

MARCH 1987 95p

# AQUARIST

AND PONDKEEPER

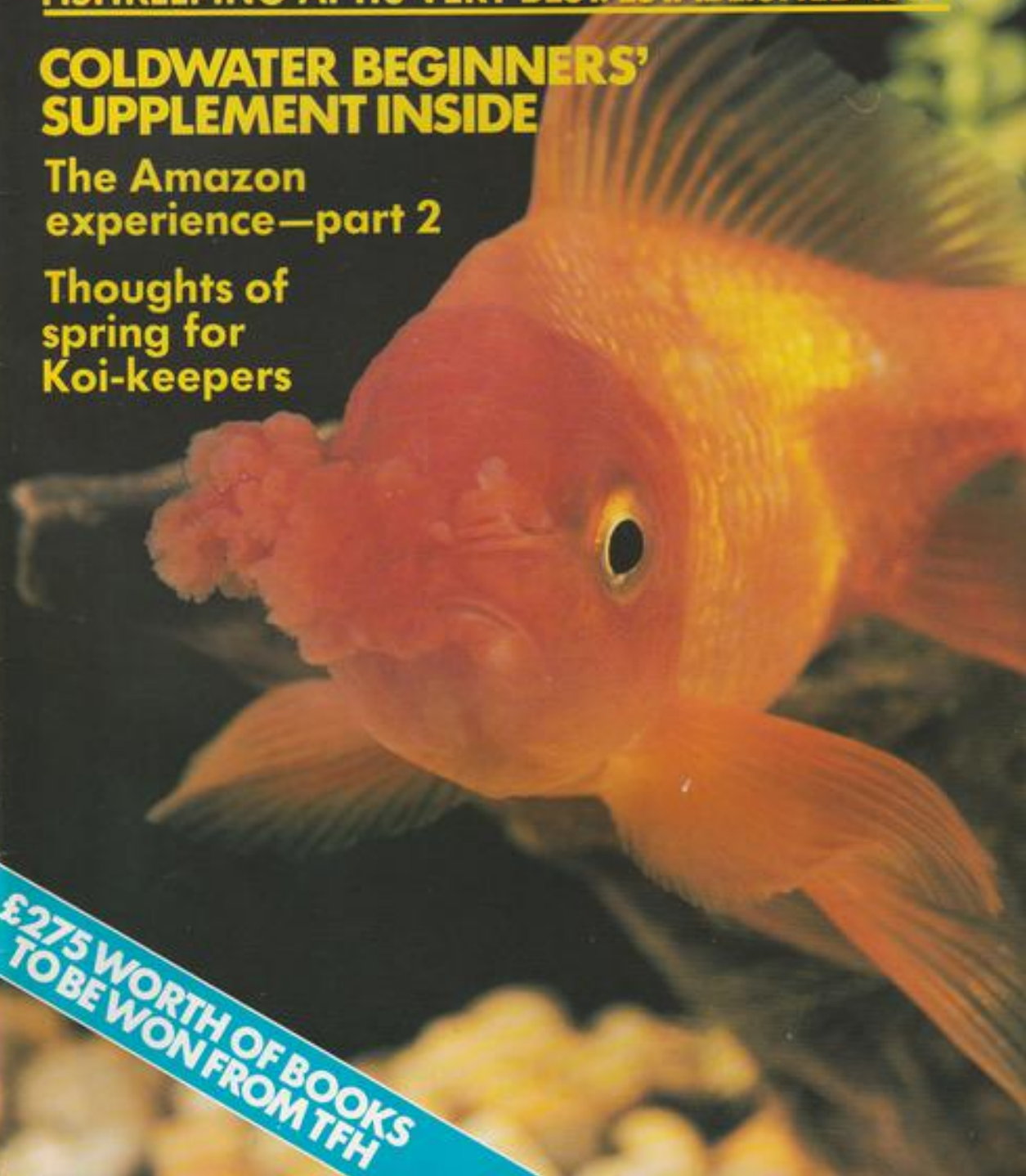
**FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924**

**COLDWATER BEGINNERS'  
SUPPLEMENT INSIDE**

**The Amazon  
experience—part 2**

**Thoughts of  
spring for  
Koi-keepers**

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## Cover Story

*Photography: Michael Gilroy*  
The Pompon is a variety of Fancy Goldfish which has highly developed nasal septa. The fleshy growths produced create the impression that the fish is carrying two fluffy balls (referred to as nasal bouquets) on its nose.

Excessive development of the bouquets sometimes occurs and this can lead to them being repeatedly taken into, and expelled from, the fish's mouth.

There are two types of Pompon. One lacks the dorsal fin and looks almost like a slightly elongated Lionhead without the hood. The second type has a normal dorsal fin. In the UK, the first variety is usually preferred.



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FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924

MARCH 1987 Vol. 51 No. 12

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# THOUGHTS OF SPRING

With spring just over the horizon, problems loom for those Koi whose keepers are unprepared for the onset of 'Spring Sickness'.

John Covelier puts forward his own thoughts on this controversial subject.

**S**pring is the time of year which many enthusiasts appear to dread, because it seems, to herald the onset of all kinds of trial and tribulation.

All those beautiful fish you put to bed around November time begin to stir, showing signs of coming out of their semi-hibernation and looking forward to the beckoning months of sunshine ahead (like us, they can dream!). Sad to say, many Koi will not live long enough to see much of the sun, as each spring sees the demise of so many fish from various causes, ranging from sheer physical debility through to something known universally as 'Spring Sickness'.

I must hasten to point out that what we see happening in OUR pools each spring, is merely a repeat of what happens in every NATURAL pool around the world at this time of year. It is nature's way of maintaining a life balance, where the weakest of a species simply die in order to protect the many! Thankfully, in our case there are steps which can be taken to reduce, or even eliminate, the toll and, as I pointed out in a previous article, we have not yet lost one fish because of winter's rigours.

With the onset of winter and its many weeks of bitterly cold water, a Koi sinks into a state of torpor, with very much slowed down breathing rate and minimal movement, in order to husband its energy reserves. In the case of a stark, clinical formal pool with no natural foodstuffs available, all feeding ceases and the fish merely lives off its own fat. All the bodily parasites on the fish also go to sleep. (Don't let anyone kid you — ALL fish have a population of microscopic animals on them). There will also be a population of parasite eggs, sitting like a time bomb!

In a semi-natural pool with a good healthy growth of algae and blanket weed on the walls, Koi will feed to a limited degree all through the winter, particularly when the temperature just wanders up a degree, or two for a few days. This diet poses no threat at all as the 'green stuff' is very easily digested. Never be tempted to feed your fish artificial food in the winter though — it could prove fatal.

With the coming of spring an extremely complicated cycle begins and it is at this time our Koi are at their most vulnerable. The keeper who immediately begins to heave handfuls of pellets into the pool at the first sight of sun and climbing temperatures can be quite literally signing the death warrant of his/her fish. **GIVE THEM TIME TO GET THEIR ACT TOGETHER!** If they are hungry, there should be more than sufficient natural food to get their digestive systems going. My fish get NO artificial food until the middle of May, sometimes later, depending upon the weath-



Spring parasite problems can rapidly build up in small ponds like this one. Larger ponds are generally more trouble-free.



The Skin Fluke, *Gyrodactylus*, is one of several parasites which can be implicated in common spring problems, such as 'sliminess-of-the-skin'.

er, and they thrive.

One has only to think of a digestive system which has been virtually unused for many weeks suddenly being asked to cope with hard, dry pellets to see the sense in this reasoning. I am convinced that many incidents of springtime mortality in Koi can be attributed to incorrect feeding at the beginning of the season, leading to digestive disorders.

Spring also results in an explosion of bacterial and parasitic life on our fish. Parasites which have been dormant all through winter come to life, eggs hatch out and fish to fish migration begins. I'm afraid my views on this subject will cause horror and indignation among the pundits and purists, but they work for me!

