceful •
Clownfish Boisterous •
Damselfish Aggressive • • •
Filefish Peaceful •
Gobies Peaceful •
Groupers Boisterous • •
Grunts Boisterous • •
Hawkfish Boisterous •
Jawfish Peaceful
Mandarinfish Nervous • •
Moorish idols Nervous • •
Moray Eels Nocturnal • • •
Seahorses Peaceful •
Porcupinefish Boisterous • •
Puffers Boisterous • •
Rabbitfish Boisterous •
Scorpionfish Nervous • •
Snappers Boisterous • •
Surgeonfish Boisterous • •
Squirrelfish Nervous • • •
Sweetlips Nervous • • •
Triggerfish Boisterous • • • •
Wrasse Boisterous •

KEY:
• Territorially aggressive
• Can be aggressive to own kind or similar
• Not with smaller fish
• Not with boisterous fish
• Not with some invertebrates

Highly sensitive species

A number of sensitive species of marine fish are not happy with boisterous species and are better in an aquarium on their own or together with similar non-boisterous species.

The best place for many of these is the more peaceful setting of the mainly invertebrate aquarium where they can add a dash of colour and movement and feel better at home. The main groups of these sensitive species are the seahorses and pipefish, cardinalfish and small species of gobies, blennies and wrasse. ■

DIARY DATES

SATURDAY & SUNDAY JUNE 13 & 14

■ **BKKS East Pennine Section** are holding their open show and craft fayre at the **Sheffield Arena**, (2 mins off junction 34 M1) More details 0226 786498 or 280507.

SUNDAY JUNE 14

■ **Llanrett Major Aquatic Society** have their Open Show at **Llanddinol Fawr Comprehensive School, Llanrett Major.** Details from **C. Turner, 166 Arran St., Roath, Cardiff**

■ **Skelmersdale and District AS** will be holding their annual open show at the **Skelmersdale Labour Club, Westgate, Skelmersdale, Lancs.** More details from **Ron Lewis 0695 28971**

■ This is the changed date for the **Redcar Fishkeepers Society's 18th Annual Open Show at Redcar School, Kirkleatham lane, Redcar.** More details from **J. Duffill, 0642 478856**

■ **Black Country Aquarists** are holding a fish auction at the Dudley and Extn Club, Abbey St., Lower Gornal, Dudley, W. Mids

SUNDAY JUNE 28

■ **Worthing and District BKKS** have their closed show at **East Preston Scout Hall, The Street, East Preston, Worthing, Sussex.** Details from **Ian Frame 0903 724068.**

■ **St Helens AS** have their Open Show at **Rainhill Village Hall, Merseyside.** More details from **Mrs H. Steadman 051 4264213; Mrs E. Boardman 0942 671463.**

FRIDAY JULY 3

■ **North West Cichlid Group** are holding a table show at the **British Legion Club, Liverpool Rd., Skelmersdale, Lancs** at 8pm. More information **Brian Wilson (0695 31406) or Ken Hilton (0565 633503)**

SATURDAY & SUNDAY JULY 4 & 5

■ **The Central Section BKKS** hold their Open Koi Show at **Walsall Aboretum, W. Mids.** All are welcome.

SUNDAY JULY 5

■ **North West Cichlid Group** second annual show and auction at **Skelmersdale Labour Club. See July 3 entry for more information.**

■ **Yorkshire Koi Society Open Show, Harewood House, Leeds** (plus Koi raffle, trade stands, information and advice, birds of prey exhibition, and classic car display) 10am to 5pm. Entry forms from **Mike Naylor 0274 662484 or Steve Lamb 0904 620655**

SATURDAY JULY 11

■ **Port Talbot and D.A.S.** hold their 22nd Annual Open Show at the **Tiaback Youth Centre, Port Talbot.** More details **Mark Morgan on 0639 883681.**

SUNDAY JULY 19

■ **Sandgrounders A.S.** hold their 22nd Annual Open Show at **Meols Cop School, Meols Cop Rd., Southport.** More details **R. Williamson 0704 505601**

Filter-free rarities

I took time out recently to visit Derek Lambert and his mum, Pat at their Lincolnshire home. There's little sign outside the large semi that their garage, now a fishhouse, conceals some of the rarest fish in the UK.

Derek virtually lives in the fishhouse, following a harsh regime of frequent water changes in his serried rows of tanks. He's perhaps best known for his love of livebearers - but the fishhouse holds a great many other species - some breeding projects, some pets, including a superb "pair" of snakeheads, Derek's new pride and joy.

I'm not ashamed to admit that I was encountering the vast majority of the fish on show for the first time. Among these fish are a number of vital breeding projects, containing fish like *Skiffia francesae* that are extinct or extremely threatened in the wild. Many of these are drab little fish of minimal significance in the hobby - but surely, no-one wishes to see any species go extinct, and Derek is performing a remarkable service in keeping these going alongside his more lucrative fish.

His fishhouse is not intended to be a shop - casual callers are not the norm - and the majority of his sales go to fellow fanatics at shows. Writing tops up his income and finances the rare fish projects.

Derek and Pat are highly articulate about the finer points of many of the drab little livebearers (some of which like Goodeids and the Mosquito fish, improve colour remarkably if offered a summer sojourn in a pond.

The Editor says

I recently raised the subject of culling young fish, an essential part of a breeding project. I was interested to hear Derek remark how much more difficult he found it to cull a larger fry, like the inch plus Angel that had slipped through his quality control.

So lots of tanks, thousands of fish - and huge electricity bills? Surprisingly, no. The fishhouse is insulated (the ceiling had to be lowered) and heated by a boiler - there are no heaters in the tanks - and no lights, filters or centralised system. Some 80% of the water in each tank is changed weekly instead.

In fact the impediments in each tank consists only of the features Derek feels are necessary to promote spawning - pots, spawning mops, perhaps some plants.

Live food is another essential - brine shrimp being permanently on the go in two large demijohns.

■ The object of my journey was to deliver a little shoal of Knight Gobies *Stigmatogobius sadanundio* a fish from brackish water in Indonesia, Burma, India and the Phillipines. We have kept this fish in the office brackish tank for a number of years without breeding success, and Derek has undertaken to to find out how to breed them and write it up for *PFK*.

Having consulted a colleague in the USA, he has now found that they breed best in freshwater (the hard water of his Lincolnshire home being ideal.)

Spawning secretively in pots, they leave eggs like a coating of slime on the rim. As you might imagine, the fry are difficult to raise. My little crew of seven fish are the test bed.

You may read that this attractive little fish needs live food. While they are happy to predate on anything small enough to swallow - playing havoc with Molly fry for instance - they are not like the Bumble Bee Gobies, (and the less-well-known Slim Mudskippers *Parapocryptes serperaster* which we also keep) which will accept only frozen or live foods. In fact, Knight Gobies will eat anything from flake to lumps of spat.

Steve Windsor

STEVE WINDSOR

CLUB NEWS

The West of Scotland Goldfish Society is a new group six months old, holding meetings on the first Wednesday of each month at **Ledgowan Tenants Hall, off Shisking Drive, Maryhill, Glasgow.** The aim of the group is to maintain high standards of Goldfish keeping. More details from **PRO Fergie Brown, on 041 946 8019** or **Secretary F. Campbell, 16/8 Bruce Road, Glasgow G41**

■ **Ray Brabrooke** of High Rise fishkeeping fame (the man with a 54 tank fishhouse five storeys up in a tower block) has now formed a club dedicated to those who love to grow aquatic plants. The **Coldwater and Tropical Aquarium Plants Club** intends to produce two newsletters a year. Club meetings will be held in various parts of the country as weekend breaks once or twice a year, with a full fish and plantkeeping programme arranged.

Ray has also set up High Rise Aquatics to market plants and accessories. More details from Ray at **30 Wortley Heights, New Wortley, Leeds LS12 1JG.** Please enclose an SAE.

More help for terrapins

The People's Dispensary for Sick Animals has produced a new guide to keeping Tortoises and terrapins with a careful list of do's and don'ts. It's a useful guide, even if the set-up illustrated is somewhat out of date. However the text does mention the possible use of a filter (which we would recommend).

You can also get a "Healthy Tortoise" badge for 50p and an SAE from the **PR Dept., PDSA Head Office, Whitechapel Way, Priorslee, Telford TF2 9PQ. Tel: 0952 290999.**

AQUACHAMP '92

The AQUACHAMP fishkeeping club quiz, is sponsored by **'Aquarian'** and ourselves. Your club can hold a quiz evening with the prizes and questions supplied by 'Aquarian'.

When you return your top scorer's marks to 'Aquarian' you give them a chance of a free weekend for themselves and a partner at the Weston Super Mare based **Supreme Festival of Fishkeeping** on **November 7 & 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 should be receiving an invitation to enter. If you're a club secretary and if you haven't receive your invitation write to **Aquachamp Contest, PO Box 67, Elland, 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.

FACTFILE

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

Name: Paul Donovan
Home town: Carterton
Occupation: Survival instructor
Hobbies (apart from fishkeeping)? Outdoor pursuits, photography, watching motor sport.
Years of fishkeeping experience? 14 years.
Favourite type of fishkeeping? Tropicals
Best book on fishkeeping? Aquarium Fish of the World by Ivan Petrovicky
Favourite species? Anything big, unusual, and poisonous
Least favourite species and why? Don't have one
How many tanks do you own? Not as many as I'd like
What was the first tankfish you ever had? A very large red bellied Piranha
What was the first fish you ever bred? Guppies - but then doesn't everyone?
Worst mistake in fishkeeping? Dropping a gallon of emulsion paint in an 800 gallon lungfish tank, then having to completely strip and re-do the tank out late one night. The fish survived by the way...
What's the most you've ever paid for a fish? £150 for a Nurse Shark
What do you think is the most important current issue in fishkeeping? Promoting the hobby as being environmentally friendly i.e. contributing to the hobby through captive breeding - Arowana being a typical example
Biggest fishkeeping gripe: The unjust reputation some fish have - particularly in the mass media
Are there any fish you wouldn't keep - and why? So called man-made fish - dye injected Glassfish being a typical example
Which fishkeeper do you most admire - and why? Heiko Bleher - he's done things I wish I could find the time to do.
Favourite fishkeeping myth? That it's expensive; it's as expensive as you want to make it.
Biggest fishkeeping ambition? To discover a new species and have it named after me.
If you were reborn as a fish, which fish would you be? A Great White Shark - King of all it surveys
How would you like to be remembered in fishkeeping? As the big fish's friend.

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ch....Newswatch....Newswat

● **Fishkeeping was once again nonsensed by the tabloid press as nearly every paper found the story of fish bites cat irresistible. For some reason the nonsense of "monster Goldfish" was reiterated in most of the reports, though the fish, which is apparently owned by Christine Kirby of Sheffield is in fact a giant Gourami. Exactly how many "teeth" such a fish has to "sink into the mild mannered moggy" is doubtful, but we bet it gave the cat's foot a nasty suck....**

Are fishkeepers really so publicity hungry that they have to come up with quotations such as the Sun's reported comment from Christine "If we can't find a new home" (for the Gourami) "we'll just have to eat him."

