

FEBRUARY 1987 95p

AQUARIST

AND PONDKEEPER

FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924

**Native
Marine
Aquaria**

**SUNDAY
TRADING**

**Spotlight
on the
Five-Banded
Barb**

**TROPICAL
BEGINNERS'
SUPPLEMENT**



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Cover Story

Photograph by *Arend van den Nieuwenhuizen*

The Thick Lipped Gourami, *Colisa labiosa*, has been a strong favourite with aquarists for many years. Surprisingly, though, it has never attracted the attentions of the "developers" in the same way as its close relative, the Dwarf Gourami (*C. latia*), has done in the past decade. At least, not until now. Our cover photograph shows a spawning pair of Golden Thick Lips — a new colour strain developed in Singapore which made its first appearance in the UK about one year ago, under the wrong name of the Golden Dwarf. Will Red and Neon Thick Lips follow in due course? Time will tell.



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A Californian King Snake, *Lampropeltis getulus californica*, my "Fish out of Water".

A FISH OUT OF WATER

The lovely thing about aquaria is that you can do so many things with them. Apart from the obvious — keeping, breeding and raising fish in them — you can maintain your own colony of *Daphnia* through the winter. You can — dare I say it? — dispense with the fish and treat yourself to a year-round underwater garden. You can even dispense with the water, gravel and heaters and put your houseplants in them, protected from draughts and flourishing under the lights. Or your thoughts may turn towards a vivarium.

My New Year resolution is not, however, to give up fishkeeping; I'm not only maintaining my interest, I'm expanding it. Two new tank stands recently arrived in an effort to streamline my small tank room. Custom-made, no less, to very specific measurements. I'm going into full-scale production! I might even go public in '88. Watch this space for share prices — and whatever you do, don't tell Sid.

My point in all this is a story — a "Winter's Tale" if you like — of just how useful a tank can be. It happened a couple of years ago, one Autumn evening just after twilight. The mist was swirling at my feet

Well, actually, it was the last of the leaves which were swirling at my feet. I was walking back from the post box, drawn irresistibly in that direction by the urgent need for an adventure; paying the gas bill. As I strolled homewards, crunching through the leaves, a sudden, bright movement caught my eye. Something had moved by my feet. I looked down and stepped back in one go. For there, uncovered by my casual

By Amanda Grimes

leaf-kicking, was a snake.

I live in the South-Eastern suburbs of London and, increasingly, hedge destruction in Kent has brought us foxes, hedgehogs, magpies and other "country" wildlife. No snakes, though. At least, not that I've noticed. In the garden, maybe, but not on a very busy main road.

Delighted at such a find, I raced home and flung myself through the front door, wheezing and coughing — I'm not used to racing. Calling my sisters to come and "look at something interesting", I collected together some equipment — my thick, leather motorbike gloves, a torch and a small 12" square plastic tank and lid I use for emergencies. Then back we all went to the scene of the "encounter". The snake was not in evidence. As we searched around cautiously, with our feet, attracting bemused stares from passers-by, an elderly lady came out of the nearest house.

"Have you lost something?" she asked.

"A snake," I replied, without thinking. "Have you seen it? It's very pretty, quite small and was here a few minutes ago."

No sooner were the words out than I realised that this could result in hysterics or a heart attack. To her eternal credit, she showed signs of nothing more serious than curiosity and joined in the hunt. Within a few minutes, my sister, Dinah, found the snake. It had crawled under a stray newspaper. While she held the torch, I put my

gloves on and placed the tank, side on, in front of the snake, bringing the lid up behind. The snake went straight in with no fuss.

The evening was very busy, phoning around in the hope of identifying our guest. Three vets said it was an adder or a grass-snake, which it patently was not. We had looked in my wildlife books and this was definitely a candidate for immigration. So I sought help from a neighbour, who had a full set of encyclopaedias. We found a full-colour plate of American snakes.

"That's it!" I cried in delight, pointing to a huge black and yellow constrictor.

"Are you sure? That's a Californian King Snake! Where did you find it?" They came back with me to have a look. The snake was being sneaky again. Through the evening it had discovered the trick of climbing up to the lip of the blue plastic lid and lying, concealed, along the rim of the tank. After a while, it would overbalance and drop. As my neighbours peered into the empty tank, it fell from its hiding-place. It was a very up-and-down night...

The next day I started ringing round shops. None of them could confirm what it was without seeing it — and I wasn't in a position to get it to them. Finally I struck lucky. Up till then, everyone had dismissed the idea of a King Snake and I was becoming nervous. If it wasn't a constrictor, was it poisonous?

Someone I phoned came up with the answer. He told me there'd been a feature in one of the local papers about two teenagers who kept constrictors. I phoned the paper and they passed my name and phone number on to the "snake-keepers".

"Did you say you had a King Snake?" an excited voice asked.

"I think so." I described it as best I could.

"Doubt it." The enthusiasm had gone. My descriptions are often pretty disappointing.

"Would you like it? It's a lovely snake," asked hopefully. At least it would go to someone who knew about snakes.

He agreed to take it and my boyfriend took it over to them. I waited anxiously. Colin came back with encouraging tales of the snakes they had and how healthy they looked.

"But what is it?" I asked in exasperation.

"Oh, they don't know. They're going to take it to a shop to get it identified." His voice told me the subject was closed.

A couple of months later, I rang them.

"Is it a King Snake?"

"Yes," he laughed, "and we're delighted with it. She's growing well and is in a tank on her own. It's good you found her. She wouldn't have lasted the winter outside."

I was triumphant. I wished him well and was just about to replace the receiver when he called, "By the way, thought you'd like to know this. We began to wonder if it was a King Snake when she tried to eat one of our constrictors! We'll take good care of her."

Last Autumn, I was walking back from the post box when something moved by my feet... I kept going.

SUNDAY TRADING

AN OPEN OR SHUT CASE

The 1950 Shops Act contains many curious and oft-quoted anomalies. You can buy a magazine, but not a Bible. You can purchase fresh milk or cream to pour over fresh fruit, but a shopkeeper who sold tinned fruit or tinned milk or cream would be breaking the law. Unless it was clotted cream, of course. That's exempt.

So if you visit a garden centre or aquatic shop and find it open you could buy some plants but the shopkeeper could not legally sell you a pot or a planter to put them in. He could be prosecuted if he sold seeds, fertilisers or peat and, of course, could not let you have goldfish or fish food.

Administration of the Shops Act falls on the Environmental Health Department of the Local Authorities. They are fully aware of the absurdities of the law which allows some shops to open on Sundays and yet restricts the range of goods which they may sell. For many years a blind eye has been turned on the thousands of shops which trade illegally. Warnings were issued or prosecutions instituted only as a last resort and as a result of complaints from the public or other traders.

All this changed when, in 1985, the Government set up a Committee of Inquiry. The Auld Committee recommended that the Shops Act be repealed and that all restrictions should be removed from Sunday trading.

The report was warmly welcomed by the National Consumers Council, which said that this endorsed the findings of a MORI poll which showed that 69% of shoppers were in favour of such a step. The NCC Chairman said that to leave what he called a "bad Act" on the statute book was to encourage contempt for the law in general.

However, when the report was published there was an outcry from many people who were appalled at the prospect of Sunday becoming just another day.

Many objected on purely religious grounds, but the shopworker's union, afraid that a change to open Sunday trading might mean longer hours and compulsory Sunday working for its members, opposed it on different grounds. A spokesman for the union said that Sunday was the only day that many married women shopworkers could spend with their families.

Small independent, family run shops who did not have enough staff to cover extra trading days said that only the multiples and the larger companies would benefit from Sunday trading. Throughout the

Taking the family out for a Sunday browse around your favourite aquatic shops is something of a gamble these days. It could be easy, difficult, or simply impossible, depending on where you live and the views of your local council on Sunday trading. For although Parliament debated the whole issue at great length only a year ago — and then decided not to change the laws on Sunday shopping — the situation is as confused and unfair as ever. **Margaret Ferris**, editor of *Pet Business World*, reports.



country Chambers of Commerce and town councils were sharply divided into those who wished a change in the law and those who did not.

Those who did pointed out that in Scotland, where the law allows Sunday trading, there was no evidence that the dreaded Continental Sunday had become a reality. In practice shops and garden centres opened in areas where it was found to be commercially attractive and where local consumers supported the service which was provided. Should the Act be altered no one would be forced to work on a Sunday who did not wish to do so. A Bill to change the Act would include safeguards for shop-

workers under the age of 18 and two new statutory rights giving protection to workers who refused Sunday work.

A year after the controversial Auld report a Bill was put before Parliament by a back-bench Conservative MP proposing that the report be adopted.

The Bill went before the Commons on a Friday afternoon. It made Parliamentary history. A record number of MPs who would normally have been on their way to their constituencies stayed at Westminster to cast their vote. The Bill was defeated and the Shops Act remained in force.

As a result local authorities have been compelled to review the ways in which they carry out the wishes of Parliament. But a survey of 15 local councils in the Thames Valley area has shown that only one borough has taken a really tough line and is prosecuting all offenders. Complaints, from whatever source, and advertising are all investigated and if action is thought to be justified a warning letter or prosecution results. Eight companies have been prosecuted, and four of them have now agreed to close their shops on Sunday. A High Court injunction has been granted against one offender, and all garden centres have been notified of the provisions of the Act.

Yet neighbouring councils retain a softer policy. They issue repeated warnings, and prosecute only as a last resort.

The great majority of district councils have voted in favour of making sweeping changes in the Act or abolishing it altogether.

"We are not over zealous about this matter," said one Environmental Health Officer. "It raises problems of staffing and overtime payments and we do not feel it has high priority when it comes to public health and safety."

Meanwhile, unfair competition exists as some shopkeepers are prosecuted and some are not.

And local councils flounder through the morass of prejudice, petty bickering and time wasting discussions which are the inevitable outcome of a bad law.

Now, under a new banner, "Sort Out Sunday", a campaign has been instigated by DIY shops, leisure centres, video shops, stately homes and garden centres to try again for changes in the Shops Act in the next Parliamentary session. It's too early to predict the outcome, but success certainly won't come quickly.

And in the meantime, the message for aquarists shopping for fish is far too often: Never, never on a Sunday.

Letters

A Passion for Elephant Noses

During the year or so that I have been keeping tropical fish, I have become increasingly interested in fish from the family Mormyridae (Elephant-nosed fish). However, it seems that my passion for these fish is not shared by the authors of fish-keeping books or magazine articles. Even most shops seem reluctant to stock them, perhaps with the exception of *Gnathonemus petersi*.

I cannot believe that the most highly intelligent family of aquarium fish (their brain-size being comparable to humans) is not more sought after than it is by adventurous aquarists.

If more information on Mormyrids were made available, I am certain that the number of Mormyrid keepers would increase significantly. I am also certain that there are aquarists in Britain who have been keeping these fish for a lot longer than I have and who possess a much greater appreciation of their needs, illnesses, cures, etc.

I would be very pleased to hear from anyone who is keeping, or has kept, Mormyrids (successfully or otherwise) in the hope that I can continue to build on my existing knowledge of this family.

**Nell Arden,
Wrexham,
Clwyd.**

The Frogs' Legs Trade

A most distressing situation, which some *Aquarist & Pondkeeper* readers may not be aware of, exists concerning world trade in frogs' legs.

Around 500 million frogs will be killed this year to supply European and American restaurants with a luxury food — frogs' legs. Most of the frogs' legs eaten in these restaurants come from two species of frogs — *Rana tigrina* and *Rana hexadactyla*, which are caught from the wild in India, Bangladesh and Indonesia.

The World Society for the



Live frogs' pressed against knife blade to cut off legs for the frogs legs trade.



Gnathonemus Petersi, one of the Elephant-nosed fish.

Protection of Animals (WSPA) have investigated this trade for many years and are now calling for a moratorium on the catching and killing of these frogs. The reasons behind this are based on humanitarian and ecological concerns.

First, the frogs are caught from the wild and transported in sacks to processing centres where, upon arrival, the surviving frogs are subjected to the horrific act of having their legs cut off while they are still alive and conscious. The legs are packed into ice for further processing while the head and torsos are discarded onto a growing pile, where they can live for an hour or more before dying of blood loss or shock!

The ecological concern is that when millions of frogs are removed from agricultural cropland, the insect pests (on which the frogs normally feed) increase and devastate the crops. India is currently paying out around £12 million on pesti-

cides such as DDT to compensate for the loss of the natural pest controllers, such as the frogs (this industry is worth only £5 million).

WSPA's repeated representations to the exporting governments have resulted in no real improvements, hence the call for the moratorium.

Anyone interested in learning more about this issue can send for a report on the frogs' legs trade from: W.S.P.A., 106 Jermy Street, London, SW1Y 6EE.

**Victor Watkins
W.S.P.A. Field Officer**

Lake Victoria Extinctions — Action Needed Now

After reading the first article concerning the Lake Victoria *Lates/Haplochromis* problem in the July edition of *Aquarist & Pondkeeper*, I was very dis-

tressed to see such a lack of published responses some three months later.

It seems, from the little response that there has been, that everyone is commenting on the problem but doing nothing positive about it. Enough talk — let's get some action!

Funds (through sponsorships and other sources) need to be found, as does a suitable site for the housing of a captive breeding facility where these fish can be protected, bred and studied. Such a centre could, in fact, become self-sufficient in time (if properly administered), particularly if it incorporated a retail outlet and a public display of the fish.