For about two weeks every spring, my Koi go quite bananas, dashing around the pool, leaping clear out of the water and generally playing silly billyies! All I do is grit my teeth and leave them to it, and eventually, they settle down, their natural defences having won the day. What we need to remember is that these defence mechanisms, having also been dormant through the winter, need time to wake up too.

I suppose I could join the majority of Koi-keepers in pouring chemical concoctions into the water but I believe that in most cases, the cure (?) is worse than the complaint! Mind you, my fish do have a large surface area in which to do their individual thing and in a smaller pool,



Fungus on a Crucian Carp. Koi are also susceptible to fungus in the spring, the fungal spores often attacking lesions left by parasites.

would possibly cause themselves some damage through leaping etc., so the reader must make a decision based upon individual circumstances.

Okay, so I'm a bit touchy about chemicals in the pool, but the thought of subjecting my fish to a treatment of say Formalin, which strips their protective mucus, at a time when they are still recovering from the effect of winter, just does not make sense to me.

The odd thing about all this is that the other varieties of fish in our pool, Orfe, Rudd, Goldfish, etc., never seem to suffer from skin flukes etc., just another little mystery in the never-ending saga of fish-keeping.

So what about 'Spring Sickness'? In my opinion, and I do stress this, 'Spring Sickness' is a blanket term covering all unexplained Koi deaths at this time of the year. Let's face it, if a fish has something wrong with it, it will be at its lowest ebb in the spring, so this is obviously the time for it to die — that's simple logic.

However, I will throw this question at you. How many Koi each year die from so-called 'Spring Sickness' which, in fact, could have been spared if the above philosophy had been followed? Answer that one and perhaps you too will, at some future date, be able to proudly display Koi which you have had in the family for seventeen years, and can confidently expect to still have in another seventeen.

# Letters

## Wetland Conservation

At Godstone in Surrey, immaculate mallard and scruffy muscovy duck beg food from Sunday afternoon cricket spectators (in season, of course!). Their home, a tiny pond on the edge of the village green.

A few yards away, behind the village pub, mallard share a much larger lake with moorhen, coot, mute swan, Canada goose and great crested grebe. Kingfishers dart across the water, while, in summer, reed and sedge warblers sing from the margin. Beneath the water, a myriad of life provides food on which the birds depend. Dragonfly and caddisfly larvae share the reed-fringed depths with hundreds of fish.

Godstone is lucky.

Many wetlands are far less fortunate. Both in Britain and abroad, wetland habitats are disappearing at an alarming rate. Not only are ponds and lakes threatened, but also rivers, streams, marshes, bogs, canals, peatlands, estuaries, and many more. Each supports its own community of wildlife, many species being endangered.

Wetlands are threatened in many ways. Ponds may be infilled, dumped in, or simply allowed to dry out. Streams and rivers may be diverted or polluted, marshes and bogs drained, or estuaries threatened by development or reclamation. Exploitation of species often exceeds their levels of replenishment.

Most wetlands produce a greater total mass of living matter than an equivalent area of farmland. Yet governments fund the drainage of wetlands. Massive areas of prime fenlands have been lost in areas like East Anglia, largely to produce food which is stockpiled in Europe.

Recognising the dangers of continuing such policies, the International Union for the Conservation of Nature and Natural Resources and the World Wildlife Fund, have joined forces to launch an International Wetlands Campaign. The campaign aims to convince governments and individuals that wetlands are not wastelands, but are vital to life on Earth. By the use of examples,

they will show that sensible development can be of value to both Man and nature.

Pollution is a major problem both here and abroad. Many parts of Britain were recently unable to meet new EEC guidelines on water quality, largely as a result of nitrate fertilizer run-off.

Much has been done by groups intent on saving wetlands in Britain, but a great deal more needs to be done.

Governments can do much to save wetlands and their associated wildlife by reducing or eliminating grants for drainage, promoting pollution control measures, and funding research into environmentally acceptable ways of development.

Aquarists can do even more. Most important is to stop demand for any species that are rare and/or endangered in the wild. Those with ponds are already doing something positive for conservation. So, if your garden is without a pond, then why not make one? If the local pond is overgrown or filled with rubbish, why not organise a work party of local people to help clean it out? Advice can be sought from the local naturalists' trust, who will also appreciate your support as a member.

The more people who understand wetlands, the greater chance is that they will survive.

Further details on the International Wetlands Campaign are obtainable from **World Wildlife Fund, Panda House, Godalming, Surrey.**

I would be pleased to hear from any *A & P* readers interested in the subject.

**John Drewett,  
Development Officer,  
Staffordshire Nature  
Conservation Trust.**



Wetlands not only provide a home for wildlife, but also add beauty to the landscape as this view of Friday Street, Surrey shows.

## Anti-antibiotic views

A query to Pauline Hodgkinson on Ulcers in pondfish in the January issue of *A & P* caught my attention as I've had similar problems and was able to cure the infected fish successfully.

Last summer, I noticed a pair of 9in red Comets (valued at £12 each) with holes the size of a 10p piece on one side of their body.

They were brought indoors and treated in a 25 gallon tank with a proprietary treatment, "Myxazin". Within two weeks the affected areas had healed over. Although white scar tissue had formed, the fish were both effectively cured of the problem.

I have no other experience with other proprietary brands but would never consider antibiotic treatment for the following reasons (which apply to the treatment of all fish whether coldwater or tropical):

- 1) Antibiotics are slow to work,
- 2) Constant use is likely to produce antibiotic-resistant strains of disease-causing bacteria,
- 3) Antibiotics will also kill the beneficial nitrifying bacteria in an undergravel filtration system (thereby causing the build-up of toxic ammonia and nitrite),
- 4) Lastly, antibiotics require a vet's prescription, and using a vet's services may be costly too!

The actual disease-causing organisms (Aeromonads or Pseudomonads) are opportunistic pathogens only attacking fish weakened by stress, due, for example, to overstocking, excess ammonia and nitrites.

Mrs Hodgkinson's advice on the necessity of buying healthy stock is sound. We should

always ensure that stock have been quarantined and kept in good condition and we should never, never, introduce fish or plants from a natural source (e.g.) Sticklebacks from a local pond harbour a whole range of parasites. How, for example, would you treat a 1-acre lake which had become infested with Argulus (Fish Louse) through the unhappy introduction of some infected rod-caught tench?

**A. Ewing,  
Slough.**

## Tetra's winning influence

Having read William Grey's letter about the effects of winning a prize in the Tetra competition (*A & P* — Jan. '87), I feel I must write to tell you of our own reaction at winning first prize of a visit to Tetra's West Aquarium in West Germany.

At the time, we had ten tanks in the living room and one in the bedroom of our one-bedroomed flat.

During our tour of the aquarium, Cliff, my husband, was quietly formulating plans to turn our flat into South-East Aquarium! The manager of the aquarium kindly gave us a big bag of the plastic plants which they use to encourage their fish to spawn. (The customs officials at Hannover Airport had a good, puzzled, look at them!) On our return to England, we began to build our own tanks for breeding. We now have 13 tanks in the front room and 4 in the bedroom (4ft, 3ft and 2 x 2ft).

So far, we have successfully bred Leopard and Zebra Danios, Flame Tetras, Rosy Barbs, Tiger Barbs, Black Ruby Barbs, Gold Barbs and we have just bred a wild-type Convict Cichlid with a pink Convict Cichlid. Not bad, since we still have been keeping fish for less than a year!

I would like to thank *A & P* and Tetra, UK for our trip to Germany and for my husband's continued enthusiasm for his hobby, although we're rapidly running out of space!

**Ellen Cummings,  
Stevenage.**



Dr David Ford and Thomas's impressive new Oakwell Factory.