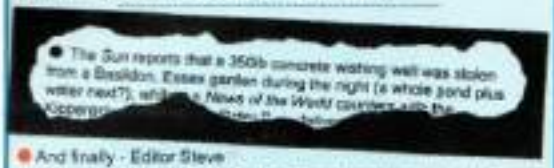
● *The Guardian* reports that 25 baby sharks (in this case Tope) were being cared for at the Sea Life Centre at Hastings after their mother was netted by a fisherman. The ten inch babes from the livebearing mother could reach around 6ft.

● **What would this column do without the *Funday Times*? The youngsters' section of the Sunday paper and its splendid correspondent the intelligent Cod just keep the fishy "facts" coming. The latest concerns Lucky a Koi who leapt from a tank onto the carpet in the absence of his owner Nellie Eves of Brighton. The fish was revived by being placed back into the water, and literally given an underwater lip-to-lip kiss of life....**

● *The Guardian* reports that acne sufferers are finding a solution of shark bile (squalroi) which greatly reduces grease production in the skin, has excellent effects. Two months of twice daily treatment actually cleared acne in some cases: stopping the treatment saw the problem return.

● **The same paper reports that Octopuses (Octopi?) are excellent teachers and learners. Italian researchers have shown that Octopuses do not just learn by experience, and by copying other Octopi, but are actively instructed by those that have already learnt the lesson.**

A group was taught to choose the right coloured plastic ball (one gave an electric shock, the other brought food) and individuals were then able to instruct the other Octopi, who indicated by rapid eye and head movements that they were paying close attention, before successfully completing the task.



● *The Sun* reports that a 350lb concrete washing well was stolen from a Basildon, Essex garden during the night (a whole pond plus water next?), while *News of the World* couriers with the [illegible]

● And finally - Editor Steve

Windsor is not widely known for his psychic powers, but it does seem some of his predictions come true. The cutting above comes from *PFK* in March of this year. But it couldn't actually happen could it? Oh yes it could! If the Birmingham freesheet the *Metro* -News is to be believed.

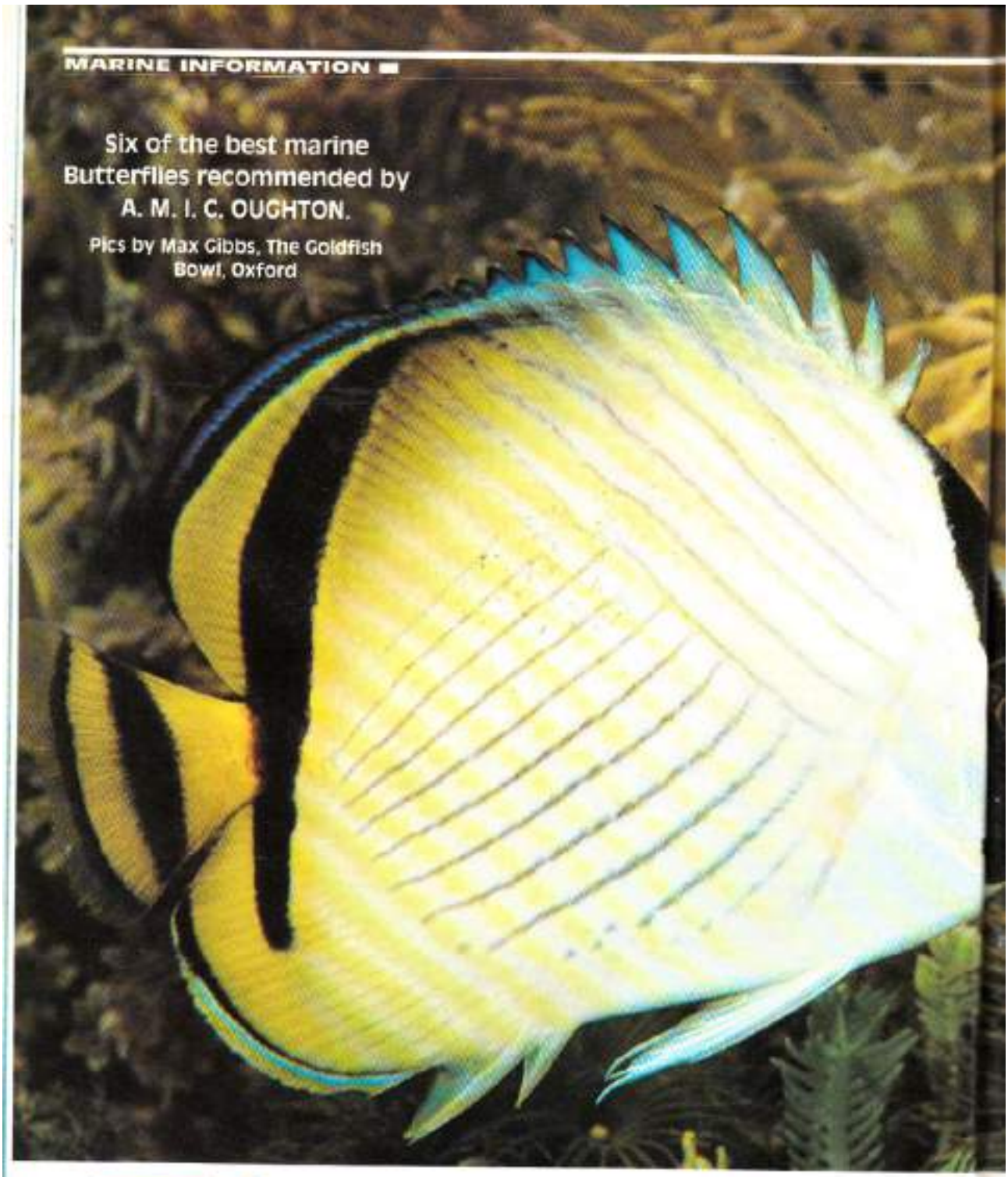
Kenneth Stanley from Telford couldn't believe his eyes when he saw a gaping hole where his pond used to be. Thieves had made off with his 3' deep 6' wide fibreglass pond - complete with fish and an estimated two tons of water...

● ***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: Dave Eastwood, Dave Knopp, and the many *Sun* and *Daily Record* readers who spotted the Gourami story.

Six of the best marine Butterflies recommended by A. M. I. C. OUGHTON.

Pics by Max Gibbs, The Goldfish Bowl, Oxford



Fluttering

by

Among the Butterflyfish, shaped like discs that have been squeezed from the sides, are some of the most beautiful species that swim in the sea.

Together with Angelfish, Butterflyfish are members of the Chaetodontid family. There are many different varieties and,

Sizes between the species vary from about three inches for the Pakistani Butterflyfish (*Chaetodon collaris*) to the twelve inches reached by the Lined Butterflyfish (*Chaetodon lineolatus*).

Unfortunately they are not all able to survive in an aquarium and some of the most colourful varieties are the most delicate. Food is also sometimes a problem and it may be necessary to feed them with live food, coral or coralline until they have acclimatized to tank life.

Butterfly fish have a spiny dorsal fin,which they are quite prepared to use in attack. However, they are not usually aggressive, except to members of their own kind, and even then they usually settle down without too much fuss.

They come in many different colours, and a broad range of patterns including stripes, spots, blotches and bars.

Vagabond Butterflyfish

The Vagabond Butterflyfish (*Chaetodon vagabundus*) is a very common aquarium fish although it is relatively rare in its very broad range - which stretches from the tropical Indo-Pacific, including Guam, to South Africa.

Colour: Its body is a creamy white colour with thin chevron-like brown stripes, and its orange fins and tail are edged in black. It also has a black eye stripe and one at the rear.

Size: Growing to about 8" in length, this Chaetodon should be kept in a large aquarium, although it is very hardy and, under ideal conditions, specimens have been known to live for several years.

Feeding: Like *C. ephippium* they should be fed on canned Norwegian brine shrimp and freeze-dried foods - in particular brine shrimp and Tubifex worms.

Black Blotched Butterflyfish

The Black-blotched Butterflyfish (*Chaetodon ephippium*) is another species that does particularly well in an aquarium, when properly acclimated.

A rare fish among fishkeepers though its range stretches from Australia through the Indo-Pacific and, although it is rare in Hawaiia it is common in the islands to the southwest.

Colour: Its body is predominantly white and has horizontal blue stripes towards the underside which is yellow. However it is easily identified by the large black blotch that covers a large proportion of its upper body and dorsal fin.

Size: Growing to about 12" in length,this Chaetodon should be kept in a large aquarium, certainly no smaller than twenty gallons.

Feeding: Canned Norwegian brine shrimp, freeze-dried brine shrimp and freeze-dried Tubifex worms.It also likes to pick food items from living coral.

Threadfin Butterflyfish

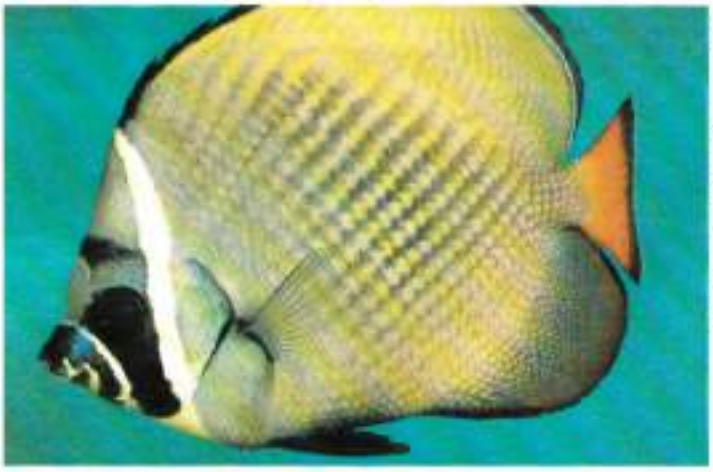
One of the most ideal representatives of the Chaetodontid family for the beginner's aquarium, and one that has been kept successfully all over the world, is the Threadfin Butterfly (*Chaetodon auriga*). One of the long-nosed Chaetodons, its range includes the Red Sea, Australia and Hawaii - making it one of the most widely distributed of all butterflyfish. Originally described: 1775

Colour: The body is predominantly yellow and white, with black markings reminiscent of an off-centre chevron. It also has a black eye stripe. Fins are yellow and rounded.

Size: About 6" in Hawaii and 9" in Australia

Feeding: When kept in an aquarium the species will thrive on brine shrimp even the freeze-dried variety. It also enjoys picking food items off living coral.

Tank care: They are sensitive to moves and may go off their food. However, after a few days they can normally be enticed to eat again, with either freeze-dried or live foods.



Main picture: Vagabond Butterflyfish, Chaetodon vagabundus.

Above: The Four-eyed Butterfly, Chaetodon capistratus.