I have given the subject a great deal of thought and would be happy to discuss my plans with other interested parties. It may be that my suggestions as to what is required and how it can be achieved may be altered through discussion — it may well be that somebody else has a better idea altogether — that doesn't matter. But let's get the ball rolling!

**Andy Hewson,
Weymouth,
Dorset.**

A Pat on the Back

I must congratulate you on your excellent magazine. It is by far the best in England.

I am glad to say that you cover all aspects in fishkeeping. I am 13 years old and fairly new to the subject, but I can understand all the advice from your experts perfectly.

I have learned lots of things from the *Aquarist & Pondkeeper* and I have found the Classified section at the back very helpful.

I hope your magazine will go on being a winner for many years to come.

**Sevina Shannon,
Sheppey,
Kent.**

Thanks a lot for your kind comments, Sevina. We all like a pat on the back from time to time. I hope you find this month's features to your liking.

J.D. (Editor)

Tomorrow's aquarist

Young conservationists adopt a pond . . . and win £1,000!

Many of us are denied the pleasure of pondkeeping, either because we do not have a garden or because our incomes do not stretch to construction work in the great outdoors. End of subject? Far from it. We are all natural "water-seekers" and most of us will know of a nearby pond — a natural pond — which is either neglected or abused.

Mrs Eunice Rees, who lives in the village of Chappel in Essex, knew of one such pond. It lay beneath a 70ft high viaduct and provided an ideal habitat for dragonflies, various frogs, Smooth Newts, the protected Great Crested Newt and many aquatic plants, including Water Crowfoot, Purple Loosestrife, Water Mint and Water Plantain. Nearby embankments provided perfect ground cover for the newts, and the aquatic paradise was completed by a water meadow and marshland only 300 yards away.

Heaven on earth, you might think. The tragedy was, the pond was scheduled to be filled in and had become a rubbish tip. Eunice's growing concern for the pond was brought to a head when 200 tons of highway rubble was dumped on the site, in preparation for the refill. She put a notice in the local shop's window, asking for volunteers to help clear the rubbish and restore the pond. Pressure was then brought to bear on the Parish Council, and they agreed to let the villagers see what they could make of the pond.

The priority was to get rid of the fill-in rubble, which included a large amount of road-salt — certain death to anything lying underneath. A mechanical digger was brought in to shift the rubble.

Meanwhile, Eunice was preparing her "troops" — and what an army she had. The response to the call for volunteers was astounding. Parents and children turned up in force. The group was under way.

To add discipline to local pride and enthusiasm, Eunice



Above, the 'Swifts' — ready for action. Right, just a little of the domestic rubbish removed by the 'Swifts'. Right Above, flowering Rush growing at the edge of the pond.

had entered her "army" for the **Kodak Conservation Awards**, which is a "World Wildlife Fund 'Youth in Action' Project". But what were they going to call themselves? A group name would add that final flourish.

It was winter when they got their conservation group together and little work could be done on the pond as the water level was too high. So they had set about "observation" projects, noting and drawing the flora and fauna. One rainy afternoon, they were gathered together when one of the boys produced a picture he had drawn of swifts, which had just arrived. So that was it! They became the "Swifts". As Eunice says, "Why not? It was an ambitious plan and what better than to take the name of high-fliers!"

Entering the Kodak competition had been more of an afterthought than a reason for the birth of the "Swifts". They set to with a will.

Restoring a pond is not easy — time is at a premium. You cannot just wade in and start. You have to consider breeding seasons, hibernation and — of course, high water! The children have worked for months, although the actual time spent on the pond can be counted in weeks. It's very much a waiting game. They have now almost restored the pond; a huge amount of rubbish has been

disposed of and the wildlife is once again beginning to flourish. A family of Mallards and Moorhens are just some of the encouraging signs. The group is justifiably proud of what they have achieved. And they aren't stopping there.

They are now heading for even greater heights — because they now the **Kodak Conservation Awards' first prize — £1000!** In Kodak's own words, "The judging panel were impressed by the group's imagination, commitment and enthusiasm, and the fact that the project represents local people getting together to tackle a local issue and save something they felt was valuable to the whole community".

So what are they going to do with the money? Buy membership badges and cards — and have a good party? Not the "Swifts"! They've already made their badges and cards, and they carry them with pride. They're not going to squander that hard-earned money.

About 100 yards away from their "resurrected" pond is an empty school classroom. It needs a lot of work to make it usable — just the job for this group! They've had it surveyed and are now awaiting permission to turn it into a "Centre for Education and Conservation in Environmental Care". They also want to repair vandalised stiles and play equipment. They are taking on a lot,



but then they've already proved it can be done. We wish them luck — they're an example to us all.

Conservation awards

The Kodak Conservation Awards, which are in effect a World Wildlife Fund education project sponsored by Kodak, began in 1985. The "Swifts" weren't the first — don't let them be the last. If you know of a pond, or in fact any potential conservation project that you could arouse interest in and help with, why not get in touch with Kodak? The Award scheme has been so successful that they are raising the prize money this year by 50%! So any school or youth group interested should contact the **Awards Office on 01-405 8979**; or write for information to **Kodak Conservation Awards, 5-11 Theobalds Road, London WC1X 8SH**. All interested groups will receive a colourful poster and a comprehensive, informative manual with helpful advice on organising a project. If you are a parent, why not put it to the school? If the sheer joy of improving your environment isn't incentive enough, take a look at this lot:

Top Award: £2,000 and the Sir Peter Scott Award
Joint 2nd Place: 2 x £1,000
Joint 3rd Place: 7 x £500
Thirty Awards of £250
How do you feel about your local pond now?!

Spotlight

THE FIVE-BANDED BARB

(*Barbus pentazona*)

Photograph by Bill Tomey

Slimmer and less aggressive than its close relative the Tiger Barb, *Barbus pentazona*, the Five-banded Barb, is a rarely imported, highly desirable, attractive little fish, as Dr Michael Benjamin of University College, Cardiff, demonstrates.

The genus *Barbus* is a very large one, and there is a good case for subdividing it further. However, as Myers remarked over 25 years ago ("Preface to any future classification of the cyprinid fishes of the genus *Barbus*", *Stanford Ichthyological Bulletin* 1960, Vol. 7, 212-215), the task of revising the whole group is extremely daunting and, perhaps, unrealistic.

Many have pointed out that attempts to base a classification partly on the number of barbels, and in this way to distinguish between the genera *Puntius* with no barbels, *Capoeta* with two barbels and *Barbodes* with four barbels, have not been universally accepted. As Banister ("A new species of *Barbus* (Pisces, Cyprinidae) from Africa", *Bull. Br. Mus. nat. Hist. (Zool.)* 1980, vol. 38, p. 149), has recently remarked, the variability in the number of barbels exhibited by a number of species, casts doubt about how useful they are as taxonomic characters.

Hence, following the example of others (including e.g. Wheeler (1975) in his "Fishes of the World"), the Five-banded Barb featured in this month's Spotlight is referred to here as *Barbus pentazona*. However, if readers are seeking information about this fish elsewhere, they should also search through the literature under the other names mentioned above.

SIZE AND COLOURS

The Five-banded Barb grows to about 2 inches and comes from the Malay peninsula, Singapore, Borneo and Sumatra. The first of its characteristic black cross bands is a narrow one that passes through the eye. You may be aware of many other aquarium fish with dark horizontal or vertical bars that pass through the eye. It is perhaps worth commenting, therefore, that black pupils are conspicuous parts of a fish that

are likely to attract the attention of predators. Thus, dark bands of a diameter corresponding to that of the pupil, may camouflage the eye. The rest of the dark bands in *Barbus pentazona* cross its back and sides and also camouflage the fish (by breaking up its "fishy outline" — an example of a phenomenon known as "disruptive coloration" that is widely shown throughout the animal kingdom). However, the colour patterns of banded barbs also play an important role in the social interaction between and within species, especially during reproduction (see Kortmulder "A comparative study in colour patterns and behaviour in seven Asiatic *Barbus* species", *Behaviour Supplement* 19, 1972).

The intensity of the black bars and red areas can vary somewhat in an individual fish, but that of the green and golden colours cannot. This is because the tiny pigment granules that impart green and golden colours are stationary within the cell that houses them, whereas the pigments that give black and red colours are lodged in a different type of cell, where they can be spread out or crowded together, to darken or lighten the colour respectively. The banding patterns are variable and several subspecies have been described largely on this basis (including the Six-banded Barb referred to by Sterba in his "Freshwater Fishes of the World" 1962, as *Barbus pentazona hexazona*).

The back of the fish is red-brown, the sides bronze and the ventral aspect yellow. The fins are colourless in parts, but red in others. The females are generally less colourful than the males. The scales are large and reflect the light well. Those in the black bars have green edges. As with any active fish that has mirror-like scales, Five-banded Barbs are best admired in a tank that is lit from the front of the hood. A sunny spot for the aquarium is also a good idea.

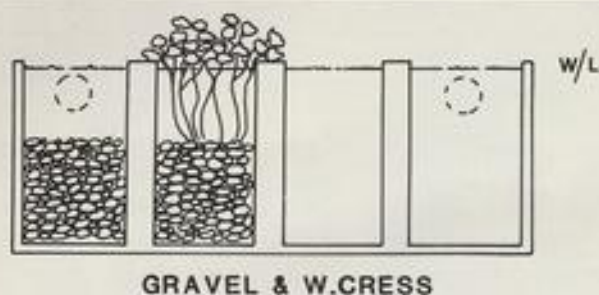
AQUARIUM MAINTENANCE

None of the banded barbs are as popular as the ubiquitous Tiger Barb (*Barbus tetrazona*), and thus *Barbus pentazona* is rarely imported. Yet, it is a nice little fish — not as aggressive as the Tiger Barb, and without such a strong schooling instinct. Nevertheless, like all our barbs, they do shoal, are active fish, and should be kept in groups in large tanks (with a soft substrate). They like mature, neutral water with plenty of plant cover and accept both live and dried food. When feeding, they mostly swim along the bottom or along plants. However, they will also take flake from the surface or live *Daphnia* from mid-water. As with many fish, normal feeding patterns are often disturbed when the fish are breeding. Barbs sleep at night (or any time when the lights are out for long periods) with the body tipped forward to 45-60 degrees.

HOMOSEXUAL FISH

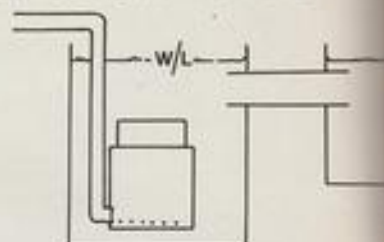
I lack any personal experience of breeding this fish and am reluctant to pass on second-hand details that I have merely gleaned from the thoughts of others. The only "hobby" article in English that I have found by searching through Zoological Record is that by Zukal called "Breeding and care of the five-banded barb", *Pet Fish Monthly* 1974, Vol. 9, 382-384. If you are thinking of breeding this barb, keep an eye out for homosexual fish (i.e. for males that direct their courting at other males). This is documented in the scientific literature for *Barbus nigrofasciatus* (the Purple-headed Barb or Black Ruby), but not to my knowledge for *Barbus pentazona*. If you see any such behaviour let the world know!





**Fig 3 SECTION ACROSS MODULE
NOT TO SCALE**

PUMP RETURN TO POND



PUMPING CHAMBER

Fig 2 SCHEMATIC DIAGRAM

Right, clump of Watercress showing its extensive root system. Left: typical Watercress bed in situ with undergravel filter.



HOW GREEN

Clear water, the natural way. John Couvelier explains how algal problems can be simply and effectively avoided.

Winter is the traditional time for Koi-keepers and water gardeners in general to reflect upon the season passed, and the year approaching. Plans must be made, books and articles consulted, along with an immeasurable amount of "brain picking". If a poll were to be held among "pond people" asking what their major problem was, "green water" would win hands down! So let's sit down, analyse the problem and see if there is a solution.