## Important news from 'Aquarian' and 'Atlantis'

### 1. New Factory Starts Production

Thomas's, manufacturers of 'Aquarian', are currently in the process of moving to a brand-new, purpose-built factory at Oakwell Park in Batley, West Yorkshire.

The new 15,000 sq.-metre factory has been built because the company has outgrown its premises at Pellon Lane, Halifax — only ten years after it first occupied the site.

The past five years have seen trade quadruple and, according to general manager, Laurie Raper, business could be doubled again in the next few years.

The complete transfer of all product lines, including well-known brands such as Simakos,

Biscrok and Marrobone, will take until the middle of the year, but already, 'Aquarian' is making the move.

All enquiries concerning 'Aquarian' and 'Atlantis' products should, therefore, be sent to the new address as from now (see details in the Advisory Service item, below).

### 2. 'Aquarian' Advisory Service

Dr David Ford, Head of the 'Aquarian' Laboratories at Thomas's of Yorkshire, will be available for help with any aquatic problem at the following venues:

**Wednesday 4 March:** Skelmersdale & District Aquarist Society, Skelmersdale, Lancs. Venue from Hon. Sec. on Skelmersdale 29428.

### Tuesday 7 April:

North Bucks. Aquarist Society, Milton Keynes. Venue: "Small Meeting Place", Stacey Bushes, Milton Keynes, at 8.00pm.

## O.F.I. Update

Miami, Florida was the meeting point for the Ornamental Fish International Board of Directors meeting which preceded a ten-day field visit by members to Manaus and the Rio Negro in Brazil.

Mike Ednoff, of the State of Florida Department of Commerce, addressed the meeting asking O.F.I. for co-operation in compiling statistics on the aquatic import and export market. The compilation of the data would form the basis of a drive by the State to sell fish bred by the Florida farmers to the world markets.

Keith Barraclough, O.F.I. President, announced that the organisation had been invited to meet with the Secretary General of CITES (Convention on International Trade in Endangered Species). In addition, O.F.I. had been asked to send observers to the CITES meeting in Ottawa in July 1987. This was a major breakthrough for O.F.I. and came at a time

### Friday 5 June:

Basingstoke & District Aquarist Society, Basingstoke. Venue details from Chairman, A. Blake, Bounty House, Barendown, Nately Scures, Nr. Basingstoke, Hants.

Dr Ford will also be at the following Aquatic Shows:

**16-17 May,** Scottish Aquarist Festival, Motherwell.

**20-21 June,** 'Aquarian' Fish-keeping Exhibition, Sandown Park, Esher, Surrey.

**12-13 Sept,** Yorkshire Aquarist Festival, Queen's Hall, Leeds.

British Aquarist Festival — when announced.

The NEW ADDRESS for the free 'Aquarian' Advisory Service, which deals with problems on any aspect of fishkeeping is:

The 'Aquarian' Advisory Service, 'Aquarian' Laboratories, Thomas's, Oakwell Way, Birstall, Batley, W. Yorks., WF17 9LU.

Any letters sent to the old address will automatically be re-routed to the new laboratory at Batley, Nr. Leeds.

when, increasingly, attention was falling on conservation issues.

The Board agreed to join the International Marine Alliance, a group of experts engaged in protecting the Philippine marine coral reefs.

It was also announced at the meeting that, through the efforts of the O.F.I. U.S. Branch Office and PIJAC (Pet Industry Joint Advisory Council), a short-term import ban by the U.S. authorities on Singapore exports of ornamental fish had been lifted. The Singapore Branch Office of O.F.I. had also been heavily involved in the negotiations.

The President reported that a further donation to the O.F.I. Appeal Fund had been received from Mr Graham Cox of Water-life Research Industries Ltd., West Drayton, Middlesex.

For further information, please contact: Keith Barraclough 0274 576241 or Bob Rushton 01-404 5575.

## Socialise with 2000 fish

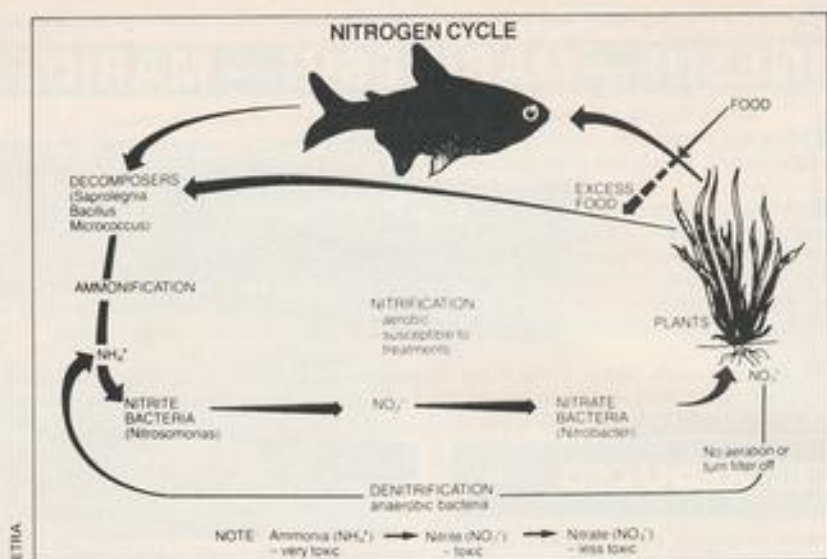
The London Zoo Aquarium holds 900,000 litres of circulating water, and 2000 fish belonging to 200 species.

As a venue for informal meetings, the Aquarium can offer a wide selection of evenings. There are three large halls — freshwater, seawater and tropical, all of which can be used for lectures, illustrated talks, parties, light refreshments, behind-

the-scenes and meet-the-animals tours.

The cost of holding an event in the Aquarium depends on the numbers involved and the type of function. Prices start at £5 per head.

If you are interested in an evening among the Piranha and Sharks, contact the Public Relations Office for further information on 01-722 3333.



Nitrogen Cycle. The bacteria in the nitrogen cycle break down fish waste into less toxic nitrites which can be used by plants as a fertiliser.

# MAINTAINING THE BALANCE

In his second article on this important subject, Dr David Pool of the Tetra Information Centre takes a close look at two factors which can have dramatic consequences.

**T**he water quality within our aquariums and ponds changes constantly throughout each day and from day to day. Some of these changes have little or no effect on the fish we keep and so can be ignored. Others do affect the fish and, to ensure that the fish remain healthy, these changes should be reduced wherever possible.

## The Nitrogen Cycle

The variation in the form and concentration of nitrogen is a good example of this change in water quality. Within any body of water a process known as the nitrogen cycle converts organic matter such as fish waste, uneaten food residues and dead plants and fish into ammonia or ammonium, nitrite and finally nitrate. Each of these stages is converted to the next with the help of oxygen-loving bacteria (see diagram).

The first stage in the nitrogen cycle is the formation of ammonia (toxic) or ammonium (non-toxic). Ammonia and ammonium are easily converted into each other. At pH values greater than 8.5 the water contains mainly ammonia, whereas at low pH values (below 7.5) it contains mainly ammonium. An ammonia concentration of only 0.1 to 0.2 mg per litre of water can cause problems to sensitive fish species. Fortunately this low level is unlikely to be reached if the pH is maintained below 7.5 and so is only a real

problem in marine and Rift Valley set-ups. Hence the need for protein skimmers and active filter media in such aquaria.

Ammonia is converted into nitrite by *Nitrosomonas* bacteria. Nitrites are less toxic than ammonia, but, wherever possible, the concentration in aquarium water should be kept below 0.2 mg nitrite per litre of water. A level greater than this indicates a breakdown in the biological filtration system, an

excess of organic debris in the tank, overfeeding or, perhaps, an unseen dead fish.