Left: The Pakistani Butterfly, Chaetodon collare.

Above: The Bluestripe Butterflyfish, Chaetodon fremblii.
Below: Redfin Butterfly, Chaetodon trifasciatus.

Aquarium Conditions

There are certain things that need to be considered before you attempt to keep Butterflyfish.

The most obvious of these is the tank, and it is probably best to buy the largest one you can afford (a minimum of 30 gallons) and then make sure it is under-populated.

This gives the fish space in which to set up their own territories and a chance to survive if your system breaks down.

Although Butterflyfish are quite hardy when acclimatised, their conditions must be maintained with some degree of consistency. The water should be clear, well-oxygenated, kept at about 26.7°C and have a salinity of not less than 1.025.

Butterflyfish can normally be considered good members of an aquarium community, as they are not usually attacked by other fish. However, it should be noted that the smaller specimens die more quickly than the larger ones.

The best chance of acclimatization occurs with acquisitions of about 2" in length, which are small enough to adapt to new foods and large enough to survive in tank conditions.

OTHER SPECIES

There are a number of other butterflyfish suitable for the home aquarium.

The Foureyed Butterflyfish

(*Chaetodon capistratus*). **This butterfly fish comes from the Tropical Atlantic and the Caribbean. It is the most common butterflyfish from the West Indies and the least expensive.**
Size: About 6".
Feeding: They are a hardy species, but unless they can be switched from their natural diet onto freeze-dried Tubifex worms, Norwegian brine shrimp or live worms, between eight to ten weeks, they almost always die.

Bluestripe Butterflyfish

(*Chaetodon fremblii*). **Although it's very common in the shallow waters that surround the Hawaiian Islands, this butterfly has not been reported from other areas.**

Colour: It can be recognized by the narrow blue bars that run the entire length of its body.
Size: About 5"
Feeding: It adapts well to the aquarium and should be fed on canned Norwegian brine shrimp and freeze-dried foods especially brine shrimp and Tubifex worms.

Redfin Butterflyfish

(*Chaetodon trifasciatus*). **A popular aquarium fish, the range of the Redfin Butterflyfish stretches from the tropical Indo-Pacific to South Africa. A peaceful fish which likes to hide in coral to feel secure.**
Colour: Its body colouration changes from creamy white to creamy yellow and there are three horizontal blue lines running its entire length. It also has a black eye stripe and a false eye spot near the tail.
Size: To 6", although the best representatives for the aquarium are about 4". ■

Marine Answers

■ Good for beginners

Which marine fish would you recommend for the beginner?

Good fish for the beginner include Gobies, Blennies, Cardinals, Dwarf Wrasse, some Dwarf Angels, Damsels and some of the Grammas.

I shall be bringing out a very large book on all aspects of marines in the latter half of this year, so keep an eye out for it.

■ Lovers of green algae

My tank has been set up for five months now, and I do not seem to be able to achieve a good green algae growth. The tank contains one Powder Blue Surgeon, one French Angel, three common Clownfish, two Green Chromis, and four Three-striped Damselfish. I do a 10 per cent water change every week.
R. J. Dean.

I don't expect you can get a good growth of green algae with a Powder Blue Tang and a French Angel in the tank. Both love algae and probably browse it away before it can get a foothold. You are not doing anything wrong — it's just the price you pay for keeping these species of fish. But it's a price worth paying, in my view.

What killed the Cleaner Wrasse?

Fish losses in young tank

Q **I am a beginner with around a year's experience and I set up a 48" x 21" x 18" (water height) marine tank last December. I have built up a rock structure to the water height in the middle of the tank. This is to provide visibility to both sides of the tank from separate rooms. The dividing wall holding this tank only attracts sunlight from one side and for only a couple of hours a day, and only at the height of summer.**

The base filter media is coral gravel supported by Hagen undergravel interlocking plates with uplift tubes either side of the tank. The rock mixture is 80% tufa rock and 20 per cent living rock.

Undergravel filtration is powered by two Aquaclear 402 powerheads.

In addition there is an external Eheim 2217 filter using ceramic chips, activated carbon, nylon mesh, filter wool, and for good measure a half Polyfilter positioned under the filter wool. Salinity is around 1.021-23 and pH 8.3.

Water movement appears good and splitting the outlet from the Eheim filter into two separate spray bars (one either side of the tank) appears to keep the water free from any surface build-up.

After a month or so maturing the tank, I introduced some stock. The tank has never had more than seven or eight small species at any time. However, I have managed to lose three Cleaner Shrimps very quickly, four Green Chromis, a Clownfish, a Sea Apple, and just recently a Yellow Tang and a Cleaner Wrasse.

The water supply (analysis supplied) is classed as moderately soft. The tank is a pleasure to look at, even without the fish. As a result of my inexperience, am I missing the simplest attention to detail that could prevent this imbalance?
• Mike O'Hare, Cleveland.

A I am sorry to hear about your fish losses. Your tank set-up is fine, except for the lack of a protein skimmer, which is essential equipment. As you do not mention any test results or other details of water changes, it is very difficult to make an accurate prognosis.

However, yours is a very young tank and prone to rises in ammonia nitrite, which are killers for most marines. My advice is this:

- Forget any invertebrates for the time being.
- Do a 25 per cent water change.
- Make sure all tests are correct and there is no copper in the water.
- If all test results are favourable, introduce two Blue Damsels, Humbug, or Domino Damsels. Keep them alive and happy for one to two months.
- If everything is OK after two months, carry on stocking very slowly.

Although the test results from your water company are average, it may be worth investing in a tapwater filter, such as a Nitragon, de-ioniser or reverse osmosis unit. I wish you better success this time.

Coral Beauty or Flame Angel

Q **I am planning to set up a 48" x 15" x 12" marine tank and two wet/dry trickle filters, with hopefully a home-made filter, using syphons and valves. Would this work?**

I do not wish to use undergravel filtration — is this OK, and if so, what should I use for tank substrate - just sand?

I intend to stock: one anemone with two common Clownfish, one Yellow Tang, one Regal Tang, one Coral Beauty, one Flame Angel, and probably one Cleaner Shrimp. Is this too much, or can I include living rock?

Coral Beauties and Flame Angels are incompatible.

A It would be best to feed your proposed trickle filter from a properly drilled tank; syphons and valves just don't work.

In a tank without undergravels you have a choice: either sprinkle a thin layer of coral sand over the base, or leave it bare and let algae grow there, making it easier for cleaning.

As far as stock is concerned, it's either the Coral Beauty or the Flame Angel (both will fight). I would also forget the living rock unless you are prepared to cut down drastically on fish.

Renewing the airstone

Q Adjusting my protein skimmer is causing me problems. At most I get just enough to wet the bottom of the collection cup, and sometimes none for more than a week. If I increase the bubbles in the column they just seem to come out at the water inlet holes at the water surface. I use a two-gang adjustable valve but this never stays stable long enough for the skimmer to work efficiently. Any solutions?

My other problem is brown algae. My original lights produced horrendous dark brown slimy algae. I washed all the rocks, bought nitrate/phosphate resins and added extra lighting. This improved matters at first, but green algae was followed by the dreaded brown patches, which took over most of the tank.

I've now noticed red patches starting to appear, a sign of deteriorating water quality, I know. Lights are on 12 hours per day, I do a 20 per cent water change fortnightly and feed frozen food once a day. I feel I should wash all the rocks again, but I fear the problem will return.

Would one light on for about seven hours per day stop algal growth altogether?

• M. J. Header

A A common cause for the seemingly apparent inefficiency of protein skimmers is a failure to renew the wooden airstone at regular intervals. Once a month, using a good quality limewood diffuser, is about right. You should also have little trouble with quality gang valves such as those made by Aquarde.

Sometimes slime algae can be very difficult to shift, even though you do all the right things. The fact is, it is a very resilient form of life and will proliferate mostly in poor, but also in quite good water quality. Lighting does not really enter into it. The only thing you can do is carry on with your water changes and syphon off the algae at every opportunity.

The cup that doesn't run over.

High tech lighting

Q In your series on setting up a marine aquarium you did not include an actinic blue tube when adding inverts. Are they necessary or would you recommend a new high intensity tube in its place? At the moment I have an Aquastar, a Triton, a Powerglo and an Actinic.

• Stephen Jones, Chester.

A The new generation of high tech fluorescent tubes have a high proportion of actinic in-built, thereby making a separate actinic tube largely redundant, although it will do no harm. The lighting in your set-up sounds fine.

Moorish idols – subject to a voluntary ban.

No more Idols

Q I would like to add a Moorish Idol to my tank, which is 48" x 12" x 18" and contains a Bicolour Angel and a Cowfish. Any advice?

• Stephen Jones, Chester.

A I would strongly advise against buying a Moorish Idol. Most fare very badly in captivity and are voluntarily banned from being brought into the country by most of the larger importers.

Stocking is over the Moon

Q I introduced a Moon Angel to my 6' x 2' x 48" tank and within days my Queen Angel stopped feeding.

After about three weeks it was noticeable that it had a problem with its mouth. I thought it must have knocked itself so I treated with Curanin. After treatment I removed the copper and treated with Myxazin, but I still lost the fish about three months after it first stopped feeding. Its mouth had almost rotted away.

Just before the Queen died all my fish had stopped feeding. I lost an Emperor, a Pearl Scale and a Pakistani, and none of these had any marks on them. I have now treated with Marine Cure and have increased the temperature to 80°F.

The only three fish I am left with are a Majestic Witch, which also has a white mark around the mouth, a Black Wedge, which is not feeding, and the Moon Angel, that is still in good health.

If these fish die will I have to strip the tank down before re-stocking?

• James Whitehouse, Walsall.

A This sounds to me like a classic case of the "straw that broke the camel's back" syndrome. In other words, you had already reached your stocking limit and by introducing the Purple Moon Angel your tank became overstocked. Did you check for ammonia and nitrite rises? I would guess they went through the roof, causing stress on all the fish and subsequent disease.

The only way to prevent this sort of thing happening is to estimate maximum stocking levels and always keep well below it.

You will not have to strip the tank down but wait until the remaining fish are back to 100 per cent health and then begin re-stocking very slowly. Every time a new fish is introduced test for ammonia and nitrites for several days afterwards.