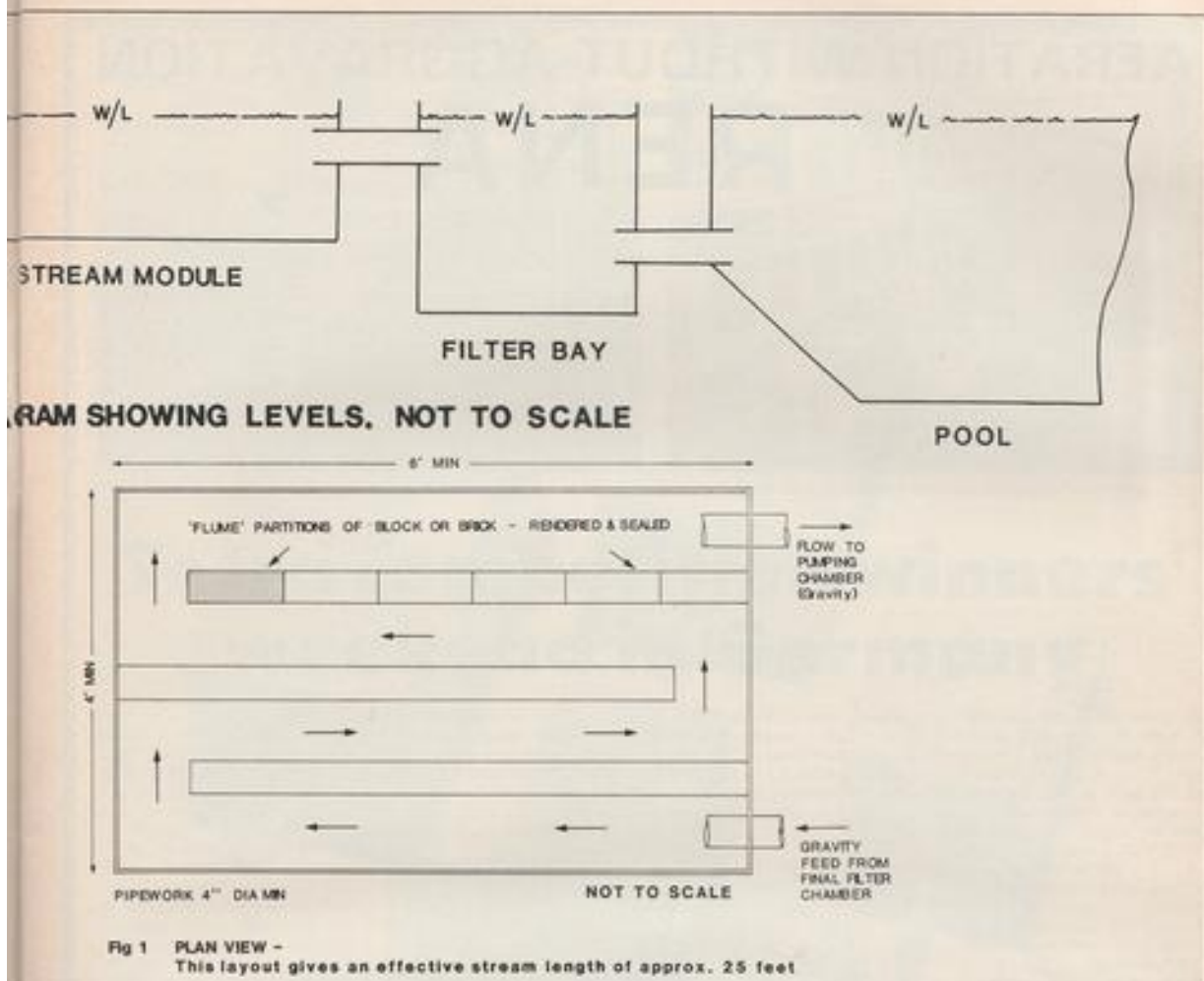
I must recap just a little on basic pool

ecology if only to restate the root cause of green water. The waste matter excreted by our fish is very high in various chemicals, the principal constituent being ammonia which is very toxic above certain levels. An efficient filter system will settle out heavy solids for regular removal from the system, leaving a reasonably "clear" fluid to pass into the next stage of filtration.

Provided an active population of bacteria is present, together with sufficient oxygen "carry over", a process known as **Nitrification** will take place. This is the point at

which our troubles begin! The ammonia etc. are converted to **NITRITE**, and then to **NITRATE** (note the difference)! Finally, the filtrate is returned to the pool — **RICH IN NITRATE!**, and all the thousands of different varieties of algal cells jump for joy, because as far as they are concerned, Xmas has arrived early, with a plentiful supply of their favourite "pudding"! Throw in some summer temperatures, and sunlight, stir well, and you have the perfect recipe for green water.

Those with unlimited space and bulging wallets could overcome the problem with sophisticated "Ion Exchange" systems and similar toys, but we lesser mortals need to resort to nature's way! Readers of my earlier articles will recall the frequent mention of a stream/watercourse into which was



IS OUR WATER

planted Watercress, a most efficient consumer of nitrate.

Obviously, the great majority of readers do not have gardens which will support a stream. What about a stream of more than 20 feet compressed into an area 6 feet by 4 feet? Can be done. Just look at figure 1.

I have lifted an idea from the water industry (again). Very cheap and easy to build, the only thing which MUST be perfect is the level. The diagram (Figure 2) is self explanatory. The dimensions can be varied to suit the builder, the longer the total length of channel, the more time the water will be in contact with watercress roots. A six-inch depth of gravel the full length of the channel is all that's needed to root the cress (Figure 3). **NO PLANTING MEDIUM IS REQUIRED** as the cress

feeds upon the Nitrate. Regular harvesting will be required.

At the time of writing, work is well advanced on our second pool and filter using this system. Construction in our case is very much an experiment as we are rendering straight on to the walls of the excavations, using "Fibromix". Those of you who do not have heavy clay soils will have to use more traditional methods for construction (concrete blocks, bricks, etc.) but do **WATCH THOSE LEVELS**.

I've no doubt some of you are thinking that it's a lot of bother to go to just to remove green water. Why not simply run some fresh tap water in? Well, if so, just think on this. Thanks to our friends in the farming fraternity and industry in general, the amount of chemicals of various types

being deposited on the land to be either absorbed by the soil or, evaporated up into the atmosphere only to return as rain, thence into our water supply, is now reaching frightening proportions. Some parts of the U.K. have been blessed with a level of Nitrate in their tapwater approaching 50 parts per million! Not much point in putting THAT into your pool is there? What the long-term result of all this is going to be I just don't know.

In the meantime, all we water gardeners can do is to soldier on in the best way we can. The addition of a watercress bed to your garden will certainly help things along. Just plant a small bunch at intervals along the channels and leave the rest to nature. You'll be amazed at how quickly it will thrive and improve the water quality.



The "tour" included a visit to the research labs.



Just a few of the 6,000 tanks that impressed Cliff and Ellen.

Tetra competition winners' weekend in Germany

A Stevenage couple, **Cliff and Ellen Cummings**, are now reliving the memories of a unique weekend fish-spotting in Germany. The all-expenses-paid trip was first prize in our August competition, sponsored by **Tetra**.

The weekend took Cliff and Ellen to **Tetra's "West Aquarium"** fish breeding and research complex in the Hartz mountains of West Germany. There, they spent two days in a tropical fishkeepers' paradise.

Cliff, a lorry driver, lives with his wife Ellen and their two-month old baby in Chertsey Rise, Stevenage. Although he has been keeping tropical fish for less than a year, Cliff already has 10 tanks in the living room. Ellen, it seems, looks after the fishes' feeding.

Cliff won the competition on a tie-breaker with a slogan that is so good that **Tetra** say they may even use it in their advertising. His slogan was: "Tetra foods are better because they are triple-tested, doubly delicious and

first for fish".

Their weekend started with a flight to Hanover before travelling onto West Aquarium which is situated in Bad Lauterberg, a little town set in the pine forests of the beautiful Hartz mountains.

Cliff and Ellen were amazed at West Aquarium's vital statistics and the fact that there are permanently 1.2 to 1.5 million fish kept there! About 4 million fish, covering 600 different species, are sold throughout the world every year.

There are 6000 tanks which impressed Cliff as he remarked: "I thought I had a problem with my 10 tanks!"

Neither Cliff or Ellen felt the cold because West Aquarium is like the Amazon Jungle; the room temperature is kept at 28°C (82°F) with a humidity of 70%.

The tour covered every aspect of Tetra West Aquarium, including the breeding tanks, the Biological Control Department, where feeding test and quality control testing is carried out and the laboratories, where Tetra's new products are developed and tested to stringent standards.

Tetra West Aquarium is situated close to the East German border and the trip included a visit to the heavily guarded border points that divide East and West.

For further information please contact: **Cliff Nash, Tetra Ltd, Mitchell House, Eastleigh, Hants SO5 5RY. Tel: (0703) 619791.**



A West Aquarium "minder" shows Ellen and Cliff around the labyrinth of tanks.

Below right, Cliff found these fish particularly fascinating. Cliff takes the opportunity to snap a moment with the Hartz mountains in the background.



News from the societies

Southern Livebearers Aquatic Group UK

The following were elected to serve on the committee for 1987:

President: John Dawes
Vice President: Jim Chambers
Chairman: Dennis Barrett
Vice-Chairman: John Corbett
Secretary: Mrs Angela Moore
Treasurer: Colin Taylor
P.R.O. (UK): Pete Moore
P.R.O. (Overseas): Ivan Dibble
Journal Editor: Mrs Pat Lambert

Printer: George Stamou
Technical Editor: Hugh Smith
Species Control: Jake Milligan

About 60 members attended the AGM in November, including some overseas members from Germany and Norway. The committee would like to thank all those who attended and made the Auction of unusual and rare livebearers such a success.

S.L.A.G. — UK holds regular area meetings in most parts of the country and produces four journals per year, along with a selection of colour slides.

Subscription rates: single adult, £6.00; family, £9.00; senior citizens & juniors, £3.00.

For further information, contact Mrs Angela Moore (Secretary), 43 Lamb Lane, Monk Bretton, Barnsley, S. Yorks., S71 2DX.

King's Lynn Aquarists Society

The 1987 committee elected at the society's AGM last November is:

Chairman: Mr B. Usher
Vice Chairman: Mr D. Manning
Club Secretary: Mr A. Ashby
Treasurer: Mr M. Laws
Show Secretaries: Mr & Mrs J. Sheldrick

For more details on K.L.A.S., write to: A. Ashby (Secretary), 38 Gelham Manor, Dersingham, King's Lynn, PE31 6HN.

Kettering Tropical Fish Club

The 1987 committee of the above society is as follows:

Chairman: Mr R. Vickers
Vice Chairman: Mr M. Such
Secretary: Mr D. Palmer
Treasurer: Mr C. Wright

For further details of the society contact the Secretary at 17 New Road, Geddington, Kettering, Northants. Tel. Kett 742951.

Keighley Aquarist Society

The K.A.S. 19th Open Show will be held on Sunday 15 March, 1987 at the Keighley Leisure Centre, Victoria Hall, Keighley. All enquiries to the Secretary, Eileen Pearson, 6 Central Avenue, Bracken Bank, Keighley, West Yorkshire, BD22 7BB. Tel: Keighley 604497.

South East Aquarist Society

The above society now meets at St Luke's Hall, Sandycroft Road, Kew, Richmond, Surrey. Meetings are still held every first and third Monday of the month. For fuller details, contact Cliff Williams (Secretary), 39 Claremont Road, Staines, Middx., TW18 3AS. Tel: Staines 64850.

West Cornwall Fishkeepers

The second W.C.F. Open and Inter-club Show was held on 26 October in Camborne, Cornwall. We have recently received the following report: "Clubs competing were Devon and Exeter, Exeter and District, Plymouth and District and West Cornwall. There were

over 300 entries, most to a very high standard.

A massive *Geophagus brasiliensis* gave M. Bryant **Best in Show**, while the prize for **Most Points in Show** went to a junior from Plymouth, J. Simpson.

The Inter-club result was a win for the second year running to the host club who narrowly beat Plymouth by two points.

The auction was well attended and some 300 lots changed hands. The judges congratulated West Cornwall on their efficient organisation, and an enjoyable day was had by all.

West Cornwall Fishkeepers have a membership approaching 150 and have a regular attendance averaging 90 at their twice monthly meeting. This year, they celebrate the 10th anniversary of their foundation by their President, Roy Skipper, who many will recall was the first man to breed Discus successfully.

As you can see from the above, fishkeeping in Cornwall is flourishing, and does not stop at the Tamar Bridge!

For further details contact the secretary, 3 Wellington Close, Camborne, Cornwall, TR14 7HE.

Diary dates

Skelmersdale & District Aquarist Society

S. & D.A.S. are holding an Auction on 8 March at the West Skem Community Centre. Booking in: 11.00 a.m. to 1.30 p.m. Auction commences promptly at 12.30 p.m. Auctioneer: Mr. D. Harrop. For further details, ring Skem 22174 or 29428.

Runcorn Aquarist Society

The 16th R.A.S. Annual Fish Show and Auction will be held on Sunday 19 March at the Royal Naval Association, Halton Road, Halton, Brook, Runcorn, Cheshire. Benching: 11.30 a.m. to 2.00 p.m. Full details from Mrs R. Muckle, 23 Adela Road, Runcorn, Cheshire, WA7 4TU. Tel. Runcorn 76099 and 61521.



Belgian Cichlid Association

Encouraged by the great success of its previous exhibitions which attracted many thousands of visitors, the Association Belge de Cichlidophiles (Belgian Cichlid Association) will be holding its sixth Cichlid Show between Saturday 4 April and Sunday 12 April at Cattelberg, Bothastraat 15-17, Borgerhout, Antwerp, Belgium. The show will be open from 2.00 p.m. to 9.00 p.m. on week-

days and from 10.00 a.m. to 9.00 p.m. on Saturdays and Sundays.

The Belgian Cichlid Association will attempt to display as large a collection of cichlids as possible in approximately 50 large, well-decorated aquaria. Every branch of the cichlid hobby will be represented. There will also be an exhibition of postage stamps depicting cichlids.

For further information, contact the Secretary of the Show Committee, Bob Lams, Verenigde Natieslaan 256, B-2710 Hoboken, Antwerp, Belgium.

Kettering Tropical Fish Club

The K.T.F.C. 1987 Annual Open Show will take place on

Sunday 26 April at the McKinley Theatre, St. Mary's Road, Kettering. Show schedules and further details from R. Vickers, 43 St. Johns Road, Kettering, Northants. NN15 5AY. Tel. Kettering 519284.

Thorpe and District Aquarist Society

The first Open Show of this society will be held on Sunday 17 May at the Bob Carter Centre, Drayton, Norwich. There will also be an Open Day with trade stands, plus other societies promoting their activities. Hot meals and bar facilities will be available on the day. For full details, contact the Secretary, Paul Sparks, 5 Gowing Close, Helleston, Norwich, Norfolk, NR6 6PX.