Nitrite is finally converted to nitrate by *Nitrobacter* bacteria. Nitrates are much less toxic to fishes and are used by algae and plants as a source of nutrition. The uptake of nitrate by the algae and plants is, however, not very efficient, so over a period of time, the nitrate level within the aquarium will rise. Nitrate levels above 40 mg per litre of water can adversely affect the fish and prevent plant growth. At these elevated levels an increased growth of blue/green algae is often observed.

In certain areas of the country the water directly from the tap has a nitrate level of over 40 mg per litre. In these areas, allowing the water to stand for several days before adding to the aquarium, using active filter media or by dilution with low nitrate water (e.g. rainwater) is necessary if sensitive fish species are to be kept and bred.

## Problems of high nitrogen levels

High concentrations of ammonia, nitrite and nitrate may affect the delicate gill membranes of certain fishes and reduce the oxygen-carrying capacity of the blood. This results in the fish showing symptoms of oxygen shortage, such as gasping at the surface, accumulating around the filter out-flow and rapid gill movements. Other



Water Test Kit. Regular monitoring of the water quality using a good quality test kit will allow problems to be identified and corrected before they adversely affect the fish or plants.

symptoms include poor growth rates, listless behaviour and greatly increased susceptibility to disease. Fry are particularly susceptible, with the growth rates being halved in some cases and the long fins of fancy varieties not developing to their full potential.

When high levels are recorded, a partial water change should immediately be undertaken and any organic debris removed. To prevent a recurrence of the problem the stocking level and feeding rates should be examined and reduced if too high, and the general tank hygiene should be improved. The nitrate level can be reduced by encouraging healthy plant (and algal) growth. Activated filtration media are available for removing ammonia and nitrites, but generally, they need only be used in severe cases or in the instances mentioned previously.

Ammonia, nitrite and nitrate can seriously affect the functioning of the gill membranes and prevent oxygen uptake. If this is combined with a low oxygen level in the water, the problem is compounded and can have lethal effects. Not only this, but in the absence of oxygen, the nitrogen cycle is effectively reversed and any nitrates in the aquarium are converted back to ammonia and other toxic compounds. Therefore, it is very important to ensure that the biological filtration has an adequate supply of oxygen-rich water, and does not become blocked with debris or accidentally switched off for any length of time.

### Oxygen

Oxygen is also subject to large changes of concentration within the aquarium. Dissolved oxygen is essential for the survival of both fish and plants. Therefore, adequate dissolved oxygen levels need to be maintained at all times.

Oxygen enters the water across the water surface, or from the plants as a by-product of photosynthesis (a process which occurs within the plant in the presence of light, involving the reaction of water and carbon dioxide to give carbohydrates and oxygen).

The amount of oxygen entering the water can be greatly increased by ensuring a good circulation is present. In this way oxygen-depleted water from the bottom of the aquarium rises to the surface where it can absorb oxygen from the air.

### Oxygen-associated problems

Oxygen is used by the plants, fish and most of the bacteria within the aquarium to respire and produce the energy necessary to live. If there are too many oxygen consumers, that is the tank is overstocked, problems of low oxygen concentrations can occur. These problems generally occur at night, when the plants are not photosynthesising (ie not producing oxygen). The overall concentration of oxygen in the water is not only affected by these processes, but also by other water quality parameters such as temperature and salinity.

Wherever possible the aquarist should keep the water saturated with oxygen. An



**Tank and Fish.** In a well planted aquarium the plants will remove many of the nitrates produced by the nitrogen cycle. Partial water changes are still advisable though.

## Correcting Water Quality Problems

Problem	Cause	Remedy
Increased Ammonia and Nitrite concentration	Overstocking or overfeeding. Build-up of organic debris or presence of dead fish.	Carry out an immediate partial water change and remove organic debris. Decrease feeding rate and stocking level. Increase efficiency and/or size of filter. Add active filter medium.
Increased nitrate concentration.	As above. Infrequent water changes.	As above. More frequent partial water change (every 2-weeks). Add plants and encourage growth.
Oxygen depletion	Overstocking or overfeeding. Decomposition of organic debris or dead fish.	Carry out an immediate partial water change and remove organic debris. Increase water turbulence. Check stocking and feeding levels.

oxygen shortage is indicated by the fish gasping at the surface and swimming in a listless fashion. When this is observed a 50% water change should be made immediately and the cause of the problem investigated. It is generally a result of overstocking or too little aeration, although excessive amounts of decomposing organic matter can use up large quantities of dissolved oxygen.

### Keeping check on conditions

Although fluctuations in the quality of aquarium water will always occur, with a

little thought on the part of the aquarist, they can be minimised, and any potential harm can be avoided.

The Table shows several water quality parameters which may vary within the aquarium, and how to correct extreme values. Regular use of a good quality test kit will allow these potential problems to be identified and corrected before they cause any harm to the fish and plants. Understocking the aquarium, rather than overstocking, avoiding overfeeding and regular partial water changes will also help to minimise water quality problems and reduce the aquarist's problems.

# Books

## Pond Book with a Difference

**Ponds and Pools — Oases in the Landscape**

By: Klaus Kabisch and Joachim Hemmerling

Published by: Croom Helm

ISBN 0-7099-1545-4

Price: £8.95

"The idea of writing this book was born out of the worldwide problem of pollution of the waters and, particularly, the threatened extinction of the smaller bodies of still waters in many European countries. The book is meant to be seen as a contribution for the protection of the environment, and it also pays tribute to the variety and beauty of the waters' fauna and flora."

Straightaway, the scene is set with these few words taken from the Preface of this impressive and thorough volume.

It is definitely not a step-by-step guide to ornamental ponds. It is, however, most definitely a book for all those whose interest in ponds and other bodies of standing water, goes beyond goldfish and water-lilies. It is an immensely interesting insight into what goes on above, below, on and around these "oases", providing a wealth of information on the organisms that make ponds what they are.

A good clue as to the sort of approach adopted by the authors can be obtained from the following brief selection of topics:

- Life on a water-lily leaf;
- Organisms as indicators of water quality;
- Making a meal and being a meal;
- Colonization of the water surface;
- The advantages of shallow still waters;
- Water animals in winter;
- Explosion of life.

"Ponds and Pools" is an absorbing, wide-ranging, though serious, book that will be welcomed by all those who regard ponds as more than just fish-filled holes in the ground. **John Dawes**

## Official RSPCA Pet Guide

**Care for Your Tropical Fish**

By: M. Richardson

Published by: Collins

ISBN: 0-00-410226-6

Price: £1.50

This beautifully presented small book covers all the basic requirements of setting up and maintaining a tropical freshwater aquarium.

It has been published in association with the Royal Society for the Prevention of Cruelty to Animals and, consequently, carries the Society's stamp of approval. This is reflected, quite properly, in the prominence given to the welfare of the fish, something that is recommended just as strongly by all of the best books on the subject. The photographs are good, the text

concise and the layout attractive and colourful.

Overall, this guide is a very good buy for anyone wishing to take up fishkeeping. It should also help to instil a proper sense of responsibility in anyone who ventures into our fascinating hobby. **John Dawes**

## A Must for Catfish Lovers

**Keeping Aquarium Fishes — Corydoras Catfish**

By: David D. Sands

Published by: Dee Bee Books

ISBN: 0-9511-959-0-5

Price: £5.95

To all those fishkeepers whose expression has changed to a grin when watching the antics of this group of fishes, David Sands' book is a must. It has every known *Corydoras* listed, the chapters ranging from natural habitat, through buying, to health care and on to breeding.

No aspect of the life of a *Corydoras* Catfish is left untouched. The pictures are good and leave you in no doubt as to the colour and pattern of these friendly community fish.