NICK DAKIN is your expert on the saltwater scene

You must include a stamped, addressed envelope and attach the Marine Answers coupon, below, when you write in with your query or your tip to:
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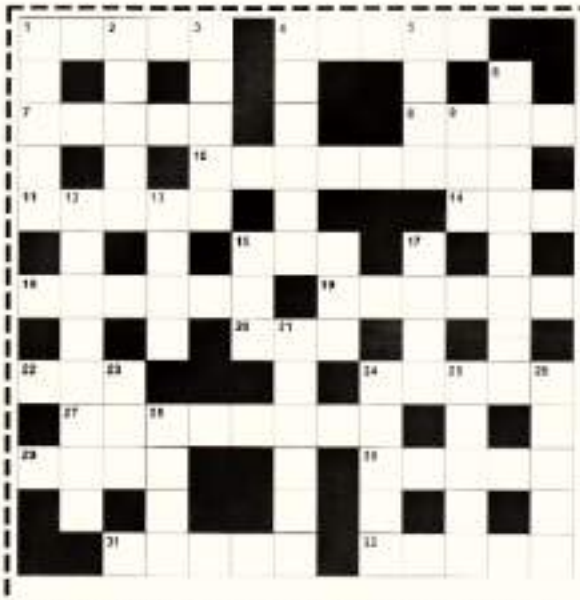
MARINE ANSWERS

Nick Dakin



GOLD LINE FEEDS

This month we begin a prize crossword competition, sponsored every month by Gold Line Feeds the makers of Phoenix 2000 fish food.

This month's prize is £100 worth of Phoenix 200 Fish Food to the first correct entry.

Cut out the completed crossword, add your name and address and send it to Gold Line Crossword Contest, Practical Fishkeeping, Bretton Court, Bretton, Peterborough PE3 8DZ to reach us by first post on Monday July 13, 1992.

Across

1. Popular aquarium fish (5)
4. Crustaceans (5)
7. Follows day (5)
8. Fish that can live out of water (4)
10. Freshwater lobster (8)
11. Right hand, initially takes mountain in, man's name (5)
14. Change one for a time (3)
15. Enquire (3)
18. Reductive crab (8)
19. Dull of perception (8)
20. Old Testament prophet (3)
22. Canine fish (3)
24. From Eire (5)
27. Unmolecular shellfish (8)
29. Flooded plant (4)
30. Group of fish (5)
31. Water places for fish (5)
32. Follow (5)

Down

1. Ocean going vessel for pond (5)
2. Heavenly messenger fish (5)
3. Emerge from eggs (5)
4. Substances made by sea polyps (6)
5. Sunshine ale (4)
6. Where people live (2,4)
9. Empty (3)
12. Flower-like sea animals (8)
13. Light shoe, for fish tank maybe (4)
16. Consumed (3)
16. Popular pond fish (3)
17. Vermin turn for heavenly body (6)
21. Garden shrubs (6)
23. Little Devils leaves garden for fish (3)
24. Give out (5)
25. Don't put all these in the fire (5)
26. Cut in two equally (5)
28. Unfasten (4)

Name .....

Address .....

.....

.....

Glassfish need a better press

Over the past two years, I have noticed the increasing sale of Painted Indian Glassfish, Painted Glassfish, and Painted Angelfish, all sold at high prices to unsuspecting fishkeepers who know no better. The colour is injected into these fish, a practise of which I think is cruel and deplorable. In my opinion and I think that of all true fishkeepers, this is unnecessary as there are numerous brightly-coloured fish without a practise that should be banned.

It is time the import of these fish was banned or retail outlets prosecuted for selling them. I have written to one or two retail outlets complaining about them selling these fish, also spoken to a couple of managers but they are still selling these fish. It is generally aquatic outlets at garden centres that are the culprits. I suspect all they are interested in is the money.

• **Larry Lainton, Stafford**

■ I am writing as I disagree with various comments made in an article entitled *A Pair of Glasses...* by Linda Lewis, as I feel that it give Indian Glassfish a very negative press. As a fan of the species, I would like to redress that balance.

I have a 3' community tank in which I keep a pair of Silver Dollars, a Red-tailed Black Shark, two sucking loaches, a Cookie loach, Neon and Cardinal Tetras, Diamond Tetras, guppies and three Indian Glassfish.

I have had my glassfish about 18 months, and have never any trouble in getting them to take dried food as opposed to live. Admittedly they enjoy live daphnia, as do all my fish, but they will eat flake food as well as floating pellets, and freeze dried tubifex worms.

I used to have breeding pair of Sailfin Mollies, and on the two occasions that fry were produced, I had no real problem from the Glassfish trying to eat them, in fact the Diamond Tetras were more troublesome!

Like Ms Lewis, unfortunately I have also had one of my glassfish infected with whitespot. I confined it to a hospital tank for two weeks and treated it with Aquarium Whitespot Remedy. The whitespot was eradicated, and the fish has never been sick since.

There has been one very disturbing factor in keeping this particular type of fish, and that has been in discovering the incredible cruelty that is sometimes used in order to increase the sales of them. When I purchased mine, two had vivid purple outlines around their transparent bodies, and the third vivid pink. This obviously makes them stunning to look at, and was the main reason I bought them.

I have since discovered that this colour is not produced naturally, but by injecting the fish with dyes. This colouring does fade in time, if the fish survive the shock of the treatment. Many of course die, but those who survive eventually lose most of the colour and are left speckled, rather than with the definite lines of colour you will find in shop tanks.

I would ask that all caring readers of *PFK* ensure that they do not buy these "dyed" fish and encourage this abominable practice. Perhaps if colouring the fish does not sell them, this cruelty will stop.

I am just lucky that my fish did survive and have flourished to give me so much pleasure. I would thoroughly recommend "Naturally" coloured Indian Glassfish as a fascinating species for any hobbyist to enjoy, and stress that the pure transparency is beautiful in its own right.

• **Helen Carless, Worcester Park**

Ed's comment: **Regular readers may remember my attack on the practice of dyeing Glassfish in an editorial last year calling for a complete ban.**

It's really down to the trade not to order them. (Though my local shop which would never stock such fish deliberately, had one accidental import hiding among some Red Eye Tetras last week. In a sense Mr Lainton has been lucky to find the fish called "Painted" anything. Euphemisms such as "Disco Fish" often con the customer into buying the fluorescent horrors.

Miss Carless has been lucky, too, with her Glassfish. While mass-bred imports often lose the more difficult traits of the natural fish, she has mixed species that prefer hard water with those that prefer acid. She really should have treated the whole tank for white spot, not isolated her fish (see this month's article on Koi diseases), and was lucky not to get a recurrence. Dyed Glassfish have been proven to be susceptible to Lymphocystis and the white marks may not in fact have been white spot.

Spawning SHANNIES

RAY THOMAS caught some Shannies on the local beach and found himself with an unusual breeding project.

Having kept tropical marines for a number of years, I was inspired by an article in an old fish keeping magazine, to keep native marines.

I set-up a four foot tank as per a tropical marine (but minus a heater of course). The tank was then matured using Seamature.

Armed with buckets, nets and battery air pumps, I set off with two willing helpers aged nine and eleven to the seaside. We returned with various shell fish, Beadlet Anemones and a few Shannies (a common rock pool fish).

Such was the family interest in the native tank that the tropical marine aquarium was dismantled and set up as another native environment.

Both tanks now live in our garage, since it is cooler. One tank contains six Shannies and a few anemones.

The second tank contains small Grey Mullet, Sand Smelts, two juvenile Wrasse, a Hermit Crab and a number of limpets and topshells. When the fish become too large for the tank they will be returned to the sea.

Filtration in both tanks is undergravel, driven by powerheads and both contain protein skimmers. Water changes are five gallons per month in each tank.

Spawning

During December/January the largest Shanny began excavating a cave underneath a rock until a sizeable cavern had been constructed.

The weather then turned very cold, so cold in fact, that I installed a heater to warm the water up.

Soon after this the same Shanny became a dark greeny brown in colour and I noticed rows of eggs on the underside of a rock in his cave. He became very aggressive to any other fish that came near his cave entrance.

On January 10th this year, I went as usual to turn on the aquarium lights when I noticed a female shanny - now a light beige colour with a very bright green patch on the top of her head- inside the male's cave, laying eggs on the underside of a flat rock, next to the existing eggs.

I observed that the female would lay a row of eggs, then the male would fertilise them. This continued until the female had finished and she left the cave. The male then took up guard, fanning the eggs constantly with his large pectorals and turning upside down to fan them as well.

I could find no literature (although some academic papers exist) on the spawning habits of the Shanny - whether the male would exercise paternal care after hatching? How long would the eggs take to hatch? Time would tell.

It has been, I estimate, five weeks since the first spawning. There have been three other spawnings since - I think the male is going to be busy for some time yet!

In the meantime, I have set up a three foot tank with a mature filter, coral gravel and rockwork ready for the fry.

At this point in time, I can see eyes inside some of the eggs and definite movement.

A brine shrimp hatcher is now going and small mesh nets have been attached to the side of the main tank to receive the fry. I intend to keep the fry in a number of these nets for the first few weeks of their lives and feed them on newly hatched brine shrimp. For the moment, all I can do is wait.... ■

Left: Male Shanny on guard, partially out of his cave

Above: Female just after spawning.

CHECKLIST

Aquarium maintenance is monthly water changes, regular testing of nitrite, pH, nitrate and of course, regular emptying of the protein skimmer waste cup.

WATER PARAMETERS

SG - at 55°F 1.024
pH - 8.3
Nitrate N - 20 ppm (using Sea Test)
Nitrite - 0
Ammonia - 0

Food - The Shannies live on a diet of frozen fine mussel, mysis shrimp, brine shrimp, gamma fish, clam and bloodworm.

Everything you want

KOI

ALEXANDER ARROWSMITH continues our in-depth Koi series by looking at the many diseases which may affect Koi.

Pick up any book on coldwater fish diseases, and it will immediately become apparent, that Koi are potential hosts to a veritable army of bacterial, viral and parasitic low-life.

The paranoid (and quite understandable) reaction is to wonder how any pond fish can survive these threats to health. Hypochondria is actually the commonest killer of the lot, when transferred from the human condition to one's pets.

And just as the born worrier hurries to the medical dictionary to look up a real or imagined ailment, then medicates the common cold as though it were a terminal condition, so there are Koi-keepers whose ponds are a permanently dilute solution of anti-parasitic/antibacterial preparations... just in case.

There are two schools of thought about pond treatments. The 'proactive' fishkeeper will medicate with malachite green and formalin, every spring and autumn, to bring down populations of protozoan parasites, and he does this irrespective of whether or not the fish are showing signs of discomfort.

A time to spot problems early - flashing. (P.C. Wigens)

Above: Ulcers - probably bacterial, on a Koi. (P Trevett)
Right: Tapeworm killed these fish. (B. Brewster)

The 'reactive' response is to medicate only when observation confirms something to be amiss - and there are dangers in both approaches.

In dosing as a prophylactic measure, the pondkeeper runs the risk of using the wrong remedy, at the wrong dosage, and interfering with the filter bacteria (which, in spring at least, require a boost, not a setback).

He may also fall prey to complacency in that, having added his bottle of Preparation W, he then fails to notice ailment Z which requires a quite different treatment.

Likewise, the reactive home medic may panic at the first sign of trouble, fail to diagnose the true cause of the problem and, in adding a so-called 'remedy', do more harm than good.

Far better than either of the above courses of action is to pay constant attention to the water quality of the pond: for, directly, or (by inducing stress), indirectly, poor or indifferent water is at the root of a good 90% per cent of fish health problems.