Books

Excellent Catfish Guide

A Fishkeeper's Guide to African & Asian Catfishes

By: David Sands
Published by: Salamander
ISBN: 0-86101-211-9
Price: £4.95

According to the press release that accompanied the publication of this book, it is "one of the new breed of Fishkeeper's Guides — the 80-page specialist guides that home in on one particular group of fishes that fascinate an ever-increasing band of dedicated enthusiasts".

African & Asian Catfishes is a compact, colourful book, jam-packed with information from cover to cover. David Sands, in my opinion, has done a great job fitting so much information into such a limited space.

To those aquarists who tend to equate Catfish with the ubiquitous *Corydoras aeneus* and, perhaps, the Upside-down Catfish, *Synodontis nigriventris*, as the token "other" Catfish, this book has a few surprises in store. Although David Sands' mammoth work "Catfishes of the World"

covered a tremendous range of species, there has been a need, for some time now, for an informative, "popular", inexpensive book on these fascinating fish. This newest publication is precisely that. If any single volume stands a chance of enhancing the popularity of African Catfish in the way they deserve, then this must be the one. I wish it well.

John Dawes

Optimal Advice for Aquarists

The Optimum Aquarium

By: Kaspar Horst and Horst E. Kipper
Published by: AD Aquadocumenta
Price: £11.45

During the late 70's and early 80's, a German book with the title "Das Perfekte Aquarium" by these two authors became regarded as "the Bible" by advanced aquarists on the Continent. The first edition of 20,000 copies sold out within a few months. Other editions followed — all with similar success.

In 1985, "Das Perfekte Aquarium" was

superceded by "Das Optimale Aquarium", a book which took in all the latest technological and biological developments in aquarium maintenance. "The Optimum Aquarium" is the English translation of this book and can justifiably lay claim to being one of the most, if not the most, advanced book on the subject.

Even the 25 pages of Contents are out of the ordinary, incorporating topics such as:

Softened water poor in salts
Biogenic decalcification
Methods of CO₂ fertilisation
Plants for health and hygiene
Metal halide lamps (HQI)
Health control of aquarium plants
Vacation care of fish . . . and many more

Clearly, such a book takes some reading, not least because of the loss of a certain degree of fluency due to the translation itself, but the effort is well worth it.

The selection of fish is quite restricted, but then the book does not set out to present a species catalogue. It aims at concentrating on the scientific principles behind aquarium keeping and on methods of implementing them. It does both jobs admirably.

John Dawes

New Book News from T.F.H.

1. A Complete Introduction to Corydoras and Related Catfishes

By: Dr Warren E. Burgess
ISBN: 0-86622-262-2
Price: Hardcover £3.95; Softcover £2.95

Corydoras and their relatives are among the most popular of all catfish, being easily obtainable, relatively inexpensive and easy to care for. This practical and colourful book will be helpful to both beginners and more experienced hobbyists. Chapters include identification, setting up a tank, feeding, breeding and health care. The book is illustrated in full colour and is available in two versions — hardcover and softcover.

2. Starting Your Tropical Aquarium

By: Dr. Herbert R. Axelrod
ISBN: 0-86622-105-0
Price: £7.50

The simple and informal text provides readers with step-by-step information on the basic rules of setting up and maintaining a healthy aquarium, together with descriptions and illustrations of suitable fish. The book is extensively illustrated with colour photographs of the various fish which also serve as valuable identification guides.

3. Encyclopedia of Live Foods

By: Charles O. Masters



ISBN: 0-87666-093-6
Price: £14.95

This unique book (brought back by popular demand) examines the various types of live foods and describes in detail methods of collecting and culturing animals and plants used to feed aquarium fish. It also includes a useful month-by-month Live Foods Calendar, glossary and index and is extensively illustrated in both full-colour and black and white.

4. Atlas of Marine Mammals

By: V. A. Arseniev
ISBN: 0-87666-810-4
Price: £25.00

In recent years, whales and other sea mammals have captured the attention of

everyone with any interest in natural history and this book is the only up-to-date volume currently available that discusses in detail and illustrates all known species of sea mammals.

It includes 118 recognised species of marine mammals of the world's oceans, with coverage also of obscure and little-known species of dolphins and seals, many of which are in danger of extinction. Each discussion of a species is beautifully illustrated with a colour painting.

5. Vierke's Aquarium Book

By: Jorg Vierke
ISBN: 0-86622-103-4
Price: £17.50

This remarkably thorough book discusses in detail every aspect of setting up and maintaining a freshwater aquarium. It takes a different approach to aquarium keeping and imparts the secrets of European techniques, long respected by hobbyists.

Translated from German and edited by Dr. Herbert R. Axelrod, it contains chapters on equipment selection, plants and planting, breeding, raising, feeding and diseases of fish, as well as descriptions of the characteristics and care of hundreds of individual fish species. The text is illustrated with over 200 full-colour photographs and many attractive black and white line drawings.

Your questions answered

Continued from page 20

Coldwater Eggbound females

Last autumn two of my fish had not spawned — presumably because the temperature had not been sufficiently warm throughout the summer. They were, therefore, egg-bound. I asked a local aquaculture concern about this and they told me the fish would not come to harm and would most probably reabsorb the eggs. They were both active and very much alive when I netted the pond against falling leaves, etc. but since then there has not been a sign of either. All the other fish have survived the winter so far and are alive and well, but of the two females — nothing. I can only assume they died and decomposed in the bottom of the pond. Your comments would be much appreciated.

There is no reason to believe that, because your female fishes did not spawn last year, that they should be, consequently, eggbound. Each year I have several females who do not part with their eggs and I have certainly not found that, because of this, they have come to harm.

Your local aquatic dealer was quite right when he explained that the fish may retain their eggs until the following year or that they could absorb them and, therefore, come to no harm.

I am sure that it was nothing to do with the fact that they did not breed which cost them their lives. There are several explanations why they should disappear (e.g.) predators or poor condition prior to the winter cold making them unable to withstand the rigours of the winter months.

Tropical Sexing Lungfish

Would you please tell me how to

sex Protopterus, Neoceratodus and Lepidosiren Lungfishes?

There are no obvious sex differences in the African Lungfishes (*protopterus*), but the South American Lungfish (*Lepidosiren*) shows the male by it guarding the eggs and developing gill-like growths from the pelvic fins. So a "broody" male is obvious from a female. The Australian Lungfish (*Neoceratodus*) are also sexually indistinguishable, but the Queensland Lungfish (*N. forsteri*) has a courtship in which the male takes a strand

of pond weed and shakes it about to attract the female. So if you have a Queensland Lungfish that waves something ... it's the male.

Home-made Guppy food

I have found a formula for making up Guppy food. It consists of 1lb beef liver, 20lbs Pablum or Ceravim, 2 tsp salt.

I cannot find out anything about Pablum or Ceravim anywhere. Could you tell me what

these products are and where I can get some?

Pablum and Ceravim are USA trade names for brown wholemeal flours. "Pablum" is based on the Latin "Pabulum" meaning food. The English equivalent is called "Ceravim" from Rank, Horris, McDougall. Gordon's formula can be prepared from any wholemeal flour.

It is a good standby recipe, but remember that it is very old and research has passed it by. Modern commercial foods are nutritionally more complete and balanced.

NEXT MONTH

Coming up in March

- Comprehensive beginners' guide to coldwater aquaria
- £275 THF competition
- Spotlight on the beautiful Filefish
- Special Helping Hand pond feature
- Out and About, Interpet, Atlantis and Underworld competitions, and much, much, more.

Start the coldwater season in style

INTERPET COMPETITION WINNERS

The correct answers to the four questions we asked you were: 1. Marathon. 2. Whisper. 3. C.B. 4. Liquitox

The lucky winners are:

1st prize — £120 of Interpet products

Mrs R. Vernon, Leighton Hall Farm, Leighton, Crewe, Cheshire CW1 4UH.

2nd prize — £80 of Interpet products

Mr D. Frost, School House, South Green Hough School, Brandon Road, Swaffham, Norfolk PE37 7DY.

3rd prize — £50 of Interpet products

Mr T. Moles, 15 Mill Green Place, Basildon, Essex SS13 3QZ.

Congratulations to all three winners and a big thank you to all the losers for supporting the competition. Sincere thanks also go to Interpet for sponsoring this highly successful competition.

FEBRUARY 1987

BEGINNERS' GUIDE

TROPICAL FRESHWATER AQUARIA

With the compliments of

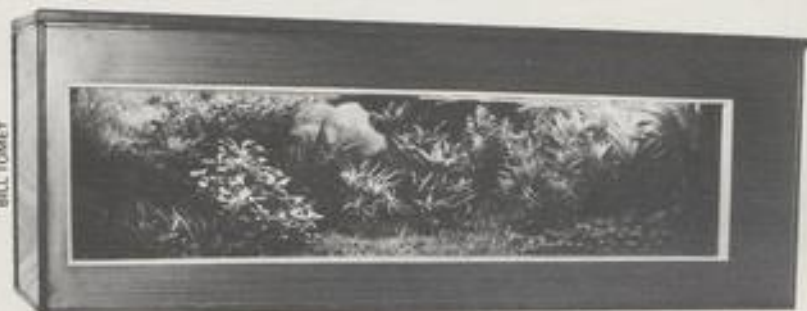
AQUARIST

FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924

- **Step-by-step guide to setting up**
- **Top ten community fish**
- **Choosing the best plants**
- **Equipment and maintenance**

THE BEGINNERS' GUIDE PART 1

TROPICAL FRESHWATER AQUARIA



BILL TOMNEY

SETTING UP A TROPICAL AQUARIUM

There is no single, inflexible sequence of rules for setting up a tropical aquarium from scratch. However, certain things are essential. **John Dawes** outlines a useful step-by-step guide designed to avoid all the major pitfalls.

STAGE 1

Check that all the necessary equipment has been bought:

Aquarium, stand (if necessary), hood (unnecessary if spotlights or mercury bulbs have been chosen), condensation tray, lights, starter unit (if lights are fluorescent), heater-stat, thermometer, aerator, airline, non-return valve, diffuser stone, filter, filter media (if model is not of the undergravel type), gravel, terracing/rocks/wood, plants (to be kept moist), plugs (one for each piece of electrical equipment — if a cable tidy is used, only one plug may be necessary), water testing kits.

NB Accessory equipment, such as algae scrapers and nets, will need to be bought

soon, but are not absolutely essential on the first day.

STAGE 2

Select a site away from direct sunlight, draughts and extremes of temperature. Check that the piece of furniture (if one is being used) on which the tank will rest is strong enough. This does not, of course, apply if you are using a proper aquarium stand or cabinet. Remember: water weighs a lot — 10lbs per gallon. Gravel weighs about 100lbs per cubic foot and rocks even more!

STAGE 3

Test the empty tank for leaks and repair, or exchange, if necessary.

STAGE 4

Rest the empty tank on polystyrene strips or sheet.

STAGE 5

- a Place undergravel filter into position if one is being used.
- b Lay gravel tidy on top of the filter plates if one is being used.
- c Rinse gravel/sand thoroughly in a plastic bucket until water runs clear.
- d Spread a layer of gravel/sand on the filter plate or gravel tidy.
- e Add layer or pockets of organic planting medium if required.
- f Add remainder of gravel/sand and arrange

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BEGINNERS' GUIDE

TROPICAL FRESHWATER AQUARIA



aquascape with chosen rocks, bogwood, etc. Personal taste plays an important part here but, if possible, symmetrical arrangements should be avoided.

STAGE 6

Place heater-stat, airline and internal filters in position, making sure that the base of the heating unit does not touch the gravel. **WARNING: Don't switch anything on!**

STAGE 7

a Start filling aquarium with water. Avoid disturbing the bedding medium by pouring the water onto a sheet of newspaper, greaseproof paper or plastic laid over the aquascape. Alternatively, pour the water into a jar or jug placed on a saucer. The important thing is to avoid direct contact between the stream of water and the bedding medium.

b Fill aquarium up to the halfway mark only.

c Add a small quantity of warm water to raise the temperature into the tropical range (even plants can feel the cold!).

d Remove newspaper, jars, etc.

e Introduce the plants, ensuring that small species are placed near the front. Make sure that plants whose leaves emerge from a crown, e.g. *Vallisneria* and Amazon Swords, have this part exposed. If covered, crowns can rot.

f Add water conditioners and dechlorinator.

g Complete filling process, leaving, at least, 2.5 cm (c. 1 in.) between the surface of the water and the edge of the glass.

h Arrange power filter inflow/outflow tubes, or push powerhead into position on top of the undergravel filter airlift.

i Lower condensation tray into position.

j Install lights in hood.

k Place hood in its permanent position.

l Arrange cables, airline, starter unit, etc., in hood compartment if this is available.

If not, arrange leads and airline neatly out of view behind the aquarium; e.g. using a cable tidy.

m Insert non-return valve in the airline.

n Locate aerator above tank level, e.g. suspended from a hook on the wall.

o Set up power filter connections.

STAGE 8

a Switch on all electrical equipment. This should be done, preferably, in the morning to allow for monitoring and adjustments.

b Adjust air and filter flow rates — neither should be too turbulent.

c Check temperature hourly and adjust thermostat if necessary.

WARNING:

Switch off all electrical appliances before any adjustments are made.