I liked the chapter on the type of aquarium that would be suitable for these fishes. I feel that on some of the fact sheets (alongside the pictures) more text would have been desirable. However, the book is well laid out, of a very handy size and written by an author who obviously knows and loves the subject. A worthwhile addition



to the bookshelf of the novice or advanced aquarist. **Adrian Blake**

## Important Messages for Herpetologists

**A Beginner's Guide to Keeping Frogs and Lizards**

By: C. H. Keeling

Published by: Basset Publications

ISBN: 0-946873-99-2

Price: £4.00\*

\*This figure refers to the price, post paid in the UK, direct from Basset Publications, 60 North Hill, Plymouth, Devon PL4 8HF.

Some books can be tremendously uplifting but leave you, nevertheless, with a feeling that their potential has not really been exploited. I found "Keeping Frogs and Lizards" such a book.

Chapter 2, "Some Pre-purchase thoughts", for example, deals with matters of responsibility, care, respect and ethics that I have been pushing for years. Not surprisingly, therefore, I warmly applaud the author for taking this stance, even though I don't fully agree with everything (s)he says.

Housing, care, and other topics, are all dealt with in this useful publication which should provide the prospective amphibian/reptile hobbyist with most of the basic ground rules.

I would have thought, though, that a book of this size (46 pages) would have better served its purpose had it restricted itself either to frogs (and toads) or to lizards. There is certainly scope for two volumes, both written by this caring, competent and thought-provoking author.

Even so, at £4.00, this book represents good value, particularly for the important messages it seeks to convey. **John Dawes**

## MICROSCOPY KIT COMPETITION

### Sponsored by Underworld

A professional-style Microscopy Kit worth over £36.00 is this month's fantastic prize from Underworld Products.

The kit includes:

Binocular (30x)

Manual

Test tubes and stand

Tweezers

Measuring jar and

pipettes

Dyes, slides and cover

glasses



Carrying case and batteries are also included, to enable aquarists of all ages to study *Daphnia* and brine-shrimp, diseases, eggs, plants, etc. etc. You could win this fabulous prize simply by identifying the microscopic organism illustrated. Write your answer on a postcard, together with your name and address and send it to A&P at the address below to reach us no later than 31 March. The first correct entry drawn will receive the prize.

Entries should be sent to: Underworld Competition (March), Aquarist and Pondkeeper, 58 Fleet Street, London EC4Y 1JU.



# Meet the societies

## Surrey Marine Aquarist Society

The S.M.A.S. was formed in September 1985 by Janette Sanders, a very enthusiastic marine hobbyist from Reigate.

Since then, the society has steadily grown and currently has a thriving membership from all areas of the south east, and a varied programme of activities.

Meetings are currently held on the first Tuesday of every month at Redhill Methodist Church Hall, London Road, Redhill, Surrey — very near to the railway station. As from April, a second monthly meeting will be held as a response to increased demand from members. This second meeting will be informal and is scheduled for the third Tuesday of the month. The venue (a member's house) will change from month to month.

The society produces a monthly newsletter, as well as a colour "Seascope" supplement distributed free to all members.

The aim of S.M.A.S. is "to broaden the horizons of the marine aquarist away from the concept of keeping these fascinating animals in 'glass boxes' and to appreciate the diverse and varied ecosystems that we pluck them from."

Talks are generally chosen to reflect this and, as such, include topics like marine conservation, sub-aqua, underwater photography, environmental aspects and allied areas of interest. This is supplemented by membership of the Marine Conservation Society and further strengthened by close links with the Underwater Photography Society and the British Sub Aqua Club.

Now that the Surrey Marine Aquarist Society is well underway, it is in a position to give advice to individuals or groups who wish to start up a marine society. If you fall into this category, S.M.A.S. would be delighted to hear from you.

This very active and "original-thinking"



society differs from many others in a number of ways, one of the most unusual being that there is no committee as such. There are, in fact, only two official positions, those of Treasurer and Secretary.

Membership fee is £6.00 per year, renewable each September.

For further details contact: Miss Janette Sanders (Secretary), 12 Smoke Lane, Reigate, Surrey RH2 7HJ. Tel. (07372) 22689.

# News from the societies

## Waterlily and Northern Horticultural Societies Seminar

The Waterlily Society and the Northern Horticultural Society will take to the water on 23 April with a unique one-day seminar entitled "The Garden Pool" at Harlow Car Gardens, Harrogate, from 10.00am to 4.00pm.

Authoritative speakers at this, the first meeting of its kind in the United Kingdom, include Bill Heritage of Wildwoods Water Gardens Ltd., author, *A & P* contributor and leading exponent of modern water gardening in Britain. His subject will be "The construction and design of water features for modern gardens".

Philip Swindells, FLS, M.I. Hort., Curator of Harlow Car Gardens and author of "Waterlilies" and "The Water Gardener's Handbook" (who has also written for *A & P* from time to time) will discuss "Aquatic plants and ornamental fish".

Seminar fees are £6.00 for members of the Northern Horticultural and Waterlily

Societies and £7.50 for non-members, who are most welcome. Full details and applications should be addressed to: The Education Officer, Harlow Car Gardens, Crag Lane, Harrogate, North Yorkshire HG3 1QB. Tel: (0423) 65418.

You are encouraged to book early for this very special event.

Delegates will also be able to preview the recently restructured and replanted streamside which undulates over half a mile through the beautifully landscaped 68-acre gardens.

### East Kent Aquatic Study Group

E.K.A.S.G. is a seven-year-old society based in Herne Bay. Members come from a wide area encompassing Margate and Ramsgate in the south, to Sit-



The magnificent flower of *Victoria amazonica*, the world's largest waterlily.

tingbourne in the north, and even as far as Canterbury. This very active society will be holding its third Open Show in April, for which it has been allocated the Federation of British Aquatic Societies' Championship Class. The East Kent

Aquatic Study Group is affiliated both to the F.B.A.S. and the K.A.A.S. Further details on the society are available from J. Edwards (Secretary), 14 Upper Dane Road, Margate, Kent CT9 2LX. Tel. Thanet 291750.

## Diary dates

### Sudbury Aquarists' Society

The 15th Open Show of Sudbury A.S. will take place at Neasden High School, Quainton Street, Neasden, London, NW10 on 5 April. For further information and show schedules, contact Barry Witteridge (Show Secretary), 142 Joel Street, Northwood, Middx., HA6 1NL. Tel. (09274) 24450.

### Anabantoid Association of Great Britain

The A.A.G.B. 1987 Members weekend will be held at Rammore House, Sheffield University on 11 and 12 April. For full details of this important annual event contact: Ron Wright (Secretary), 141 Military Road, Colchester, Essex.

### Skegness & District Aquarist Society

The 1987 Open Show of

S.D.A.S. will take place at the Imperial Café, North Parade, Skegness on 15 March. Benching: 12 noon-2.00pm; Judging (to Y.A.A.S. Standards) starts at 2.15pm. Auction, refreshments, side stalls, raffle and trade stand. Fee per entry: 20p. Further information from H. Drawwater (Show Secretary), 14 Simpsons Court, Ingoldhells, Skegness, Lincs., PE25 1QE. Tel. Skegness 72421.

### Runcorn Aquarist Society — Wrong Show Date

The date of the R.A.S. Annual Fish Show and Auction is Sunday 29 March and not 19 March as advertised in February's Diary Dates. Sincere apologies to all concerned.



Left, fishing for Cardinals was an unparalleled experience for me.

Below left, Caymans, magnificent creatures though they are, are hunted for food in the Amazon. This one was released seconds after the photograph was taken.

Below, right, two *Cichla ocellaris* (Tucunaré), the larger one measuring 20in, and a 24in *C. temensis*, caught for the pot on rod and line, after our "Cardinal" excursion.