Filter failure

What causes this? Often, a filtration system that is not up to the job, or overstocking, or both. Let's say that a commercial filter claims (perfectly reasonably) to be able to support 10" of fish per 100 gallons treatment capacity.

That does not mean you should stock up fully on day one. Rather, you should aim for 20% (on the inches-per-gallon reckoning), increase that gradually, over six months, to 50 per cent, and then allow natural growth rate to make up the difference.

While a filter is maturing, it is essential to perform daily tests on ammonia and nitrite levels and, if these are too high, dilute the toxins with water changes.

It also pays to keep a check on pH which, in an ideal world, should be between 7.5 and 8.1.

Perform the latter test at the same time of the day, as there

...ted to know about...

can be a significant (but not usually harmful) fluctuation over a 24-hour period, particularly in a planted pool. This is caused by release of carbon dioxide, which gases off providing there is good water turbulence such as might be provided by a waterfall or venturi.

Stress - and early warning signs

In the extreme, bad water caused by inadequate filtration can kill fish directly. But what usually happens is that unacceptable (as opposed to lethal) levels of toxins stress the fish, leaving them abnormally vulnerable to attack by opportunistic organisms. These are present, at so-called 'background levels', in most ponds. In the case of protozoan parasites, and indeed gill and skin flukes in particular, almost every Koi carries around a resident population - it is only when the balance is tipped in favour of the invaders, rather than the host, that human intervention will be necessary.

Stress is caused not only by chemical imperfections, but by ponds that are too shallow to give the Koi a sense of security, or by excessive netting out and handling (paradoxically, by over-anxious owners giving them the once over).

It can also be brought on by incorrect or over-feeding, low oxygen levels or sudden temperature changes. As we have seen in earlier articles, these conditions can all be avoided, at pool construction stage and, subsequently, by exercising common sense.

The best assurance of continued good health in your Koi is to learn how to be a fish-watcher: not just a casual glance at feeding time, but detailed observation of their behaviour.

Invariably, the first sign of trouble is when a fish acts out of character - and I use the phrase quite intentionally because, as with humans, there are introvert and extrovert Koi.

Some will rise immediately food is offered, while others hang back, seemingly low down in the pecking order (although Koi are not actually territorial).

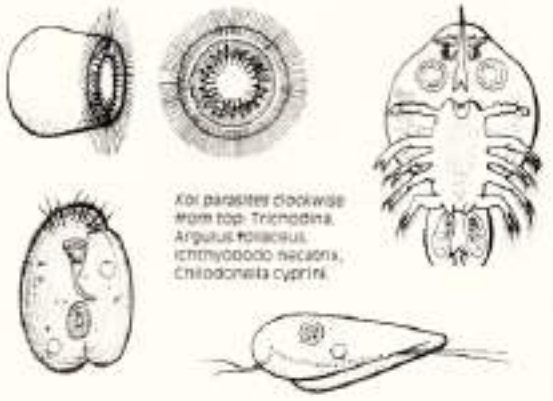
Leeches are a common early season problem.

It is when an outgoing fish ceases to swim with the shoal and skulks, perhaps with fins folded and respiring more rapidly than usual, that something is suspect.

Even so, don't immediately reach for the bottle of cure-all. First, check your water quality - it could be that one fish is indicating a problem that will soon be common to all, such as nitrite poisoning. Other signs of possible trouble are when Koi 'flick' or 'flash' against objects in the pond, exposing their lighter undersparts with a characteristic glint, or when they repeatedly leap clear of the water. One leap, or one flick, is nothing to worry about. But if the behaviour is repeated, and by the same fish, something is causing irritation and needs investigation.

KNOW THE ENEMY

Whether introduced by unquarantined fish, brought on by stress, or induced by other factors already mentioned, there are four main sources of Koi ailments:



Koi parasites clockwise from top: Trichodina, *Argulus foliaceus*, *Ichthyobodo necator*, *Chilodonella cyprini*.

PARASITES

These include many single-celled protozoans, the most common response to which is production of excess mucus by the Koi because of the irritation they cause. This greyish film can be mistaken for fungal infection.

■ Protozoans most likely to be encountered are *Ichthyobodo*, *Chilodonella* and *Trichodina*, all of which are at their most dangerous in early spring, as they are more temperature-tolerant than their hosts, and can soon overwhelm a Koi coming out of semi-dormancy.

■ Protozoans are effectively invisible to the naked eye, and flukes nearly so, but other external parasites are all too-readily seen. The Fish Louse (*Argulus*) can be up to 10mm across and looks like a tiny flatfish. Besides causing direct damage by sucking blood through its piercing mouthparts, it leaves the site of the wound vulnerable to secondary bacterial and fungal infection: it can also transmit viral diseases.

Argulus has no outside link in its life-cycle, and is therefore always introduced unknowingly by the pondkeeper - either as the parasitic adult, on new fish, or in egg form, on unsterilised pond plants collected from the wild. Prevention measures are therefore glaringly obvious!

Anchor worm (*Lernaea*) is similar, in that it is a crustacean parasite and usually introduced with new (especially recently imported) Koi. Reputable dealers will, in any case, medicate for- ▶

The home medicine chest

Every Koi keeper should have one of these, stored in a cool, dark place. As a minimum, it should contain the following:

■ **Malachite green and formalin.** Do not purchase the ingredients separately and mix them yourself, but buy the following strengths.

For general pond treatment, 0.1ppm (parts per million) formalin, 25ppm malachite green. For short-term baths, 1.0 ppm malachite green, 200 ppm formalin.

Both these preparations have a maximum shelf-life of six months. If you see any formalin crystals as a white precipitate, discard.

■ **Antiseptic wash.** Tamodine (by VetArk) is recommended, but remember that it should be used only on individual fish, never added to the pond.

■ **Antiseptic, waterproof barrier cream.** You can pay a fortune for this, but just as good is Orabase cream, from any chemist.

■ **Bactericide (for adding to the pond).** Many commercial brands are available - remember that buying the larger size container saves money.

■ **Cotton buds.** For administering and wiping away surplus ointment, antiseptic washes etc.

You will also require...

■ **Salt** - again buy a large bag and use as a pond additive at 1 ½oz per gallon as a stress-removing antiseptic, or 5oz per gallon as a short-term bath.

■ **Sterilised nets** (two), **large baby-bath, supply of deep heavy gauge plastic bags,** and **cotton towels** (to be used wetted with pond water when fish are removed for examination).

■ **Portable airpump and airline** (for bath treatments).

■ And, of course, **pond test kits** - Ammonia, nitrite, nitrate and pH.

this pest during quarantine, removing any dead adult females from the skin with tweezers and disinfecting the wounds before selling the fish.

Fish leeches (*Piscicola*) are a much more serious pest, since their egg sacs are resistant to most medication, and even to short periods out of water. Once in a pond, the adults will attach themselves to any fish, causing the same problems as *Argulus*, but on a grander scale. Individuals can be removed with tweezers, but to prevent re-infestation, the pond will have to be drained and limed.

Parasitic Copepods. Left: Ergasilus, right: Lernaea.

Gill 'maggots' (*Ergasilus*) are, in fact, crustaceans, though the parasitic adult females, which feed off the gill filaments, adopt a wormlike form.

They are featured in all the books but, like *Myxobolus*, are extremely rare in ornamental fish. I think of them as *Crimewatch* parasites: "Don't worry, it won't happen to you".

■ White Spot *Ichthyophthirius multifiliis* is less common in ponds than in aquaria, but once the parasite is encysted in the familiar pinhead 'ich' spot, the fish is headed for death unless treated.

Another parasitic protozoan is *Myxobolus*, this one causing fatal internal cysts and highly resistant to treatment. Fortunately, its occurence in ornamental fish is extremely rare.

■ The final large passengers are vermicular endoparasites - or gut-worms. Flatworms, tapeworms or threadworms make for lurid and colourful pictures in the horror sections of Koi manuals, but their life-cycle is invariably so complex that not all the vectors will be present in the pond. Therefore, only individual fish will carry them.

The danger is that the symptoms (usually progressive emaciation, clamped fins and lethargy) will be diagnosed as worm infestation when, in fact, they are something more sinister and contagious - such as bacterial Fish Tuberculosis.

FUNGUS

The spores of *Saprolegnia* are present in all bodies of water, as evidenced by infertile fish eggs or uneaten food pellets quickly developing that characteristic white 'fur coat'.

The real damage, when a fish shows these tufts, is taking place within its body tissues, which are being digested down to form a nutrient, enabling the branched filaments to spread.

Saprolegnia is not a primary disease, but almost invariably the result of the spores invading an already damaged site - a wound or abrasion (which, incidentally, is prone to bacterial invasion, too, unless promptly treated).

There is another fungus, *Branchiomyces*, which affects gill tissue, but unlike *Saprolegnia*, it is not endemic to ponds. As with so many disease and parasite problems, it can be disregarded providing new Koi introductions are properly quarantined.

BACTERIA

As with protozoan parasites, ponds naturally support a whole host of bacteria - some harmless, some beneficial (such as the filter bacteria *Nitrosomonas* and *Aeromonas*), still others are dangerous to fish - though invariably only when they are weakened by other factors.

The commonest source of trouble are *Aeromonas* and *Pseudomonas*, associated with

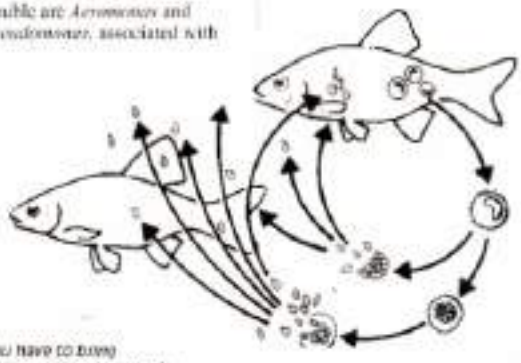
so-called 'Hole Disease', finrot and internal bleeding.

Another, *Flexibacter*, causes the so-called 'mouth fungus', although this condition can affect other parts of the fish's body and its fins. It is important to make the correct diagnosis, for fungicide treatments are unlikely to be of much use against bacteria, and vice-versa.

VIRUSES

Every season, there are scare reports of new viral problems coming in with ornamental fish. It is not hard to understand the panic as, on a human level, we are all by now aware of the damage these simple, and apparently untreatable, organisms can cause.

Many so-called 'viral' Koi problems are, however, nothing of the sort. The pondkeeper may



You have to buy whitespot to your pond - it needs a carrier (top right). The cysts leave the skin to lie on the bottom where they multiply by simple division - breaking up to infect more fish.

Trichodina parasites caused the swelling (arrowed) and the reddened patch on this Koi. Anaesthetised it was laid on a damp towel for treatment.

encounter just two – one fatal and notifiable (Spring Viraemia of carp, or SVC), the other harmless but unsightly (fish pox).