Allow heater to cool down for about ten minutes before removing it from the water.

d Test pH and hardness and adjust if necessary.

e Run the system on a 12-15 hour light period for a week if possible. This week-long period is not an absolute necessity with the water treatments and conditioners available today. However, it is advisable since it allows the aquarium to settle down and the aquarist to carry out adjustments and generally become familiar with the art of aquarium management.

During the first week, the water may become cloudy — this is quite normal and is caused by a 'bloom' of micro-organisms. It should clear within a few days, marking the end of the first major observable stage in the maturing process.

CLOSING REMARKS

The tank is now set up and running, and will soon begin to settle down. Guidance on what fish to buy (and at what rate), which plants to choose, what equipment to get, and how to manage this new aquarium are given in the other articles in this Beginners' Supplement.

Welcome to fishkeeping... and Good Luck!

*The text for this article is based on the setting up section in "The Tropical Freshwater Aquarium" by John Dawes published by Hamlyn (1986), ISBN 0-600-30649-6. Price: £6.95.

BEGINNERS' GUIDE
TROPICAL FRESHWATER AQUARIA

TOP TEN COMMUNITY FISH

Selecting the first collection of fish for a community tank can prove quite difficult for newcomers to fishkeeping. **Dr. David Ford**, Head of the Aquarian Laboratories, gives sound, basic advice on the ten species voted the most popular by aquarists in 1986.

There are at least 20,000 species of fish, all with different habits and, therefore, needs when kept in captivity. In fact, it is this very diversity that makes fish such interesting pets. There is the challenge of keeping difficult species such as Discus, or Coral Fish in seawater; it is fascinating to breed species such as livebearers, bubble-nesters or mouth-brooders and to specialise in particular fish such as Rift Valley Cichlids, Killifish, Armoured Catfish or Goodeids.

Many of these fish require a particular water chemistry, may be territorial, fighting

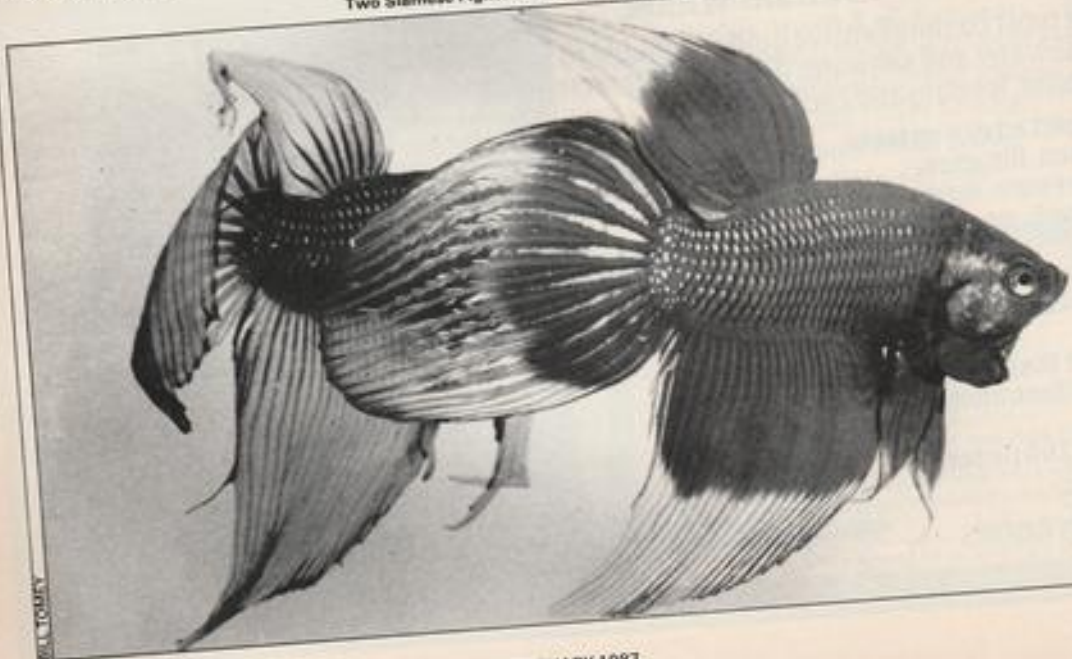
among themselves for space, or need special diets.

If an easy-to-keep collection of colourful Tropicals is required by the beginner, obviously such fish should be avoided. There are many species that are tolerant of a wide range of water conditions, accept the convenient commercial foods, are peaceful and, providing water quality is maintained, will live for several years. These are called "Community Fishes" because they will live together in the confines of a small tank. However, do remember that a "pecking order" is always established in a collection of fishes. There will be a "boss of the tank"

who bullies the other fish to show it owns the place, is entitled to the first flakes of food and the best swimming areas. Providing no physical damage occurs, you may accept this situation, but if any fish actually bites or chases the others continuously, exchange it for a smaller specimen or something different.

Your choice of the many community fish should include top, middle and bottom feeders/swimmers. In this way the whole tank looks busy and not just one crowded area. Boisterous fish should not be housed with timid species and fish so different in size that one can swallow the other!

Two Siamese Fighter males squaring up to each other.



TROPICAL FRESHWATER AQUARIA

THE TOP TEN

The "Top Ten" most popular fish are obviously a wise choice. They have proved to be the most successful in the aquatic trade and so are in plentiful supply. This is because the popular species are mass-produced in Fish Farms in the Tropics and supplied in bulk (usually) free of disease and used to life in the aquarium. Wild species are inevitably carrying parasites and will be stressed from transferring from the wild.

These top ten are:

Neon Tetra	<i>Paracheirodon innesi</i>
Angel Fish	<i>Pterophyllum scalare</i>
Guppy	<i>Poecilia reticulata</i>
Swordtail	<i>Xiphophorus helleri</i>
Platy	<i>Xiphophorus maculatus</i> or <i>variatus</i>
Zebra Danio	<i>Brachydanio rerio</i>
Harlequin	<i>Rasbora heteromorpha</i>
Dwarf Gourami	<i>Cotisa lalia</i>
Bronze Catfish	<i>Corydoras aeneus</i>
Siamese Fighter	<i>Betta splendens</i>

It is best to keep at least three of any species, so they can shoal and feel secure. Where appropriate males and females should be mixed but do not expect breeding in the community tank. If you want to breed tropical fish you must set up a separate breeding tank. In the community tank, the fry are eaten as soon as they are born, and parents that care for their family will fight other species, so breeding pairs need to be isolated.

Stocking Levels

How many fish to keep depends on the tank size. It is always better to understock so the water stays cleaner, longer: that is better for the fish and reduces the maintenance time spent in cleaning and partial water changing.

Buy only 1/10th of the total required each week over two months or so... this is to allow the system to mature. If you stock the total fish at one go, half will probably die. When several months have passed and the tank is mature and you are more knowledgeable too, the totals listed can be (slowly) increased by some 50%, perhaps by adding other more rare community fish that you will find in the shops.

You also need to know the individual requirements of these Top Ten fish:

Neon Tetra

Voted the most popular tropical fish by British aquarists in 1986, this fish displaced the Angel Fish from its first place position over the last 10 or more years.



Angels are elegant members of the community tank.

The Neon is the most colourful of a whole range of Tetras, most of which make good community fish. They originated from the Amazon and so fare best in soft waters — but this is only necessary for breeding. They accept tropical flakes and feed mainly at the surface but will shoal and swim mid-water. The supplies are ample from Far Eastern fish farms so prices are reasonable, but do not buy very young species. These are too small for a community tank; choose specimens 2cm or more in length.

Angel Fish

These were also Amazonian fish originally, but have been bred by man into many varieties such as Lace, Black, Gold, Ghost, etc. Choose the variety you fancy, but again make sure they are not too small, certainly

larger than a new penny. They are midwater swimmers and will accept tropical flakes exclusively.

Guppy

The Guppy, or Millions fish, is so fascinating there are societies of fishkeepers devoted to the study of just this little fish. It originated in South America but has been introduced into most parts of the world's tropical areas to control Malaria (by consuming mosquito larvae).

The males are brightly coloured to attract and impregnate the larger, non-coloured females. She is then permanently pregnant, producing live fry every month or so, long after they father may have even died. Buy the males for their colour and tail shape but include one or more females so the males will display. They are surface feeders and take floating tropical flake. Special Guppy flakes are also available.

Swordtail

These are Mexican fish, famous for the elongated caudal (or tail) fin. This "sword" is only found in the male fish. Like the Guppy, the female produces live young periodically. There are Green Swords, Red Swords and specially bred varieties with a

STOCKING LEVELS

Tank size (inches)	Metric (cms)	No. of Top Ten fish (small)
18 x 12 x 12	45 x 30 x 30	2 of each = 20
24 x 15 x 12	60 x 38 x 30	Trio of each = 30
36 x 15 x 12	90 x 38 x 30	Six of each = 60
48 x 18 x 12	120 x 46 x 30	Dozen of each = 120

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TROPICAL FRESHWATER AQUARIA



BILLY TOMLEY

Platies are colourful and peaceful but will interbreed with Swordtails.



JOHN GARDNER

There are several varieties of the Dwarf Gourami now available.



BILLY WHITEHEAD



BILLY WHITEHEAD

Above, Guppies come in all shapes and colours and are extremely hardy. Left, the Neon was voted the most popular tropical fish of 1986 by UK aquarists.

variety of colour patterns or elongated finnage. The common Green or Red is the best fish for a community tank, being hardier than the others. Tropical flake is taken from the surface, but a vegetable flake should be included for these fish because they are partly vegetarians.

Platy

The Platy is a nice, lively, little fish that has been bred into over 30 different colour varieties. These, too, are livebearers and easy to keep and feed.

Zebra Danio

There are several Danios that make good community fish but the Zebra is most suitable for its unusual stripes and ever-busy swimming all around the tank. Several fish will form a shoal. They will take crumbled flake food.

Harlequin

Again, there are several suitable fish in the group known as Rasboras. Lively swimmers, they accept tropical flakes readily. The Harlequin is a particular favourite for its unusual black diamond coloration.

Dwarf Gouramis

There are many Gouramis, some of which are suitable for community tanks. The Dwarf is one of the smallest and, when a pair is "courting", certainly the most beautiful in coloration. Their mouths are very small so crumble their flake food.

Bronze Catfish

The previously listed fish occupy the top and middle of the tank. Catfish occupy the bottom. Of the thousands of species the *Corydoras* Catfish are most suited for community tanks and, of these, the Bronze is particularly pretty and easy to keep. Let flake food fall to the bottom to feed these fish, or drop a tablet of food onto the gravel for them.

Siamese Fighter

This is the one fish unsuitable for keeping in twos or more. The males fight to the death, so keep just one male (which is the more attractive anyway, with long flowing fins) alone or with one or two females. There are Reds, Blues, Greens of almost iridescent hues and others. They are partly surface fish and accept floating flake foods.

Whatever you choose make sure the fish is colourful, lively with a bright eye, erect fins and no blemishes anywhere before you buy it. With proper care, particularly the water quality, the above species will live for 3 years or more.

Further Information

Free Beginners' Guides are available by writing to Dr David Ford at Thomas's, Oakwell Way, Birstall, Batley, West Yorkshire, WF17 9LU.

TROPICAL FRESHWATER AQUARIA

FILL YOUR TANK WITH MOUNTING GREENERY

Dick Mills provides expert guidance on some of the best plants to buy for a first aquarium. (All photographs by the author).

Give your new aquarium that 'established for years look' by making good use of aquatic plants. This is not a selfish act on your part alone, for the fishes will also benefit: plants provide shade, spawning and resting sites, sanctuary for subsequent young fry or timid adults,

combat algal growth and even provide food should you pick vegetarian-minded fish!

Choose each plant with a definite purpose to fulfill (apart from looking nice, that is!) Background-fillers hide the walls of the tank, while space-fillers disguise its inherent box shape. Cover gravel with low-growing species out of which rise your 'pride and

joy' specimen plants. Overhead, floating plants reduce the blaze of light from the lamps, giving a sense of security to the fish and enabling shade- and light-loving plants to be grown in the same tank.

Many people do not realise just how many plants it takes to set up that well-established look; be prepared to spend at



Always buy healthy plant stock, from a healthy display.



Cabomba, Hairgrass (*Eleocharis acicularis*) and Water Wisteria (*Hygrophila difformis*) add a sense of distance within this tank, helped by small foreground plants.



Water Wisteria, *Hygrophila difformis* (*Synnema triflorum*) fills corners of the tank perfectly.



Rosbora borapetensis show up nicely against a backdrop of Cabomba (left and right) with *Hygrophila polysperma* (centre front).

BEGINNERS' GUIDE

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least the equivalent price of a power filter on plants for even a modest-sized aquarium. Plants in nature do not grow in splendid isolation or in well-ordered rows like apple orchards. Plant in 'species clumps' and don't stock too many different species — like fish, some plants require different conditions and aren't compatible, no matter how much you like the look of them together.

When choosing plants, bear in mind what fish you intend keeping too: tough cichlid characters need tough plants (Amazon Swordplants, *Vallisneria* and *Sagittaria*); vegetarian fishes will make short work of soft-leaved plants such as *Cabomba* and *Limnophila*; livebearer fry and Killifishes will appreciate floating plants (*Riccia*, *Salvinia*); spawning egg-scattering fish will use bushy type species (Java Moss). Terrestrial indoor plants such as *Dracaena*, 'Ivy-Leaved Crypt', Spider Plants, etc may provide striking foliage for a while but cannot be regarded as permanent aquatic plants.