Above, small, but beautifully put together, this Black Piranha cannot be taken lightly, as Eddie Pillinger found out. Below, a fish's eye-view of a Tarafa, in the hands of an expert, at midnight. Far right, the clear, "tea-stained" waters of the Rio Negro and its tributaries, harbour an unknown wealth of, as yet, unidentified species.



# PIRANHA, CARDINALS AND CAYMANS

John Dawes completes the second half of an adventure-packed Amazonas expedition organised by **Ornamental Fish International.\***

Photographs by the author

There was blood on his T-shirt, and a bemused look on his face. He was holding up a forefinger that looked very distinctly the worse-for-wear. It had two arc-shaped gashes which almost encircled the tip, just below the fingernail. "Would you believe it?", he kept repeating, as blood kept dripping from the still-fresh wound.

Eddie Pillinger, from Water World, had just had a close encounter with a Black Piranha.

While the majority of our 29-strong party had slept (in between emergency dashes as we struggled with our bouts of Amazon Tummy), we had arrived at our destination and had dropped anchor. We were in the Rio Araçá, a tributary of the Rio Itú which, in turn, was a branch of the Rio Delmini, itself a tributary of the Rio Negro. Even here, the river was nearly half-a-mile wide.

A few, or should it be *the* few, who still had all their faculties more-or-less intact, had gone off before daybreak with a guide to set out some nets (Malhadaira) in one of the many flooded areas (Igapós) bordering the river bank.

## Dicing with Jaws

A few hours later, as dawn broke, they had gone back to check the nets and had found two small Black Piranha. Eddie had reached down to untangle one from the net and pass it over to the next boat when it did what any self-respecting Piranha would do — it turned round and bit him.

It was just as well that the specimen in question only measured 6 in. from snout to tail. Had it been the 12 in. specimen we caught later on — who knows?

That same morning, we went ashore in incessant, light, warm rain for our first go at what I call "wade fishing" — that is, wading through shallow water with large, hand-held, framed nets.

Our haul was quite staggering. Every net swing brought up something new. There were Dash-dot Tetras (*Hemigrammus bellottii*), *Parlotella*, *Parotocinclus*, Pencilfishes (*Nannostomus beckfordi* and *N. unifasciatus*), two unknown species of *Astyanax*, *Copella collettii*, a large Talking Catfish (*Ambly-*

*doras hancockii*), a few unidentified Tetras and several other species. It was incredible.

Not satisfied with this, we set off after lunch in our fleet of small boats on a 1½-hour trip up the labyrinth of creeks and channels choked in luxuriant vegetation down to the water's edge, and beyond, in search of Cardinals.

## In Search of Cardinals

This was one of the things I was really looking forward to. I feel that the Cardinal often suffers as a result of its extreme popularity. It is such a familiar fish that many aquarists don't really look at it as closely as it deserves. Few people would, therefore, classify it as one of the top five most attractive fish. Yet, take the time to inspect it at leisure, setting aside its undoubted familiarity, and you cannot fail to be impressed by its staggering beauty.

Anyway, here I was, thousands of miles away from home, on the trail of one of my favourite fish.

And I wasn't to be disappointed.

Why is it that when you place a group of people in a shallow pool in the middle of the jungle and stick a net in their hands, they suddenly and inexplicably, become children all over again? I don't know the answer — but the feeling's great!

I can still hear the shrieks of glee everytime someone caught his or her first Cardinal. And I will never forget the sight of those small shoals of Cardinals swimming in close formation in the clear, "tea-stained" water, among tangled roots and masses of rotting water-sodden leaves.

Magic — real magic!

Added to this, the long list of species we caught, which included *Crenicara filamentosa* and an *Aptisogramma* I couldn't identify, was the cream on what had turned out to be a delicious cake.

Even then, we were only two-thirds through the day. On the way back, one of the boats decided to go fishing to catch something for the pot. The "something" turned out to be two *Cichla ocellaris* (known here as Tucanaré), the larger of which measured — wait for it — 20 inches, and a closely related *Cichla temensis* which came in at no less than 24 inches.

At 10.30 p.m., after dinner back at base, we set off yet again — this time to check nets and, when these yielded nothing, to a sandbar a further 30 minutes downstream.

As the bow of the first boat touched land, our guide jumped out and disappeared into the undergrowth amid a great commotion, only to appear a few seconds later, soaked from head to toe, beaming, and holding one of the most beautiful animals I have ever seen — a four-foot and, consequently, small, Cayman (Jacaré).

Caymans are hunted in these parts for food, the usual means of capture being by harpoon. This, in fact, was what our guide had done. Fortunately, the wound was minor and, bowing to unanimous pressure, he released it, whereupon it sped off to try and put together the scattered shreds of its rudely shattered dreams. But not before we had all taken in the pure, unadulterated beauty of this magnificent creature.

## Casting Nets

The main purpose of our excursion to the sandbar was to try our hand at casting a handnet (Tarafo). Not surprisingly, we were useless — and I mean useless. Our guides were, on the other hand, experts. The very first cast yielded yet another two Black Piranha about 6 inches long.

Our numerous casts produced — well, they didn't produce anything at all. It was great stuff, though. What a day.

Every day brought its own little gems and our species list kept getting longer and longer. Too soon, though, it was time to head downstream with our cameras full of what we hoped would become perfect, indelible reminders of what we had seen, and with our minds overflowing with enough "embryonic" memories to last us, at least, a lifetime.

\*This expedition was organised by **Ornamental Fish International** and led by **Keith Barraclough**, President of O.F.I. and Chief Executive of King British. For full details of O.F.I., contact **Robert Rush-ton**, O.F.I. Secretariat, 4th Floor, Onslow House, 60-66 Saffron Hill, London EC1N 8QX.

# FROGS AND TOADS THE TOWN DWELLERS

Many garden ponds harbour thriving populations of frogs and toads, providing them with a welcome haven in a world where they are fast disappearing. Julian Sims discusses the species you are most likely to come across and puts forward some important thoughts on pond design.

**F**rogs and toads are two types of amphibian that twenty years ago were widely distributed throughout mainland Britain. Today, amphibians are, unfortunately, under threat of extinction in many of the wild places which they traditionally inhabited.

Reasons for amphibian decline include poisoning of invertebrate foods by pesticides, over-collecting of frog-spawn by school children, natural disasters, such as the drought of 1976 and the severe winter of 1981-82, but are mainly due to the destruction of habitat by human activity. One particularly common example of this environmental damage is the loss of long-established farm ponds. These have been drained, ploughed in and replaced with piped water supplied to galvanised troughs, raised off the ground and inaccessible to amphibians looking for a spawning site.

## AMPHIBIAN BIOLOGY

British amphibians are limited in the type of habitat which they can colonise for three biological reasons:

- (a) A thin, semi-permeable skin which is not water-proof.
- (b) Reproduction without copulation: Fertilization of eggs takes place outside the body of the female frogs and toads. An external water supply is, therefore, required so that the male sperm can swim to the eggs as they are released by the female.
- (c) External development of the fertilized eggs. Amphibian eggs are surrounded by a layer of jelly which absorbs water and swells up after release from the female's body. On emerging from these eggs, the gilled larvae (tadpoles) undergo a period of aquatic development.

Collectively, these biological characteristics limit most species of British amphibian to habitats where they have access to freshwater, especially for breeding purposes. Garden ponds are just such places and these man-made creations are progressively providing havens for frogs and toads.

## GARDEN POND DESIGN

The garden pond is a rapidly increasing feature of the urban environment and if a few simple requirements are met, will give hours of enjoyment "frog watching". These specifications are as follows:

### 1. Shape of pond.

The pond should have as large a circumference as space in the garden permits. This

will help to avoid overcrowding in future years when amphibian colonies become well established.

Gently sloping sides are necessary for easy access by adult amphibians at spawning time and exit by the metamorphosed juveniles later in the year. At its deepest part, the pond should hold at least 18 to 24 inches of water.