The latter manifests itself as smooth, waxy blobs on fins and skin, making the fish look as though it has been swimming under a dripping candle. It appears to be quite selective as to which fish it invades, some becoming covered in the mutated cells into which the virus has incorporated its own genetic material, others escaping.

Small fish are the main sufferers, and the virus may, even then, disappear spontaneously, to reappear when the Koi are stressed. Incorrect diagnosis, not the virus itself, can be the killer, since Fish Pox can be mistaken for bacterial, fungal or protozoan problems.

Beating the enemy

Vigilance is the best weapon, since early diagnosis and prompt treatment can make all the difference. Aside from the larger ectoparasites, you will need access to a microscope if you are to identify bacteria and protozoans.

■ **Microscopes.** Brunel makes an inexpensive range suitable for the pondkeeper. To take a swab, net the affected fish into a bowl, take a plastic coverglass and gently scrape off a small amount of mucus. Spread this across the surface of the slide with the other cover-glass, and view as soon as possible.

If you do not have a microscope of your own, prepare a slide as above and take it, without delay, to a veterinary consultant specialising in fish diseases (having made a prior appointment, since speed is of the essence). Bring along, too, a sample of your pond water for analysis.

■ **Call outs.** If the situation is critical, and numbers of prized fish are in jeopardy you might consider bringing such a specialist to the pond itself: most operate a system of a call-out charge, plus an hourly rate, plus the cost of any medication. Nobody pretends this is a cheap option, but the specialist alone will have access to injectable antibiotics, fish anaesthetics and other items of first aid not generally available.

■ **Or back to the dealer.** Another option, if you have bought your Koi from a reputable dealer, is to take ailing fish back to them, for examination. No dealer operates a guarantee on fish, but it is in everyone's interests (not least or just the goodwill factor) to find out what is wrong.

The affected fish should be double-bagged (with oxygen if possible, failing which, blow up the air-space with an airpump), and packed securely into a polystyrene box for what will, hopefully, be a short journey.

Do not forget to take along a separate sample of pond water – that in the fish bag will not be representative of your water quality.

Localised or general treatment?

Proprietary (and some home-based) remedies can be used in two ways – in a short-term bath, or added to the pond. In the latter case, the concentration is always much the weaker.

■ **Pond remedies** are invariably less stressful to fish, as they do not have to be netted out individually.

Avoid those containing methylene blue, which may halt the activity of filter bacteria; be sure to calculate the dosage correctly (for which you will need to know the exact volume of your pond, including filter capacity), and check that Orfe, Rudd and any Centrarchids like Sun bass will not be adversely affected.

Most treatments span a period of time, so check that you have sufficient medication for the whole course.

■ **Bath treatments** are most commonly used when just an individual fish is affected. Use a smooth, rounded container of known capacity; aerate the water while treatment is being carried out, and watch the fish constantly for signs of distress – if it keels over, return it immediately to the pond. ■

How to diagnose

Symptom: All fish showing sudden, simultaneous signs of distress.
Cause: Almost certainly down to poor water quality: check your filter and test for ammonia, nitrite and (if you have recently performed a significant water change) chlorine/chloramine from the mains.

Symptom: Larger fish, in particular, gasping at the surface.
Cause: Low oxygen levels – particularly after a humid summer night. Increase turbulence immediately (turn on a fountain/waterfall/venturi or, as a temporary measure, play a hose-jet on to the water).

Symptom: Constant flicking or flashing, not only immediately after feeding.
Cause: Irritation – but this is just as likely to be from something in the water as from flukes or protozoan parasites. Check water quality first, and only if that is impeccable, suspect parasitic problems.

Finally, remember: Many Koi problems are of a secondary nature. Bacterial and fungal infections almost always occur at the site of an earlier wound. Work back in your mind to the possible source of any abrasion – could it be something with a rough edge in the pond, or are there ectoparasites (ie Argulus) breaking the skin?

As you build your experience over the years, you will develop almost a sixth sense and know when to medicate – and when to leave well alone.

Checklist - points to avoid

■ Do not use the parasite remedies Diptarex or Masoten – these were banned last year.
■ Do not mix remedies.
■ Do not exceed the stated dose in the belief that higher concentrations will be more effective.
■ If antibiotics are being used, see the whole course through, even if the fish appears to have recovered early.
■ If a fish has internal bacterial problems, then clearly it will need specialist treatment. An intra-muscular injection from a qualified person is always better than feeding medicated food because the dosage can be relied upon; because only the targeted fish receives the medication, and because there is evidence that antibiotics applied indiscriminately can build up resistant strains of bacteria.
■ Do not administer anaesthetic (ie MS222) unless you have first seen this done by a qualified person. Some fish are, in any case, unusually sensitive and may not come round, even after the recommended amount is used for the correct period.
■ Do not allow your Koi keeping to become alarmist. Consistently good water quality and a stress-free environment builds up the natural resistance of your fish, so they can shrug off minor ailments. But be aware of the likely course of events if trouble does occur – this can prevent wrong diagnosis.

In well-planted ponds there is a major difference between daytime and oxygen-starved nights.

Blanketweed collecting on the waterfall may cause water to seep away from the pond itself.

objects. The effects are more severe than oxygen depletion and may result in prolonged poor health in your fish.

Raised levels of nitrite in the water are a problem whenever they occur, but can be a particular menace during the warmer weather. Nitrite affects the fish by binding with the blood and preventing it carrying as much oxygen as normal.

If the water has low levels of oxygen due to the raised temperature and other factors already discussed, the effects of the nitrite may be greatly exaggerated.

Careful monitoring with a test kit will enable rapid detection of raised ammonia or nitrite levels. Levels significantly above 0mg per litre of water would indicate a poorly functioning filter, overcrowding, overfeeding or a recent introduction of fish. Such problems can be overcome immediately by undertaking a large (25-50%) water change to dilute the polluted water. At the same time remove any excess debris that has accumulated on the pond bottom. The use of an active filter media such as zeolite which will absorb the ammonia will also help.

Holidays

Many home pond owners are concerned about leaving their pond while they are away on holiday. In fact, those worries are unfounded and the pond will come to no harm while they are enjoying themselves.

In a planted pond the fish will find plenty of algae and insect larvae on which they can feed in order to survive. Even in a Koi pool, the Koi will find sufficient algae and other aquatic life to survive without any adverse effects. It is advisable however not to introduce any new fish in the weeks immediately before the holiday as any diseases introduced could cause severe problems if not controlled. Overfeeding just before departure is also not advisable as any uneaten food could pollute the water.

As a precaution, it is wise to ask a neighbour or friend to have a look at the pond occasionally to check there are no severe

problems (e.g. dead fish, pump not working).

This person could be asked to feed the fish, but unless they are a fishkeeper the amount to give at each feed should be measured into a polythene bag or envelope. Most non-fishkeepers add too much food to the pond resulting in polluted water and the loss of your fish.

Evaporation

The loss of pond water due to evaporation can be considerable, particularly if you have a waterfall or fountain. In fact, in extreme cases the water loss can be so great that it can be confused with a leak in pond.

If the pond level only drops during periods of hot weather it is safe to assume that evaporation is the cause. A continual drop in the pond level, despite the weather conditions, can be attributed to a leak, which will need finding and sealing.

Evaporation losses can be topped up with tapwater that has been dechlorinated with a good quality conditioner such as TetraPond AquaFin.

It is likely that most of the country will be influenced by hose pipe bans during this summer, therefore it will be necessary for most of us to use buckets. Regular topping up, for example, whenever the water level has dropped by half an inch, will make this task considerably easier. The thought of adding several hundreds of gallons of water by bucket will not appeal to anyone.

Fountains

Many garden ponds have ornamental fountains which are switched on hot days or when you are in the garden. In windy weather, water from the fountain can be blown out of the pond, resulting in debris from the surroundings washing back into the pond together with water loss from the pond. It is therefore advisable to switch off the fountain whenever the wind is particularly strong.

Fountains have an adverse effect on waterlily growth. Water lilies do not grow well if water is falling onto their leaves. If the water on the leaves evaporates in strong daylight, it can burn the leaves causing brown areas which rot, leaving holes and 'tatty leaves'. It is

A feeding mass of comet - contented summer koi

therefore advisable to place water lilies away from your fountain and waterfall, to minimise the amount of water falling onto the leaves.

Spawning

In the late spring and summer it is likely that the fish in most healthy ponds will spawn. This does not create any problems at all in the majority of ponds. It is, however, worthwhile keeping an eye on the parent fish after spawning is completed to check that they have not been damaged.

Grazes and torn fins will usually heal within a few days, but if there is any sign of infection by bacteria (which cause the wound to become inflamed) or fungus (resulting in cotton wool growths) treatment with a general external parasite remedy is recommended.

While the fish are spawning the females can be pushed into shallow water or even out of the pond. Obviously it is worth keeping watch over the pond during these times to ensure that the fish do not become stuck.

After a successful spawning, problems can develop due to your pond becoming overcrowded. Such problems generally occur in late summer as the fry grow, and can be identified by the fish gasping and the water becoming cloudy.

If such problems do occur it will be necessary to reduce the fish numbers, getting rid of the excess to friends or neighbours who have a pond, or, if you can make the necessary arrangements, to a local aquatic shop.

Perhaps the most common 'summer pond problem' is that of excessive algal growth. This subject was covered in my last article. However, if you did not read it and require further information, please write to me at **Tetra, Lambert Court, Eastleigh, Hants** or telephone the Tetra leaflet line on **0703 643339**.

Most of the summer pond problems are easily prevented providing you are aware of what causes the trouble, and how it can be overcome. ■

An ultra-violet unit will help to control green water

Practical Pond

NICK FLETCHER's pond forum tests a new filter, gives pumps a good clogging; and discusses a "different" Koi.

Variety is the spice of Koi

Variety within a variety can't be bad, and of all the Koi currently available, the prize for acceptable variation must go to the Goshiki (pronounced 'Gosh-key').

The Japanese say that these fish are five-coloured, the hues being red, white, black, dark and light blue.

The latter colour usually derives from Asagi lineage, an Asagi being one of the first varieties to emerge from the Magoi (black carp).

A bad Goshiki is a hotchpotch fish, whose colours look as though they have been mixed by a five-year-old and applied with a wet rag. But the Japanese have become obsessed, in recent years, with improving the strain, so that now a good Goshiki has all the virtues of a Kohaku, in terms of ordered blocks of colour, with the added bonus - shared by Koromo fish - of additional overlaying patterns.

White never used to be a predominant Goshiki colour, but now it is realised that a snow-white base admirably sets off the other shades.

I recently bought a fish sporting a white nose, with a black saddle-shaped marking separating the head from a body of sky blue, with Kohaku-like red patches overlaid with darker blue. No prize-winner, perhaps, but a very distinctive Koi.

As Goshiki are grouped in the catch all Kawarimono class at shows, the Koi buyer with limited funds has a good chance of rearing on a future champion, providing the fish has that certain something.