BACKGROUND PLANTS

Vallisneria and *Sagittaria* are clear favourites for the job, easily blocking out the back and side walls of the aquarium. *Vallisneria spiralis* and the shorter *V. spirifolia* can be used together to form a graded background. Similarly, *Sagittaria* species can be used to the same good effect. Both

species are excellent in deep tanks and complement the body forms and swimming habits of Angelfish, Discus, Headstanders (*Anostomus*), and other reed-dwelling fishes admirably. They are relatively undemanding, doing well in ordinary hard, alkaline tap water. Propagation is by runners.

SPACE-FILLERS

Water Wistaria (*Hygrophila difformis*, formerly *Synspha triflorum*) is a wonderful space-filler. It thrives under bright light, developing deeply-indentated leaves. It propagates by cuttings; even a single floating leaf will produce roots in a short time.

Indian Fern (*Ceratopteris thalictroides*) is very similar in looks but is a much more buoyant species, relentlessly floating up from the gravel no matter how hard you root it. Its leaves lie on the surface, give shade, and its long trailing roots provide refuge for fry. It prefers a bright light. Propagation is by daughter plantlets forming on leaves.

Softer-leaved plants such as *Cabomba*, *Ceratophyllum*, *Limnophila* (*Ambulia*), and *Myriophyllum* all demand two things in common — good lighting and very clean water. Use *Ceratophyllum submersum* and *Myriophyllum hippooides* for tropical use; transferred coldwater varieties will not thrive. All can be propagated by re-rooted cuttings.

Bacopa caroliniana and *Ludwigia malletii* have thick fleshy leaves that can be induced to turn a reddish hue under good lighting conditions. Propagate by cuttings, which also makes the plants produce more side shoots.

Java Moss (*Verticillaria dubyana*), Java Fern (*Microsorium pteropus*) and African Water Fern (*Bolbitis huadeloti*) are all rootless but will cling to any surface. The former provides an excellent spawning medium, and all can feature as background or specimen plants, doing well under subdued lighting.

GRAVEL-COVERERS

Foremost among the carpeting plants must be the *Cryptocorynes*, many of which thrive in the semi-shade. Smaller species such as *C. beckettii*, *C. nevillii*, *C. vanderii* and *C. willisii* will cover the aquarium floor, whilst the larger *C. affinis* (formerly *C. haerleiana*) often runs quite rampant, its main attraction being the rich purple undersides of the leaf.

The small species of Amazon Sword, *Echinodorus tenellus*, is only a couple of inches tall. Another ideal gravel coverer, like all *Cryptocoryne* species, it too propagates by runners.

The paler leaves of Water Cabbage (*Samolus parviflorus*) create a distinctive effect against darker green neighbours. A

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terrestrial plant really, it does not thrive too well above 21°C (70°F); it propagates by daughter plants but if grown emerse will produce seeds. Alternatively, adult plants can be split.

SPECIMEN PLANTS

Hairgrass, *Eleocharis acicularis*, has stiff needle leaves rising vertically from the gravel. Place clumps in front of a piece of sunken wood or a rock face for dramatic effect. Fed with clay pellets in the gravel, it will reproduce by runners.

Without doubt, the real specimen plants come from the *Aponogeton* and *Echinodorus* genera, pride of which, surely, being the Madagascar Laceplant (*A. madagascariensis*). Regrettably, although the plant often grows readily from the original tuber it never seems to survive the 'resting' period; it must also have just the right amount of light to prevent the skeletal leaves becoming clogged with algae. More successful, for the beginner are *A. crispus*, *A. ultracrisp*, *A. undulatus*; these prefer a rich substrate and will provide very striking centrepieces for the aquarium. *Aponogeton* species produce single or double flower spikes (depending upon country of origin) which can be pollinated; seeds should be sown in shallow water to provide new plants. *Aponogeton* specimens benefit from a resting period: remove the died-down plants and store them in cooler water 12°C (50°F) for two months before replanting in the aquarium.

The rivals to *Aponogeton* must be the Amazon Swordplants, *Echinodorus* species. Growing from roots instead of tubers, their bouquet-like sturdy leaves are ideal spawning surfaces for cichlids such as Angelfish, as well as for underleaf spawners such as bubble-nesting *Trichopis* (Croaking Gouramis) and egg-depositing *Rasbora heteromorphus* (Harlequins). Young plants are sent out on runners and should be detached to form new plant stocks.

FLOATING PLANTS

Discounting the humble Duckweed (*Lemna* sp) and its attendant problems, surface floating plants are both attractive and useful. *Riccia fluitans* provides shade and shelter and, as anyone with big Barbs will tell you, good fish food too! Water Lettuce (*Pistia stratiotes*) is usually too large to be practicable in the average aquarium, whereas *Salvinia* and *Azolla*, if kept in check, are well worth keeping for their fry-refuge and bubble-nest-building material considerations.

Salvinia seen from above. Note the "hairy" leaf surfaces.

The twisted leaves of *Vallisneria spiralis* merge naturally with root and wood.



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CHRIS ANDREWS

'Lighting' — special high-intensity, over-tank lights are best for deep tanks. Fluorescent tubes can achieve good results in shallower aquaria.

STARTING UP

It is essential to know what equipment you need to set up a tropical aquarium from scratch. **Dr. Chris Andrews** of the London Zoo Aquarium sets the ball rolling by naming all the basic items of aquarium hardware and outlining the most important techniques of aquarium care.

The tank will probably come complete with hood and condensation tray, and will simply require a good rinse out with warm water before it is ready for use. Many tanks are now all glass, silicone-sealed

affairs, which may require sitting on a firm, even base. If in doubt, provide such a base in the form of a layer of polystyrene ceiling tiles.

Water is heavy — each gallon weighs 10lb — so the tank needs a strong support,

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such as an aquarium stand. Once it is filled with water you will find that you will not be able to move it.

TANK DECORATIONS

Whatever type of fish you are going to keep, the decorations for the aquarium will require careful selection. Use calcium-free gravel and rocks, making sure that the rocks have no sharp edges. Quite realistic plastic plants are available for those who do not want to bother with the real thing, and one or two pieces of well-soaked bogwood always looks nice in a tropical tank. You can buy plastic sunken galleons, opening and closing oyster shells and even plastic skeletons to add to the tank decor — it's your choice.

LIGHTING

If you intend to grow real plants, you will have to use some form of above-tank lighting. Fluorescent lights are the best for the average home aquarium. You should allow 15-20 watts of cool white light per foot length of tank, and leave this on for 10-14 hours a day. Compared to ordinary light bulbs, fluorescent lights are more expensive to install (though not difficult), but they do not give off as much unwanted heat.

TEMPERATURE CONTROL

You will, of course, require a reliable

heater-thermostat, allowing about 4 or 5 watts per gallon of water. But no matter how reliable the thermostat, the tank temperature will still require checking with a good thermometer. The digital stick-on thermometers are accurate, neat and easy to use.

You may have to persuade whoever pays the electricity bills that a fish tank does not use much electricity. Well, the simple fact is that it does not, an aquarium will add very little to the quarterly bill. If you have to, work out the likely power consumption from the wattage of the various pieces of equipment, noting that the heating will not be on all the time by any means.

PUMPS & FILTERS

You will also need an air pump and/or a filter. Undergravel filters are certainly very popular, and, like polyfoam cartridge filters, will require an air pump to make them work. Do choose a reliable but quiet pump. Noisy air pumps can be turned off for an hour or two each day — if necessary — but if you leave them off for longer than that you may get water quality problems.

Under-gravel filters are said to affect plant growth adversely, and in any case the gravel will require regular and thorough cleaning with a siphon if it is to perform efficient filtration in the long term. If sufficient depth of medium is provided and

the flow of water through the gravel is maintained at a low level, though, plants can be grown.

I tend to favour polyfoam cartridge filters in small to medium sized tropical aquaria, perhaps using a good power filter in larger aquaria. These come with their own very quiet water pump. Whether you filter the tank by an under-gravel, polyfoam or power filter, you will probably not need any extra aeration.

WATER TREATMENTS

Most aquarists rely on tap water to fill their tanks, but tap water is designed for drinking, not necessarily for keeping fish in. Fortunately, there are a number of excellent conditioners on the market, which will remove the potentially dangerous chlorine and effectively "age" new tap water — making it safe to keep fish in. Fish are very susceptible to sudden changes in temperature, so always bring conditioned tap water to the correct temperature, using a little boiling water from a kettle, before you add it to the aquarium.

THE FISH

Your local aquarium shop will be able to offer advice on which fish are best suited for a beginner. Remember that you cannot set up the tank and add all the fish on the same day, as the tank and its filters need a

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CHRIS ANDREWS

Plastic plants need not look out of place in a tropical aquarium.

settling in period. If you are desperate for the tank to have some fish, choose a small number of Barbs or Danios. Stocking a new aquarium must be achieved gradually over several weeks, and rushing the process will only cause problems.

FEEDING

The golden rule of feeding is "little and often". Fish must be fed 2-4 times per day, but with only as much food as is consumed in a few minutes. Overfeeding results in

uneaten food accumulating in the tank and possible water pollution. Avoid it at all costs. Dried flaked foods are an excellent staple diet for aquarium fish, but there are many other types also available, such as freeze-dried, deep-frozen and tablet foods.

REGULAR MAINTENANCE

Just as pet dogs need to be taken for a walk, and pet cats need litter trays, fish tanks have to be routinely maintained. That is not to say that you will have to spend

every waking hour with your sleeves rolled up delving into the murky depths of the aquarium, but do remember the importance of fortnightly or monthly partial water changes and filter maintenance.

RECOMMENDED BOOK

An excellent, inexpensive book for beginners is: **A Fishkeepers Guide to the Tropical Aquarium** by Dick Mills, Published by Salamander, Price £4.95.

"Tank Ornaments" — some aquarists prefer the bizarre — others the simple. The choice is purely personal.



CHRIS ANDREWS

Helping hand

Nick Lushchan

Two Eheim products useful to disabled aquarists

1. Filter Taps

Several years ago, I, and other disabled aquarists, found one major stumbling block to using Eheim filters. Their taps required the sort of effort to turn that could cause severe problems, and not just to those having hand or arm disabilities.

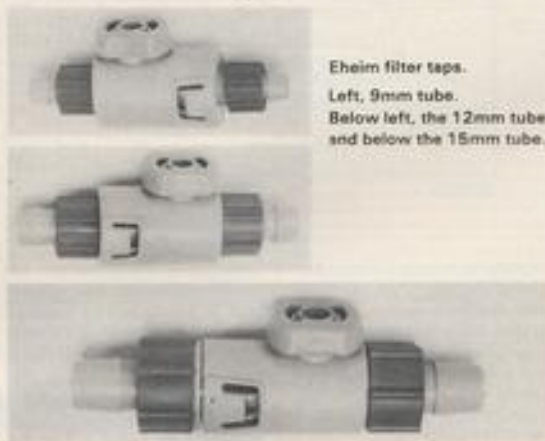
I was, therefore, absolutely delighted to receive a sample of the new, improved, Eheim filter tap which has just come on the market.

The construction of the whole unit is tough and durable, and the operation of the new, chunky, "knob-style" tap itself is extremely smooth and easy, requiring the minimum of effort. In my opinion, this is a tremendous improvement on

the old model and will be appreciated by all aquarists, disabled or not.

The overall size of the unit is such that you can hold it comfortably in one hand while you effortlessly turn the tap with the other.

There are three sizes of tap,



Eheim filter taps.

Left, 9mm tube.

Below left, the 12mm tube and below the 15mm tube.

all of the same design, to fit different tubing sizes:

9mm - £2.35 inc. VAT

12mm - £3.17 inc. VAT

16mm - £6.62 inc. VAT

2. Filter Holders

These holders for the 2007

and 2009 Eheim filters have been available for some time now but I have only been able to test one over the past few days.

Again, this simple piece of equipment marks a major step forward for disabled aquarists. Once a holder is pressed into position by means of four suckers, it doesn't need to be removed ever again for filter maintenance. Sucker removal has always presented problems for people with hand or arm disabilities — no more.

The filters themselves simply slide on and off the holders with no trouble at all. Bearing in mind the effort and contortions that some disabled aquarists need to make to remove suckers from awkward places, the holders now allow you to carry out this potentially tricky operation, not just effortlessly, but safely as well. Each holder costs £1.16 inc. VAT — a small price to pay for such a useful accessory.

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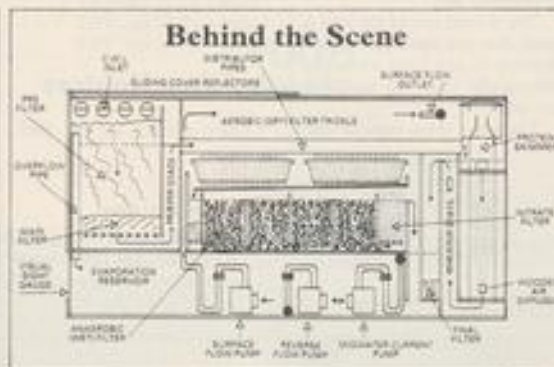
1. The Economy System

This new system has been designed as a basic life-support system at an economical price. Each system is available in a range of sizes in rectangular or cube-style aquariums with the following features:

Constant water level (C.W.L.), mechanical pre and main filters, trickle distributor pipes with aerobic (dry) biological filters, counter-current aeration chamber with heater-stat, single or twin pumps (as required), evaporation chamber with visual sight gauge (V.S.G.), wood-grained or coloured laminate surround, sliding cover glasses and optional "plug-in" reverse flow filtration. Prices start at £95 for a 30" x 12" x 12" aquarium.