### 2. Material used for pond construction.

Three groups of material are in popular use for garden pond construction — fibre glass, flexible pool liners and concrete. Some ready-made fibre glass ponds have sheer sides, so unless a ramp is fitted to these, escape by metamorphosed juveniles can be difficult, if not impossible. All fibre glass ponds, however, have the long-term advantage that they are extremely durable and, once established, will last for many years.

Flexible lining materials are of variable quality and durability. Rubber (butyl) sheeting is the most expensive but lasts longest. Thus this investment is undoubtedly best in the long run, not only saving the cost of replacement, but also the time and effort this involves. Polythene sheeting is the cheapest and least durable, quickly becoming brittle in sunlight. PVC liners are intermediate in both cost and durability.

Concrete of between 4 and 6 inches thick, laid on a foundation of compacted rubble, can also be contoured with gently sloping sides. However, after the concrete has set and dried it must be treated with a water-proofing compound which will also neutralise the remaining toxic free lime. Left untreated, these salts will dissolve in pond water and poison livestock.

### 3. Vegetation cover in and around the pond.

A variety of plants can be purchased from a water garden centre. Suitable species include Curled Pondweed (*Potamogeton crispus*), Canadian Pondweed (*Elodea sp.*) and related species, Water Milfoil (*Myriophyllum spicatum*) and the alga *Chara sp.* Not only will all of these species release oxygen into the water, but they will also contribute to the food chain. When frog and toad tadpoles first emerge from their spawn they are herbivorous.

After leaving the water, growing amphibians need surrounding vegetation for protective cover. Marginal plants with large



Typical "mushroom" of frogspawn laid among 'Crispa' (*Lagarosiphon major*) in shallow water.



Common Frog tadpoles are totally herbivorous at this stage in their development.

leaves, eg Plantain Lilies (*Hosta sp.*) and Irises, allow them to hide from predators, such as Blackbirds and cats. A closely mown lawn around an amphibian spawning pond poses several dangers to emerging juveniles. These dangers include death by desiccation in the hot summer sun, or being sliced up by the rotating blades of a lawn mower.

### 4. Position.

Amphibian ponds should be sited in an open, sunny position. Sunlight will promote photosynthesis by the submerged plants — releasing oxygen into the water. Secondly, the sunlight will warm the pond water and so speed up tadpole development.

Ponds should not be excavated near overhanging trees. Deciduous trees will shed their leaves into the pond in the Autumn. As the leaves decay in the water they will cause organic pollution with the release of humic yellows and the build-up of phenols.

### 5. Water supply and quality.

When pond construction is completed, tapwater can quite safely be used to fill it, with the help of a hose-pipe. The agitation and general turbulence associated with this method will drive out most of the chlorine remaining from a domestic supply. The rest will disappear in about 24 hours.



Common Toads mating — their string-like spawn is clearly visible.



The Edible Frog (an introduced species) does not stray far from water. Note the distinctive light green dorsal stripe.



The Natterjack Toad — a delightful but endangered species.



The African Clawed Toad is an introduced species which can survive moderate winters and can cause problems where it shares its pond with our native amphibians.



Male Common Frog awaiting the arrival of a female at a shallow-water spawning site.



Countless toads meet their death every spring on their way back to spawning ponds as they attempt to cross busy roads.

The water level in an established pond is supplemented in the spring and autumn by rainfall and run-off from the surrounding soil. Such run-off can contain dissolved fertilizer and/or pesticides previously used in the garden. Nitrate-phosphate fertilizer will cause the rapid growth of water plants which will choke the pond. Dissolved pesticides entering the pond will either directly kill the tadpoles or poison the tiny invertebrates which form an important part of the diet of older tadpoles.

#### 6. Aquatic predators.

Fish and amphibians in a garden pond generally do not go well together. In particular, Goldfish eat large numbers of tadpoles and Sticklebacks will even remove the actual amphibian egg from the centre of its protective envelope of jelly.

The aquatic larvae of some insects also feed on tadpoles. Examples include the larvae of Dragonflies and of Great Diving Beetles (*Dytiscus marginalis*) which eat many tadpoles in the course of their development.

### AMPHIBIAN SPECIES

Currently, there are six species of frogs and toads which are either found throughout Britain or form self-sustaining breeding colonies in local areas.

The Common Frog (*Rana temporaria*) is the most widespread of the six and does particularly well in garden ponds. It is the first amphibian to spawn in the year — in a mild winter there are records from Cornwall of spawn being laid on Christmas Day. Shallow water, only a few inches deep, is usually selected for spawn release — a survival strategy to avoid predation by fish. Newly-emerged tadpoles are herbivorous at first, rasping at algae and other water plants with their horny jaws. However, these jaws are lost in the later stages of development and the tadpoles become carnivorous.

On average it takes around 12 weeks from when the tadpoles hatch from their spawn to the time froglets leave the water, but development can take much longer with low temperatures and in pure upland waters which have low concentrations of dissolved iodine salts.

The other two species of frog found in Britain are more limited in their distribution. The Edible Frog (*R. esculenta*) is identified by the light dorsal stripe in the centre of its back and the Marsh Frog (*R. ridibunda*) is very large. These two species don't stray far from the water and love to bask on rocks overlooking the pond. When disturbed, they leap in with a distinctive "plop".

It is thought that the Edible Frog was introduced into Britain during the Roman occupation (as a source of "Frog's legs"). However, the Marsh Frog has a much shorter history in Britain, only dating from 1935 when twelve specimens were introduced onto the Romney Marsh in Kent. Today, there is a thriving local colony in the drainage dykes and gravel pits, but the species has, fortunately, not spread to other parts of Britain at the expense of our native *R. temporaria*.

The Common Toad (*Bufo bufo*) is the most widespread species of toad. It does well in the garden and frequently colonises

greenhouses where it controls insect pests. However, there is a real danger of desiccation in the heat of summer if a water bowl is not provided. Common Toads travel a long way from their spawning ponds, sometimes up to 2½ miles away. The main migration back to a spawning pond takes place in the spring, and mostly at night. Common Toads spawn later than Common Frogs, usually in late March or early April.

Toads lay strings of spawn, very different from the spawn clumps laid by frogs. Deeper water is usually chosen. As with the Common Frog, Common Toad tadpoles also take about 12 weeks on average to complete their development.

The Natterjack or Running Toad (*B. calamita*) is our other indigenous species of toad. This is an extremely rare amphibian, now reduced in distribution to coastal regions of North-West England, East Anglia and Hampshire. This very endangered status is reflected by the complete legal protection it receives under the Wildlife and Countryside Act, 1981.

Currently, the African Clawed Toad (*Xenopus laevis*) is colonising parts of Britain. This introduced species has already established breeding colonies on the Isle of Wight and in Wales.

### CONSERVATION FOR A POSITIVE FUTURE

Garden ponds are undoubtedly a very important factor in the widespread distribution and long-term survival of many of Britain's amphibian species. Frogs and toads are not only very interesting to watch but are also of genuine value in the garden where they consume vast quantities of invertebrate pests. Indeed the use of pesticides must be stopped to avoid the very real risk of poisoning the amphibians themselves.

The easiest way of establishing a frog and/or toad colony in a pond is by spawn in the spring or tadpoles in the summer. Spawn or tadpoles can be obtained from the garden pond of a friend or relative. It is preferable to obtain spawn from several different sources so that a good "genetic mix" is obtained in the amphibians which develop. For this reason, spawn or tadpoles from a neighbour's pond should only be used as a last resort — your garden and their's will already share migrating amphibians from the same population.

It usually takes from two to four years for newly-metamorphosed froglets to grow, reach sexual maturity and return to their pond of origin to reproduce. This is another good reason for using spawn or tadpoles to establish a new breeding colony. You will guarantee getting some adults to return to their "adopted pond" in future years.