Yellow skin and bright red eyes – a Kigoi

In total contrast, I saw last week a Koi whose beauty relied on simplicity. If you like single-coloured fish and want something rare and precious, then the answer could be a lemon or rather, a Kigoi.

Such Koi have a bright yellow body, set off by white fins. Don't confuse them with the metallic Yamabuki Ogons, which look decidedly vulgar when you see the two varieties side by side.

The Kigoi I saw had the added attraction of red eyes (not essential, but certainly a plus point).

I was told that it became hand-tame almost immediately, and I wondered whether this had anything to do with those eyes. Albinos of any animal (even humans) have poor vision in strong light, so perhaps the Kigoi relies on the hand that feeds it because it is beaten to the foraging by normally-pigmented pondmates.

Hopping mad?

In answer to my office colleagues who saw me manhandling a hopper-shaped device into my car boot the other week: no, I was not setting up a home distillery, merely preparing to field-test a pond filter.

The principles of the **NBS**, brainchild of A1 Garden Aquaria's Peter Oakes, were outlined in last month's column, but little did I imagine that the device itself would be in my hands so soon afterwards, let alone up and running in time for this update.

The filter, as you may recall, is an external upflow model with three gate valves, no less (two to facilitate back-washing), and relies on the sintered glass medium, Siporax, for its astonishing claims to biological efficiency.

I am sure Peter will not take issue with me for saying, right now, that his filter is an ugly beast. In full above-ground mode (for which an angle-iron support stand is provided), it stands a mite over three feet tall. The stand measures 21 inches across, while the plastic "hopper" which carries entry pipework and holds the media is of a similar diameter.

Were my pond not part-raised (and itself no design award-winner, I must confess), then the NBS could have been installed as a semi in-ground filter.

As it is, it excites comment and, to coin an old tabloid favourite phrase, "Love it or hate it, you can't ignore it." Ugliness aside, the standard of workmanship is very good. All pipework is of the screw-fitting type and, providing you apply elbow grease, the unions are drip-free. The gate valves are firm and positive and the stand (once encouraged into tight assembly with a rubber mallet) gives the filter a stable support.

I would have preferred black pipework to white, for its unobtrusiveness but, more to the point, the hopper itself could have been made of a darker and heavier-gauge material.

My prototype reminds me too much of a kingsize white plastic bucket, and I suspect that a combination of this summer's largely ozone layer-free sun and a winter frost or two might render it brittle.

The NBS should be filled (bottom layer first) with coarse and fine gravel which cover the slotted water inlet pipe.

Baskets of Siporax in the NBS.

I topped these materials off with Hortag granules, on top of which the Siporax was placed in slatted planting baskets – for no other reason than this makes it instantly recoverable, should it need washing.

A small but obvious point – ensure the baskets have slatted bottoms, as well as sides, or else the water upflow will not percolate the material.

I opted to connect pump to filter with flexible hose. You can use more bends and elbows to make a rigid pipe union, of course, but this adds still further to the 'Windscale' appearance of the thing. For flexible/rigid pipe unions, you will need a hosetail (about £1.50). These incorporate a stepped-down length of pipe, one diameter of which is sure to be a tight push-fit into your hose. The smaller diameters should then be sawn off, to minimise flow restriction.

Make sure you make the saw cut in the right place! I have known one idiot (nameless) who did not heed this simple advice and made two visits to a water garden centre in ten minutes, earning the unfair accolade of 'groupie'.

As to my choice of hardware, I cheated a bit, for my Koi pond already contained an admirable in-pool Oase filter, powered by a seemingly indestructible stainless steel-bodied pump by the same manufacturer. ▶

Unclogable pumps?

What's your most time-consuming job as a Koi-keeper in summer? Chances are, not filter-cleaning, but attention to your pump strainer. Why? Because most submersible pumps are not designed to cope with solids. This sounds – and indeed is – strange. What's one of the main reasons for having swirl chambers, brushes or settlement compartments, let alone foam sheets, in your filter, if not to trap solids?

And what's the point of spending money on them if, when it comes to the crunch, you have to act as a 'human filter' on daily call, lugging foam cartridges or whatever from your pump intake, dripping the sludge across the carpet and more than likely blocking the sink?

It's not a job that can be delayed, either, for once foam starts to block, then it's minutes, rather than hours before your flow-rate drops dramatically, soon ceasing altogether. In an ideal world, your pump should be able to cope happily with normal pond detritus, without the need for a strainer of any kind, and any de-sludging should be at the filter, where back-washing makes it less of a chore.

But...this isn't an ideal world. Pumps have to cope with the unexpected. Dead leaves, sweet wrappers, bits of decaying waterplant stem, twigs blown off surrounding trees – all will defeat your average impeller.

The 'Best' pump is a 'top-of-the-market' clog beater at £175.

Even the excellent Amphibious range of submersibles is quickly bargained by blanketweed, and who can claim to be free of that? There are also the fish to consider. Not so much the adults, as fry. With an unprotected pump, they are soon whizzed heavenwards to be discovered later, if they are lucky little fish, as unexpected guests in your filter. (I know someone who grew one such refugee into a prizewinning Koi...)

If you have a planted pool, and/or the likelihood of fry, then some form of strainer is (regrettably) essential. It should be of the coarsest foam possible, so that suspended solids pass through it – in other words, a blanketweed trap.

The finer the foam, or the smaller the cartridge, the more often it will need cleaning. It helps if the pump and cartridge are kept clear of the pond bottom, where larger debris accumulates. The Amphimaid will, as the name suggests, fit the Amphibious range of pumps, while you can also buy pre-filters for the upright type of submersible such as the Dab Nova.

For unplanted Koi pools requiring a turnover of the entire volume once every two hours or so, Cyprio has introduced a range of pumps that can cope quite happily with solids of up to 10mm diameter.

To do this, the internal passageways are larger than you will find in conventional pumps, and electrical consumption is higher – but, on the plus side, the Lowara 'Doc' series is capable of delivering the higher pressures required for spraybar or venturi aeration. Five models, manual or automatic, all feature stainless steel bodies and hardened stainless shaft, plus bottom bearing protection: the gallonage rating is from 1,350 gph at two-metre head to 3,000 gph at 3-metres, and prices start at £120.

Higher up-market is the 'Best' pump, again capable of dealing with large solids, but this time with ceramic, replaceable shaft. Prices start at £175 for the 2,300 gph model.

A base-plate adaptor is available for all the above-mentioned pumps and so – if you need it – is a coarse foam pre-filter.

Waterlilies for the Connoiss

HARRY HOOPER talks about special but rarer varieties o

Most dedicated gardeners normally have a secret passion for a particular variety of plant. It's not only the chrysanthemum or dahlia enthusiasts who search for the best types of plants for the show bench. Nowadays the keen water gardener has become far more selective when purchasing waterlilies, either trying to obtain some of the rarer varieties or experimenting with some of the more recent introductions of *nymphaea*, especially some of the outstanding new varieties that have been produced in America.

The growing interest in water gardening has obviously generated the publication of many books and other forms of literature on this subject. Oddly, the majority of books available about the cultivation of waterlilies tend to display pictures and descriptions of the rarer and more unusual varieties. These are not readily available from many retail outlets but can usually be ordered from specialist water garden nurseries.

Reliable Old Favourites

Although there has been a vast selection of beautiful waterlilies in cultivation for many years, some of the rarer varieties are slower in producing the development of "eyes" on the rootstock that eventually provide the cuttings to propagate new plants. This is why the more desirable lilies are always more expensive.

Red varieties: Well-worth growing, is *N.* **William Falconer** an ideal lily for the average size pond producing intense red flowers amidst olive green foliage.

N. laydekeri fulgens has deep crimson flowers which are really eye-catching.

Above: N. Texas Dawn.

Left: N. Rose Morn.

For something a little different *N. luciae* is an unusual red variety of outstanding beauty. The foliage is light green and splashed with purple markings.

Pink varieties: These generally offer a wide range of many shades of colour. The beautiful cultivar *N. amabilis* produces salmon pink star-shaped blooms with deep green foliage.

For the larger pond *N.* **Gloire du Temple-sur-Lot** is a really outstanding variety. The blooms are a soft pink, and fully double, with over a hundred petals to each flower. It does need plenty of room in which to grow properly.

Another good choice of pink would be *N.* **Madame Wilfon Gonnere** an almost double-cupped shape bloom suitable for the average garden pond.

White varieties: Here there is a wide choice, but the most spectacular and sought-after variety of the whites is without any doubt *N. gonnere* sometimes referred to as "snowball". This variety of lily produces the most beautiful fully-double white blooms - possibly the best white lily ever cultivated.

New Varieties of Waterlilies

Although the proven varieties of waterlilies have always been popular, some of the recent introductions of *nymphaea* will produce blooms of more intense colour and fragrance. The water lily is obviously the centrepiece of any water garden, and providing the pond is in a sunny position and the plants are cared for properly, there is no reason why any waterlily will not perform well.

Yellow varieties: Recent introductions from America such as *N.* **Charlene Strawn** and *N.* **Texas Dawn** are proving to be promising and therefore becoming popular.

Red varieties: *N.* Perry's **Black Opal** or *N.* Perry's **Red Star** and *N.* **Irene Heritage** are

seur

utsome of the
waterlily

Main picture:
N. Charlene Strawn.

Above: N. Hal Miller.

real beauties among the reds and should be available soon.

Pink varieties: *N.* **Dallas** currently being produced in America and a newcomer *N.* **Yuh Ling** are both lovely shades of pink and will eventually become very popular.

N. **American Star** has been available for a few years here in the UK.

N. **Pink Sensation** is one of the finest pinks that has ever been cultivated.

A lily really worth searching for is *N.* **Rosy Morn** very similar to *N. amabalis* but deeper in colour.

White varieties: An unusual variety is *N.* **Hal Miller,** a vigorous plant of creamy white or *N.* **Virginia** a variety also suitable for a larger pond. ■

■ With the growing interest in waterlilies enthusiasts all over the world are producing new varieties every year. Many more varieties will be on show during the 1992 International Water Lily Society Symposium being held in Texas. There is even a rumour that a hardy blue variety will be unveiled.

Left: N. Celebration

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

All pre-filter media listed here will support some bacterial filtration. But the main function of most of these items is to remove the large detritus that most pondkeepers feel is an inevitable result of keeping large goldfish, orfe and Koi.

Pre-pump filters and strainers

The innocent pre-pump strainer or filter - seemingly just a block of foam that keeps grit from jamming the pump - can be quite controversial. Despite the rapidity with which all pump strainers seem to block, there's no doubt that a degree of filtration will take place in the foam as the mulm gathers. This will possibly suffice to keep the tiniest of ponds clear and consequently, some small foam blocks find their way out of the less-reputable outlets as fully fledged filters. But unlike their aquarium counterparts, they are far from man enough for most jobs.

We have examples from **Trident** and **Blagdon.** Blagdon do claim that the foam can operate as an effective filter, and certainly theirs is far more substantial than most of the equivalent models. It will require regular maintenance.