2. The Modular System

This system is basically as above but has "add-on" capabilities for those aquarists who do not wish to resort to the initial



expense of buying a Fully Integrated System. Add-on modules available include, among others: anaerobic (wet) biological/nitrate filter, protein skimmer and "plug-in" reverse flow plates with additional pumps. Prices start at £240 for a 30" x 18" x 18" aquarium.

3. The Fully Integrated System

This system is mainly built to

customer specifications and can easily include all the features now in production by Lahaina. A presentation pack is available with an A-Z Features List,

along with a questionnaire to help the aquarist design his/her system. Aquarium shapes include cubes, bow-fronts, 5-sided, rectangular, and others. While prices for such personalised systems are difficult to quote in general terms, a typical 48" x 22" x 20" system would cost around £415.

4. Quarantine Tank

As from April, there will also be a Constant Water Level Quarantine tank with precisely measured treatment compartments to allow for accurate calculation of dosage levels.

For further details, contact "Lahaina", School Lane, Udimore, East Sussex, TN31 6AT. Tel: (0797) 224237.

The Ultimate Solution by T.A.P.

Technical Aquatic Products have launched a new range of medications and water treatments under the overall label of "The Ultimate Solution". There are products covering the whole aquatic spectrum from ponds to marine aquaria, many of which have been based on the Aqualife range, with a number of improvements.

There are two broad groups of products:

1. Medications

Broad Spectrum Bactericide (BSB) for both freshwater and marine systems; Marine Multiculture — a copper-based treatment for Velvet and marine White Spot; Parsure — an anti-parasite agent for both freshwater and marine set-ups; White Spot Remedy for freshwater; and Pongus Cure for all types of fungus.

2. Water Treatments

Marine Carbon for marine and



freshwater; Bioflor — a nitrate-free plant food for freshwater and marine systems; Vitamin Booster to replenish lost vitamins in freshwater and marine set-ups; Trace Element Plus for weekly use; Aquarium Algicide for freshwater systems; Snail Smasher — self explanatory!

Other water treatments in the range will be mentioned in the March edition of **Product Round-up**.

For further details, contact Technical Aquatic Products, 64 Nicholls Lane, Winterbourne, Avon, BS17 1NE. Tel: (0454) 778160.

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The entry with the most correct words, received by 28th February, will win the prize.

Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope the name of the expert to whom your query should be directed. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper, Buckley Press Ltd, 58 Fleet Street, London, EC4Y 1JU



TROPICAL
Dr David Ford



COLDWATER
Pauline Hodgkinson



PLANTS
Barry James



KOI
Roger Cleaver



MARINE
Graham Cox



DISCUS
Eberhard Schulze

Marine Hallway problems

I have a 39" x 18" x 12" aquarium which I intend to set up for marines. It will be sited in a hallway which receives a certain amount of sunlight but is near the front door. Will a single heater-stab be enough and will the opening and closing of the door cause any problems?

In view of the draughty position in which your aquarium will be sited and, because you need to adopt a "belt and braces" safety policy with regard to heating a valuable marine aquarium, I suggest that you use two 125 watt heater/stabs. Opening and shutting of the front door should not cause any real problems.

Algal Bubbles

There are lots of bubbles mixed with the algae growing on my tufa rocks and dead coral. Is this all right? I have never seen this illustrated anywhere.

The bubbles which you can see trapped within the algae biomass covering your rocks, etc., are bubbles of life-giving oxygen.

As the algae grow, they remove carbon dioxide from the seawater and, using light as the energy source, combine this

carbon dioxide with water to produce starchy and sugary foods for themselves. This process is called PHOTOSYNTHESIS and is perfectly natural. If green plants didn't have the ability to photosynthesise primary foods in this way it would be a toss-up whether (i) we all asphyxiated first due to lack of oxygen in the planet's atmosphere, or (ii) we all starved to death for lack of food.

Burrowing Anemone

I have purchased an anemone. It is cream in colour with short

tentacles which each have purple spots on their tips. It is approximately 5" in diameter, buries its body into the sand and sticks to the filter. Is this normal?

Anemones will frequently travel around the aquarium seeking the most brightly illuminated position. If, in their wanderings they decide that their best position is on the coral sand, then the body of the animal will work its way down through the sand until it reaches a solid, immovable surface to adhere to.

This behaviour, although frequently inconvenient to the aquarist, is also perfectly natural and cannot be prevented.



*If other fish are to be housed with Discus, they should belong to small, softwater species, such as the Flame Tetra (*Hyphessobrycon flammeus*).*

Discus

Aids to settling in

Although I am not a newcomer to fishkeeping I am trying for the first time to keep Discus. I have been told by one of my fishkeeping friends that these fish would settle down much easier in a new set-up if they were kept with other fish. What kind of other fish are suitable?

One often sees photographs of Discus set-ups which also contain other fish; I have seen such photographs where Tiger Barbs, or even Fancy Goldfish, were kept together with the "King of the aquarium." Personally, I am not in favour of such a set-up. I know that one of the best Far Eastern Discus breeders always keeps a few male Guppies with his Discus, but only for the first few days to settle the fish in their new aquarium. The male Guppies are usually removed after a week or so. Dr E. Schmidt-Focke sometimes keeps one Siamese Fighting fish in a Discus tank; but only to test the suitability of the water.

If you find a purely Discus fish tank not acceptable I suggest that you include some "gentle" fish like Cardinal Tetras, Rednose Tetras, Clown Loaches or any small soft-water loving species.

PRODUCT REVIEW

WATER TEST KITS

Many years ago, a popular radio personality always prefaced his reply with "The answer lies in the soil . . ." We can usefully transcribe his catchphrase to read "The answer lies in the water . . .", for much, if not all, of our fishkeeping successes depend upon water. By understanding some of its properties we can do much to improve not only the conditions under which we expect our fishes to live, but also our chances of keeping them healthier, living longer and eventually breeding them.

In the freshwater aquarium we are concerned mostly with three things — pH, hardness and nitrites. The pH of water is a logarithmic measure of how acid or alkaline it is (usually around a fairly narrow range,

6.5-7.5 being the normal extremes). Hardness, due to dissolved salts and often loosely-related to, and certainly confused with, pH in some people's minds, is another important parameter to be considered when attempting to recreate water conditions of a species' natural habitat.

Measuring the nitrite content becomes important after the water has been subjected to aquarium use and has become "contaminated" with ammonia-based toxic substances — the products of bacterial activity upon waste material present.

In saltwater aquariums, pH measurement is vital to assess the ageing process of the water (a falling pH indicates necessary action) while nitrite assessment is very important when judging the safe moment to introduce those first inhabitants into a

newly set-up aquarium. An extra test (especially important in marine aquaria) is that of salinity, more usually referred to as Specific Gravity (S.G.), assessed by means of a hydrometer.

Should disease require treatment, then it is more than useful to be able to gauge dosages accurately and Copper Test Kits allow this facility.

There are two things to bear in mind when considering the various test kits available: firstly, you only get what you pay for (generally the more expensive equipment is more accurate) but having said that, while inexpensive equipment may not be accurate to the same minutely-exact degree, as long as tests are made under similar conditions (same time of day, same water temperature, etc) the results obtained will be accurate enough for diagnosis. Another point to consider when pricing the various kits is to price out each test rather than to go simply for the cheapest outlay.



AMMONIA/NITRITE/NITRATE TEST KITS

These kits test for ammonia/nitrites/nitrate by measuring nitrogen-based substances present in freshwater and marine aquariums. Various tests indicate the level of toxicity present and the degree of efficiency or establishment of the biological filter bed.

Manufacturers:

Aquamagic Ltd (Tunze Products) market Merck Paper Indicator strips for instant elevation
Instant Ocean (Marine)*
Merck (Marine) (T.A.P.)
New Technology Products
Sera

The Sera Nitrat-Test, a "staged" kit which is easy to use

Tetra**

Waterlife Products

* INSTANT OCEAN also supply a Master Kit.

** TETRA Laboret contains pH, Hardness and Nitrite test kits, and colour wheel comparator systems.

SPECIFIC GRAVITY (S.G.) MEASUREMENT

Two types of hydrometer exist — an internal aquarium floating type (similar to floating thermometers) and an external 'swinging needle' fixed to a sample box.

The former can be difficult to read accurately, the external type's needle swings up to indicate the S.G. on a clearly marked scale.

Manufacturers:

Hobby (floating)
Instant Ocean (swing needle)
Interpet (floating, also combined unit of hydrometer and thermometer)
Waterlife Products (floating, with a measuring cylinder included)
Atlantis (floating)
Sera (floating)

COPPER TEST KITS

Allow accurate dosage when using copper-based marine aquarium treatments; can also be used to monitor aquariums and ponds for copper pollution.

Manufacturers:

Aquamagic Ltd (Tunze Products)
Instant Ocean
Merck (T.A.P.)
Sera
New Technology Products

CHLORINE, OXYGEN, IRON and PHOSPHATES TEST KITS

Although these more sophisticated kits may not have achieved the "popularity" of the others as yet, they provide for the checking of extra parameters. Use the chlorine tester to see if you really need to treat the water with dechlorinators; the amount of dissolved oxygen may be vital in

UND-UP

BY DICK MILLS

the spawning of some species, especially marines — an increase in aeration may be just the stimulus the fish need. Phosphate content again may prove to be crucial in marine systems. Iron is essential for plant growth.

Manufacturers:
Aquamagic Ltd (Tunze Products)*
Merck (T.A.P.)
Sera

pH TEST KITS

Based on a simple colour change (comparison occurring in a sample of the aquarium water to be tested), these range from the inexpensive sensitised paper strips, through to more accurate dry and liquid indicators and colour wheel comparators (which also take into consideration the colour of the sample water). Freshwater and saltwater measurements require different test kits.

Manufacturers:
Aquamagic Ltd (Tunze Products)*
Instant Ocean (marine; uses dry indicator agents)

New Technology Products
Merck (Marine) (T.A.P.)
Sera
Tetra
Waterlife Products** (saltwater; narrow (7.2-8.5) and broad range (4-10) freshwater with different colour change at each cardinal point; each kit contains free pot of acid and alkaline buffer)

* Electronic pH meters (including Redox potential readout), while within financial reach of a Society may be a luxury for the individual hobbyist.

** To avoid ambiguity with similarly-named companies, refers throughout to Waterlife SeAquariums products (Waterlife Research Industries Ltd).

HARDNESS TEST KITS

Like pH test kits, these are also based on observing a colour change occurring; most are liquid based. Kits may differentiate between General and Carbonate Hardnesses and usually give the final reading in European units, ie °GH (general hardness) or °KH (carbonate hardness). Hardness due to non-carbonates (°NKH) is then calculated

by the simple equation, °NKH = °GH - °KH.

Manufacturers:
Aquamagic Ltd (Tunze Products)*
New Technology Products
Sera
Tetra

* Electronic hardness meters, actually measuring water's conductivity due to dissolved salts, are also available, and the above comments on their pH counterpart apply equally here.

MARINE ALKALI RESERVE TEST

Tests the capacity of the sea water to resist changes in pH, ie, its buffering reserve. Should be used in association with a marine pH test kit.

Manufacturer:
New Technology Products

Finally, don't be intimidated into buying or using these kits until you clearly understand their purpose. While you cannot cause damage by carrying out the tests (which are all done outside the aquarium), the knowledge that the results provide can panic beginners into over-treating the water for the best of intentions, only too often ending with the direst consequences. As with all good aquarium practice, make any adjustments s-l-o-w-l-y.

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HOME FROM HOME FOR NATIVE MARINES

Although the rockpool inhabitants of British shores are much harder than their tropical counterparts, they still require clean, well-filtered aquarium conditions. Continuous filtration combined with powerful aeration ensuring a vigorous flow of water, are just two essentials. Adequate equipment, aquascaping, choice of substrate and choice of water are other important factors.

1) Selection of Aquarium & Equipment

Anything less than a 20 gallon tank, 36 in (90 cm) x 15 in x 12 in is too small for a community native marine aquarium, housing the more common large fish and invertebrates. However, smaller tanks are good adjuncts in which to keep some of the more delicate creatures that would be preyed upon in the principal tank.

The aquarium will require a hood. Blennies, crabs and the like will soon find a way out of an uncovered tank. It is envisaged that the newcomer will use an undergravel filtration system. In a 20 gallon tank, with the water circulated by air, you will require two pumps with the airstones placed in the filter uplift tubes. The water should be rapidly foaming at the surface.

If you intend to use an external filter, it is strongly suggested that you use a power filter (motorised), as a much greater flow of water will be filtered. However, if anemones are kept, which show best when small amounts of suspended food particles are present, this type of filter installed permanently may be too effective.

Air-operated internal filters are not recommended for the principal tank since their capacity is usually too small.

You will also require a thermometer calibrated 0°C to 25°C, and a hydro-meter for measuring the specific gravity and calculating the salinity of the water, which should read between 1.020 and 1.025.

2) Lighting

There is a lot of scope for artistic or personal taste in native marine aquaria. Sombre tungsten lighting, with a tankful of rocks and caverns, can produce an eerie and mysterious scene. Generally, light is best directed from above. Tungsten or fluorescent

Andy Horton continues his occasional series with the first of two step-by-step guides to setting up a successful native marine community aquarium. (Photographs by the author).

is a matter of personal preference. If the latter is used I recommend installing the starter unit outside the hood of the tank. This is because the fierce agitation of the water surface will result in a spray, that will corrode aluminium units.

3) Location of Aquaria

As I said in an earlier article (*A&P* Nov 1986) the major drawback in keeping native marine aquaria is that the water heats up too much in the summer. Ideally, it should not rise above 17°C. The tank should, therefore, be located in the coolest practical spot.

Allow plenty of arm room above the tank. You may need to hook out a half-eaten crab, or release a fish that has grown too large for the aquarium.

4) Substrate

An undergravel filter plate will require covering to a depth of at least 4 cm by a layer of shingle. This will enable effective biological and mechanical filtration. Gravel can be collected from a clean beach, but sediment may need to be washed from the stones.

Gobies, flatfish, shrimps, and fish from sand or mud shores are suited to a silver and sand substrate. The small grains tend to clog an undergravel filter and impede the water flow. A Grand Tidy or coral sand provide suitable substitutes.

5) Aquascaping

An art form in its own right (the tasteful arrangement of the plants, rocks etc. are as important as the fish. Therefore, it is a good idea to spend time deciding on the appearance of the final layout, and the requirements of the specimens that you are likely to keep.

Only a small selection of red seaweeds, notably the brownish coloured Irish Moss, *Chondrus crispus*, can be kept in a native marine aquarium. It is the rockwork that provides the furniture in the tank. Choice of rocks is likely to be what is available. Use hard rocks: flint and granite. Soft rocks, like chalk, will crumble in the water.

Many of the rock pool fish are bottom dwellers. Indeed, the Gobies, Cottids, Blennies, all lack a swim bladder, and spend much of the time resting on rocks and hidden in crannies. Therefore, if these fish are to be kept, arrange a fairly extensive layout of rocks, with a large supportive anchor boulder on the floor, and smaller rocks on top.

For the Blenny, *Lipophrys pholis*, at least one rock should reach above the water surface as this fish likes to bask on dry land during the summer. Be careful to ensure rocks do not overbalance. A Shore Crab, *Carcinus maenas*, will dislodge over ten times its own size and weight. Large crabs are incredibly destructive and best omitted from the aquarium. If necessary, rocks can be cemented into place.

Rocks from the shore should be examined to avoid any with strips of metal, which would be dissolved by the saltwater, with fatal consequences for the fish. Barnacles, limpets, anemones, can be left attached. Barnacles will provide food for both fish and crabs.

Sponges can be found fastened to rocks. They are filter feeders and will not survive for long in a properly filtered aquarium. Unlike molluscs, they are not eaten, and will quickly foul the water. Cockles, mussels, and oysters have a longer lifespan. Don't use too many though; three or four at most. If and when they expire, or before if the crabs or fish are dexterous enough, they will be gorged eagerly. Empty shells can be left as further decoration.

Rock pools and estuarine waters abound with the fry of larger fish. Small Grey Mullet, *Chelon labrosus*, are good to keep. They will require free swimming space. Some of the rockpool fish, especially the Bullhead, *Taurulus bubalis*, other Cottids, and the larger Gobies, prey on these fry.

6) Seawater

Common salt dissolved in water is not suitable. Seawater contains a 25% composite of other elements. Specially prepared sea-



Top, general view of an aquarium. Barnacles encrust the flint rocks, wedged firmly on top of each other to form caves.

Above, small Corkwing Wrasse, *Crenilabrus melops*, with Hermit Crab in Periwinkle shell. These small Wrasse fry are plentiful on weedy and rocky coasts.

A Sea Urchin hitching a ride on a Hermit Crab, *Pagurus bernhardus*.

water mixes available from marine aquarist shops are ideal. The only main drawback is the cost.

Seawater, if unpolluted, can be collected in four, five-gallon plastic drums. You will need at least one for water changes at a later date. Collection at high tide usually requires less effort. Water in rock pools and estuaries is often dilute or polluted. In the confined space provided by an aquarium, any pathogenic organisms in the water can quickly reach epidemic levels. This, perhaps, is the major drawback of using natural seawater.

7) Maturation Period

With the rocks carefully arranged on the gravel or coral sand substrate, the aquarium is beginning to take shape. Any spare rocks can be built into a diorama to the rear of the tank. In seawater, carefully added and

churning fiercely, it will take up to one month for the bacteria to multiply sufficiently in the gravel to act as an efficient filter. To ensure perfect results, buy a nitrite test kit. For a few days the nitrite will rise. As the aquarium matures, from two weeks to one month, the nitrite level will gradually fall to nil, when it will be safe to begin to stock the tank. In practice, limited stocking can take place immediately with the hardier rockpool invertebrates. This will be the subject of another article.

8) Accessories

Useful accessories include a siphon for transferring seawater. The thickness of piping should be the same as a hosepipe. One is available with a bulb so that you can avoid a mouthful of dirty water. An aquarium net and scraper are indispensable. If a magnetic

scraper is used, take care to prevent scratches appearing on the glass.

In a second article on setting up, I will be dealing, among other things, with stocking levels, feeding and aquarium maintenance. See you then.

Footnote: I would be happy to answer any enquiries or exchange information on native marines through *A&P* if a return stamp is provided.

Coldwater jottings



Stephen J. Smith

Watch out — winter's still about!

If the weather at the beginning of this year is anything like it was in 1986, we are in for a lot more winter before February is out.

A mild spell during January actually had the crocuses peeping above the lawn; while at the same time the fish were even beginning to look for food.

Just as many of us were expecting an early season — bang! February arrived and temperatures plummeted to the mid-twenties below zero.

Fish which had begun to emerge from their hibernation had little enough energy to withstand the sudden onslaught. While some of my fishkeeping colleagues fortunately suffered no losses, others reported several deaths of Goldfish, Koi and other pond species.

And isn't it always your favourite fish which get clobbered?

Until last February I was the proud owner of a six-year-old Calico Fantail — beautifully coloured and larger than my hand. Fortunately, I have several of her offspring and she was approaching peak condition for further spawning before her demise.

So what can we do to prevent such losses?

The answer lies with one most important word — preparation.

At the end of each season, the pond should be emptied and cleaned thoroughly with fresh water to remove all traces of sediment, rotting leaves and vegetation.

Many people have been surprised to learn that it is not usually the cold which kills fish. The damage is caused by poisonous gases from rotting matter being unable to escape from the surface of the pond when it is sealed with a layer of ice — thus poisoning the fish.

As a precaution, a pool heater will help to ensure a small area of the surface is kept clear of ice to enable noxious gases to escape.

My own ponds are protected

against all but the severest of frost by greenhouse polythene stretched over frames. Snow and ice is allowed to remain on the covers while an insulating layer of air helps to keep the pond surface clear.

There are as many methods of combating the rigours of winter as there are coldwater hobbyists. Why not let me know which method you favour?

Your ideas will be "aired" in *Coldwater Jottings* towards the end of the season to help provide guidance for other hobbyists.

A pond in your pocket

A useful guide entitled "Pond



Care" is the latest in a series of "Pet Guides" from Hamlyn, and should be in your local pet shop before the spring.

Penning by *A&P* editor, John Dawes, the pocket-sized book has a pocket-money price of only 65p. Over thirty pages provide guidance on all aspects of pond construction and maintenance and its colour illustrations would grace a book ten times the price!

Pond Care by John Dawes. Published by Hamlyn.

Filtration feedback

It is heartwarming to hear that even tropical fishkeepers find *Coldwater Jottings* of interest, and I have received a number of enquiries regarding Jack Larter's filter system, highlighted last June.

Ray Curle of Darlington, Co Durham, has written for advice about installing such a filter system in his six-foot Discus tank.

Frankly, the Goldfish is one of the dirtiest fish to keep — Jack Larter's system will keep a tank of Goldfish in crystal clear water and with virtually no maintenance.

However, for Ray Curle's Discus, I would save valuable tank space by installing an external power filter, perhaps with a built-in heater.

Such a luxury for the Goldfish keeper would, however, require constant attention in order to keep the filter medium free from clogging. Jack's filter never needs to be stripped down — so I know which I would prefer!

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Atlantis Competition, Aquarist and Pondkeeper (February), 58 Fleet Street, London EC4Y 1JU to reach us not later than 28th February.

The first correct entry drawn will win the prize.

Naturalist's notebook by Eric Hardy

Bait-digging survey

The Nature Conservancy is conducting a national survey of effects of bait-digging on shore life. They appreciate the need for anglers having adequate supplies of bait, but when demand outstrips supply, casual diggers may have a less responsible attitude than professionals towards shore environment.

Complaints were raised on parts of the Northumbrian coast and prosecution instituted on a nature-reserve. Locally, our chief problem was diggers on the Mersey at Liscard disturbing the haunts of a famous Iceland gull which came for 30 winters, but now seems to have died elsewhere. In popular places, lugworms are completely dug out. More noticeable were the losses of young cockles (food of flatfish) in the 1986 New Year's severe frosts at low tides.

Gullible's Travels

In the Eastern Highlands last summer, I left Loch Ness and its gullible's travels seeking fictitious monsters, for the real wildlife of Scottish waters — Golden-horned Slavonian Grebes nesting on nearby Loch Ruthven, Black-throated Divers on Loch Affric and a Scoter Duck with its young below Monar Lodge on Loch Monar, far above Glen Farrar. Even the forest-pools beyond Strathpeffer golfcourse had Golden-eye with young and the Red-throated Diver. Without a scrap of scientific evidence, Inverness has commercialised the so-called "monster" for half-a-

The Stone Loach
(*Noemacheilus barbatulus*) is about 30 times more resistant than Brown trout to cadmium poisoning

century.

Salt-glands derived from nasal glands enable sea-turtles as well as sea-birds to drink sea-water. The discovery of these in Australian freshwater crocodiles implies that they had a marine past in their evolution. Crocodilians were part of the evolutionary explosion of reptiles in late Triassic times with the phytosaurs, with nostrils in the top of the head instead of the end of the snout. True crocodiles replaced these at the end of the Triassic. Isn't this more interesting than the mythical monster of Ness?

Metal tolerance in fish

Fish vary considerably in their tolerance to cadmium, biochemists at Cardiff University College have found; but zinc plays an important part in aiding their resistance.

In other cases zinc and other heavy metals like copper have a direct toxic effect on fish, though in streams, migrating fish will turn back to avoid zinc. Zinc and cadmium are usually found together, if at all, in freshwaters with industrial effluent.

Rainbow trout, for example, are much more sensitive to cadmium than are Brown trout, and these are ten times more sensitive than cadmium-resisting Roach, Perch and Rudd. They, in turn, are more than three times as sensitive as Stone Loach.

While Rainbows retain nearly three times as much as Stone Loach and five times as much as Roach, they retained no more than the latter when zinc was added to the tank. Exposure of Rainbow trout to zinc, either reduces their intake of cadmium

or increases its discharge. Otherwise, it accumulates in them in association with proteins.

Learning abilities in fish

The personalities of fish are well-known to aquarists whose opportunity to observe them is most intimate. A north Lancashire boy placed a small Fellbeck trout in the well in his orchard. That was what I wrote over 50 years ago. The trout lived in the well 53 years and in all that time came regularly to be fed by his master's hand when called by the name of Ned. It would be the vibration from his voice close to the water that it responded to. But fish seem insensitive to conversation when we watch them.

Fish can be taught to proceed to a given spot to be fed in response to the note of a tuning fork in lower C. Wrasse are quick to form the habit. They can also distinguish between monochromatic red, green, yellow and violet lights.

Natural fungus protection

Many readers will remember the alarm 20 years ago when *Saprolegnia* fungus almost decimated salmon spawning beds in Britain, though the disease was long known in trout hatcheries. For want of a better name it was called Ulcerative Dermal Necrosis, and infected fish were patched with ugly rings and blotches of fungus. Research at Windermere's Freshwater Biological Laboratory has discovered a natural defence against the fungus in brown trout, produced in its

external mucus.

It is a fallacy that only damaged or sunburned fish are infected and it may be possible in future to obtain this protective material by stripping fish of their mucus in plastic bags.

No Boops, Puntis or Orfe

My Oxford Dictionary fails to include the Bogue, *Boops boops*, a rare Mediterranean Sea Bream identified last autumn at Aberystwyth University after a local netsman found it among his fish. This and another species range through the Mediterranean to Palestine where they are common on rocky ground.

Another not entered is the Puntis, *Barbus trigema* (or *Pantrius*) a cheap, Pakistani aquarist's fish which is sometimes put to good use to make printers' ink of good quality. Its oil is mixed with linseed oil, which isn't surprising, as shark-liver oil is also used to manufacture black printers' ink. One could continue with no Golden Orfe. A pre-war Hornsey owner of a garden pond related how a 12in specimen suddenly leapt 2ft out of his pond, seized a sparrow by its tail, and fell back with it into the water. He rescued the sparrow before the Orfe could do anything with it.

The dictionary has, of course, a wealth of references justifying its place on any fish-keeper's bookshelf. For instance, who knew of the West African freshwater Flying Fish, *Pantodon*, here called the freshwater Butterfly-fish? Its large, wing-like pectoral fins have an interesting anatomy, with special muscles to move them up and down. Kept in aquaria, these readily leap out if there is no cover. This tropical fish is fed with live insects or shrimps.