To solve the clogging problem, Peter Oakes of **A1 Garden Aquaria** has made the **GSM** which uses Siporax and also acts as a main biological filter. In discussing Siporax as a biological media we'll see why Peter claims that this works.

Brushes

Black Knight brushes come in a large range of sizes and lengths, with full instructions on filter design, not just use. By arranging them in dense rows with a settlement area below them, its possible to remove and collect much of the mulm that would otherwise build-up and clog the main media. Cyprio are also aware of this and market a similar brush (only the colours and the fact that Black Knight has "hooks" where Cyprio has loops, differ) but add to the potential for biological filtration with their denser crimped bristle Bio-brushes.

Contacts:

Siporax - Schott UK, Drummond Road, Astonfield Industrial Estate, Stafford ST16 3EL Tel: 0785 223166 or Peter Oakes, A1 Garden Aquaria Ltd., Garden Centre, Radway Green, Nr. Crewe, Cheshire Tel: 0270 882733

Crystal Clear - Bob Tomlinson, Regan St Works, Halliwell, Bolton, Lancs BL1 8AR Tel: 0204 842801

Blagdon Water Garden Products plc - Unit 6 & 7 Commerce Way, Wallow Ind. Est., Highbridge, Somerset TA9 4AG Tel: 0278 781556

Speedy Brush Co - Mercury Works, Kingswood Ave., Swanley, Kent Tel: 0322 662480

Trident - Carlton Rd., Foleshill, Coventry, CV6B 7FL Tel: 0203 638802

Cyprio Ltd. - Eastgate Mews, 131/133 Eastgate, Deeping St James, Peterborough PE6 8RB Tel: 0778 344502

Sigma - Borth Cottage, Bwlchtocyn, Pwllheli, Gwynedd, LL53 7E Tel: 075 881 2820

Spirex Aquatech - Cypriculture, 8 Truman's Heath Lane, Hollywood, Birmingham. Tel: 0527 821601

Lotus Water Garden Products Ltd. - Junction St., Burnley, Lancs BB12 0NA Tel: 0282 20771

Crystal-Clear are possibly the only manufacturer offering **pond filter pads,** in sizes large enough for most pond filters. This dense material would more-commonly be seen in aquarium filtration, and may require a pre-filter brush set-up to avoid frequent clogging. They are a lot cheaper than most filter foams, and the thinner filter mat is suggested as a "disposable" pre-filter. The same company offers a carbon-impregnated mat if you're troubled about your tap water or anxious to remove a medication from the pond.

Foam

Sheet foam is often laid over the main biological media to act as a primary or secondary pre-filter. Examples shown come from **Trident, Cyprio** (and from the **Lotus Bio 500**). A lot of biological action will also take place in it, and some media manufacturers such as **Cyprio put** a lot of faith in foam as a main biological media.

Lotus

Well-known water gardening company **Lotus** do not sell media separately but they do offer the Bio 500 filter which is loaded with a foam pre-filter and Flocor type media.

Turbulator

Aeration: Many experts now recommend aerating your pond filter to increase the activities of aerobic (oxygen using) bacteria. Crystal Clear recommend their very large Turbulator aerators for this use (up to 18" long) and they come "double ended" so that a series of units can be combined on one airline in different filter sections. They should last a long time, and can be stripped down and boiled to clean them. Prices from £2.17 to £10.43 (2" to 18").

Final polish

Crystal clear's matting and many of the foams can also be used to finally polish the water before it returns to the pond.

The engine room

Main biological filtration is entrusted to media with plenty of surface area, to encourage the growth of aerobic bacteria.

Plastic media

There are many examples of plastic media, but we received two for review which are very representative. These were **Cypripack** plastic media which Cyprio offer as a cheaper alternative to foam (which they say is 5 to 8 times better than most plastic media). Cypripack is nevertheless used in the treatment of domestic sewage and on large fishfarms.

Trident sell the popular rippled "drainpipe"-like material **Flocor** which appears to be mainly aimed at free movement of water over its surface.

Granules

Simple gravel and other aggregates have been used successfully in filters. **Blagdon** supply **Bio-Filter Medium** high-grade semi porous light clay granules with a large surface area. It's recommended that these are used in conjunction with brushes to keep them from clogging. A degree of anaerobic filtration should take place in this media.

Foam

Cyprio now offer an unusual layered foam **Cyprinat Biomedia.** Profiled foam is layered and permanently welded together to form a very expensive block of media which Cyprio claim is four to five times more effective at filtration than Flocor and their own Cypripack.

Also illustrated in our pictures is one of the long green foam cartridge filter sponges which Cyprio offer for main filtration. These are oblong with a circular hole for a feed pipe. Cyprio point out that water should always trickle **down** through foam not up, as otherwise it will float up. Cyprio also offer full details of how much foam you need for the average pond.

Tape

Springflo is an embossed polypropylene tape, similar to parcel tape, but coated with calcium carbonate which it is claimed aids the development of bacteria. It's sold by surface area on a spool. The tape leaps off the inside of the spool and runs into springy coils. These can be made tighter by running the material over a hard edge to squeeze the coils. Mainly suitable for main filtration the manufacturers claim that by stuffing it more tightly into your filter you can use it for pre-filtration too.

Sintered glass

Siporax is the name synonymous with this media at present. The makers **Schott** claim that this porous glass material has exactly the right combination of aerobic and anaerobic opportunities for bacterial growth. More controversially perhaps, they claim that neither plastic media nor foam offer the right type of home for bacteria - that on plastic media, in fact, they have to build-up an adhesive slime which is self-clogging to the media and self-destructive to the bacteria.

On Siporax, it is claimed, the bacteria have no need of this and

Media	Use	Material	Surface area*	Sizes	Recommended retail price	Source
Siporax	Main biological filtration	Sintered glass	200m²	15mm	£10.47 per litre	Schotta UK (also supplied for this review by Trident)
			270m²	25mm	£13.84 per litre	
Pond filter pads	Pre-filter; biological filtration; final polish	Heat bonded synthetic material	N/A	11" x 16" x 3" 21" x 27" x 3" 21" x 42" x 3"	£1.87 £4.68 £6.97	Crystal Clear
Bio-filter medium	Main biological filtration	Semi-porous light clay aggregate	N/A	10kg (500 gallons) 25kg		Blagdon
BF100 Amphibious Inpool Biological Foam Filter	Pre-filter; main biological filtration	Foam	N/A	Pools to 200 gallons		Blagdon
Black Knight Filter Brushes	Pre-filter; main biological filtration	Stainless steel wire; polypropylene bristles	N/A	8' 6" 3' 3" 2' 6" 1' 8" 1' 4" 1' 9" x 8" diameter	£8 £3.90 £3.60 £2.40 £2 £1.65 £1.40	Speedy Brush Co.
Filter foam	Pre filter; main biological filtration	Reticulated foam	N/A	3 sizes		Trident
Flocor	Main biological filtration	Black rippled PVC tube	230m² per cu metre			Trident
Black Foam	Pre-pump filter	Foam	N/A			Trident
Cypripack Plastic Filter media	Main biological filtration	Black plastic	N/A	25 litre 6 cu ft 35.5 cu ft	£10 £45 £225	Cyprio
Cyprimat	Main biological filtration	Layered foam matting	800m per m for size shown	48" x 38" x 12"	£270	Cyprio
Settlement brushes	Pre-filter	Crimped polypropylene & stainless steel wire	N/A	Five sizes 6" to 18" (4" diameter); two sizes 15" and 18" (8" diameter)	£1.95 to £3.42 4"; £4.80 and £5.76 8"	Cyprio
Biobrush	Pre filter/main biological filtration	As above	N/A	4" dia x 12½" long	£2.50	Cyprio
Biohome	Main biological filtration	Sintered glass	N/A	14mm mixed with 8mm cylinders in litre or 5 litre packs	£6.99 or £31.49	Sigma
Springflo	Main biological filtration	Polypropylene ribbon & calcium carbonate	5 m² or 16.5 m²	Sold by surface area as on left	£9.99 or £19.99	Spirex Aquatech

get on with the important job. As each hole in the glass joins to the next, water movement is claimed to be self-perpetuating but oxygen only reaches the outer surfaces. Inside the anaerobic bacteria therefore break down and "de-gas" nitrates. With the correct flow rates it's claimed that water changes are virtually redundant.

Critics of Siporax claim that the material must clog as the pores are so small but without the adhesion problem, Peter Oakes of AI says that Siporax's bacteria will breakdown anything organic. Thus the GSM pre-filter which it is claimed with just a litre of Siporax will not just filter, but perform complete filtration for 20 fish 12" long, and with room for three litres will filter to 70 fish 12" long. Quite a claim for a box little more than 1' by 6". Sceptics are invited to visit Peter at AI Garden Aquaria and see Siporax in action.

How does Peter prevent large objects clogging the filter? A pre-filter of simple gravel. (We have tested a prototype GSM - not the new model - which still suffered from the age old problem of clogging, which also afflicts simple foam pre-filters).

■ A new sintered glass product which bears little similarity to Siporax is **Biohome** which is reviewed on our *What's New* pages this month. We hope to conduct long-term experiments with both media. ■

Next Month...

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■ DEREK LAMBERT has tips on preparing your tanks for a holiday absence, and explains how, and if, you can bring those holiday fish purchases home.

■ On the beach - no seaside holidaying fishkeeper can avoid the joys of rockpooling. ANDY HORTON looks at what you'll find and where.

The massive Mbuna set-up

PROJECTS

■ Breeding angelfish with IAN LUCAS; MICHAEL ROBSON sets up for South American cats; PLUS a reader's massive Mbuna set-up; and more reader's projects, and postbag comments.

REVIEWS

■ A Buyers' Guide to UV filters and sterilisers.

TROPICAL

■ ANDREW SMITH on the Croaking Gourami.

■ Breeding the Green Chromide - a reader's unique success.

■ A guide to feeding with worms with IGGY TAVARES.

■ Colour confusions - MARY BAILEY explains how natural colour mutations occur in the cichlid world; PAUL DONOVAN's Favourite Fish feature looks at the Texas Cichlid - but is it *Cichlasoma carpinte* or *cyanoguttatum*? PHILIP ROBINSON's superb illustration helps us distinguish.

Cyanoguttatum or carpinte - the Texas cichlid

Under an English heaven - seemingly a simple English pond, but as we find next month, the Japanese have influenced every part of koi keeping.

MARINE

■ JOHN CRIPPS has an original and successful approach to keeping Butterflies and Angelfish.

■ Lovelier than the rainbow - MAX GIBBS praises the gorgeous Fairy Wrasse.

FISH HEALTH

■ More in-depth fish health coverage from JERZY GAVOR.

COLDWATER

■ Turning Japanese - our "complete and utter" guide to keeping Koi considers the influence of the Japanese from the names of the fish to the ornaments around the pond.

■ In quarantine - PETE TREVETT describes his method with sick Koi.

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