After a few years, garden ponds quickly become over-crowded with breeding amphibians, especially Common Frogs. This is the time to stock the ponds of friends or release spawn or tadpoles of Common Frogs and Toads into new ponds in the wild. If such a project was undertaken nationally, this release programme would prove of major significance in the conservation of frogs and toads.

# OUT AND ABOUT

with John Dawes

## WetPets — Home of the Romford Reef

If you are the sort of aquarist who will travel anywhere to see really good aquaria — start packing and head for Romford. To be exact, head for 71 Victoria Road, Romford.

There, behind an attractive but otherwise unspectacular shop front, lies WetPets, "specialists for Tunze filters and metal halide lighting systems" and home of probably the most spectacular marine invertebrate aquarium to be found in any shop anywhere in the UK.

The "Romford Reef" as the tank has become known, is truly breathtaking. While many marine aquarists struggle to keep their corals and other delicate invertebrates in good condition, Terry Evans has trouble stopping them from growing and taking over every conceivable habitable nook and cranny.

The 500-gallon tank is a dazzling display of rainbow colours wafting to and fro in the currents created by the vigorous aeration/filtration system which is capable of turning over the complete volume of the tank more than 10 times every hour.

If you have ever dived on a coral reef, the similarity in movement in this tank is quite uncanny. The masses of swaying, seaweeds, corals, anemones, shrimps, "invertebrate-compatible" species of fish and numerous other reef inhabitants will easily take you off to your own personal exotic coral island, if you allow yourself to give them less than half a chance. And believe me, it's not difficult to do just that. However, if you were to think that WetPets consists of just a single, large, spectacular reef tank and little else, you would be very wrong indeed.

Keeping the invertebrate tank company is an even bigger fish-only tank, holding no less than 600 gallons. Again, it's condition is nothing less than perfect. Turn your back on this huge aquarium and you are confronted by a superb battery of smaller tanks in which all the quarantined, marine sales stock is kept.



The Romford Reef.



No matter how often you see a spectacle like this, it never fails to amaze.



**POND PUMP  
COMPETITION**  
SPONSORED BY ATLANTIS

Win a £40 Sisce Ekto Pond Pump from Atlantis in this month's prize competition. This is the ideal complement to any garden pond, with a mushroom fountain attachment and 24-volt transformer included.

The competition couldn't be simpler. All you have to do is describe, in 25 words or less, why your pond should have a Sisce Ekto Pump.

Write your answer on a postcard and send it to: Atlantis Competition (March), Aquarist and Pondkeeper, 58 Fleet Street, London EC4Y 1JU. Closing date is 31 March, and the best entry in the opinion of the Editor, will receive the prize.

A measure of just how healthy the stock is can usually be gauged from the behaviour of Cleaner Shrimps and Cleaner Wrasses. During my visit, both were admirably living up to their respective names.

Expert handling, of course, has a great deal to do with the quality of stock. Equally important, though, is a thorough understanding of marine environments, as well as the needs of their inhabitants. Terry Evans has both these qualities in abundance and has put them to good use in devising his own "mega-Tunze" system which filters and treats the whole of the marine retail section to perfection.

You could spend hours looking at the innumerable species of marine organisms offered for sale. If you did that, though, you would only have seen about 50% of the total range of fish and plants housed in WetPets' 120-foot-long sales area.

And, taking this line of thought a stage further, once you had gone through every coldwater and tropical freshwater tank, you would only have seen part of Terry Evans' complete stock. The rest is all held behind-the-scenes, in a multitude of quarantine tanks, because Terry practices what he preaches and quarantines every single fish for, at least, one week (but often longer) before offering it for sale.

Then, of course, there are the dry goods — the tanks, cabinets, filters, pumps, lights, nets, pond liners, water treatments (including Terry's own Nitragon for removing nitrates from water), foods, books . . . and so on. Oh yes, you can also buy your copy of *Aquarist & Pondkeeper* at WetPets — can't be bad.

As you probably gather(!), I'm a bit keen on this shop. Visit it, and you are likely to be hooked as well.

Opening Times: 10.00 am to 6.30 pm six days a week. (Closed on Sundays).

For further details, contact WetPets of Romford, 71 Victoria Road, Romford, Essex. Tel. (0708) 44880.

# 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



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Dr David Ford



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Graham Cox



**DISCUS**  
Eberhard Schultze

## Marine Stocking limits

*I am starting up a 40" x 12" x 18" marine aquarium with an undergravel filter powered by two powerheads and one Eheim powerfilter. I hope to keep a Lionfish, a Pufferfish and a Clown Trigger. Would I also have room for an Angel Fish and a Tang?*

Your aquarium will have a gross capacity of 31 imperial gallons (140 litres) and a probable net capacity of the order of 28 gallons (approx. 125 litres).

Even with all the water management equipment which you already have, plus possibly a U/V sterilizer, I wouldn't advise you to exceed 1" of fish to each 4 gallons of seawater for the first 6-9 months of the aquarium's life i.e. after you have matured the filter-bed. Thus, initially, once the filter-bed is matured, you have room for  $(28 \div 4) = 7"$  of fish.

Allowing 4" for a young *Pterois volitans* (Common Dragonfish or Lionfish) and 3" for a Yellow Tang or Sailfin Tang, or the very hardy Mink Tang (*ZoRASOMA scopas*), it would be some considerable time before you could extend

The Sailfin Tang suitable tank-mate for a Lionfish and a Clown Trigger in a 40" tank.

your stocking from 7" of fish to the tank's ultimate, absolute maximum of 14" of fish.

Frankly, my advice is that, with such a small tank, you keep to your original idea of one Dragonfish, one Tang and, a year from now, a baby 2"-2½" Clown Triggerfish, and leave it at that. It is far better to have just three specimen show fishes in superb condition than push things to the limit and finish up with five stressed, warring, bickering fishes which always look slightly under the weather.

## Powerhead choice

*I have a 39" x 13" x 12" tank which I intend to set up for marines. I plan to use an H200 powerhead. Is it sufficiently strong to do the job properly?*

Your aquarium will have a nett capacity (i.e. allowing for dis-

placement by rocks, corals, filterbed, etc.) of about 27 to 28 gallons, or around 125 litres.

I am not familiar with the H200 powerhead. If the "200" part of the type description stands for "200 litres per hour", this would give you a specific turnover period, i.e. the time taken for all the seawater in the system to pass through the filterbed once, of  $(125 \div 200) \times 60 = 37$  minutes.

Whereas this would be adequate for a lowly-stocked sea aquarium, i.e. one containing no more than 1 inch of fish per each 4 gallons of seawater, it, unfortunately, gives you no back-up facility in the event of the failure of your single powerhead.

It would, therefore, be preferable to use two 18" under-gravel filter plates, each plate having one uplift operated by its own powerhead. You would then have a failsafe system, since the likelihood of both powerheads failing at the same time is extremely low.

## Plants Sub-gravel heating

*Can you explain the principles and advantages of sub-gravel heating systems?*

Sub-gravel heating systems have been developed to give a more even distribution of heat throughout the tank. Other advantages are that plants grow better when their root systems are kept warm, and that the system is much better from the safety aspect.

The system consists of three elements. Firstly, the current passes into a transformer which reduces the voltage from 220-240 volts to 42 volts. The thermostat is electronic and often possesses a liquid crystal display of the temperature in the aquarium. The thermostat is externally situated and derives its information from two electronic sensors located in the aquarium. The heater consists of a long flexible cable element covered in insulating rubber. It is placed on the base of the aquarium, but special anchoring devices keep the element from direct contact with the glass bottom and locate it in position to give the best heat distribution throughout the gravel.

The only problem is that the system is pretty expensive at the moment, although it is quite feasible that manufacturers will come up with cheaper systems in the future.



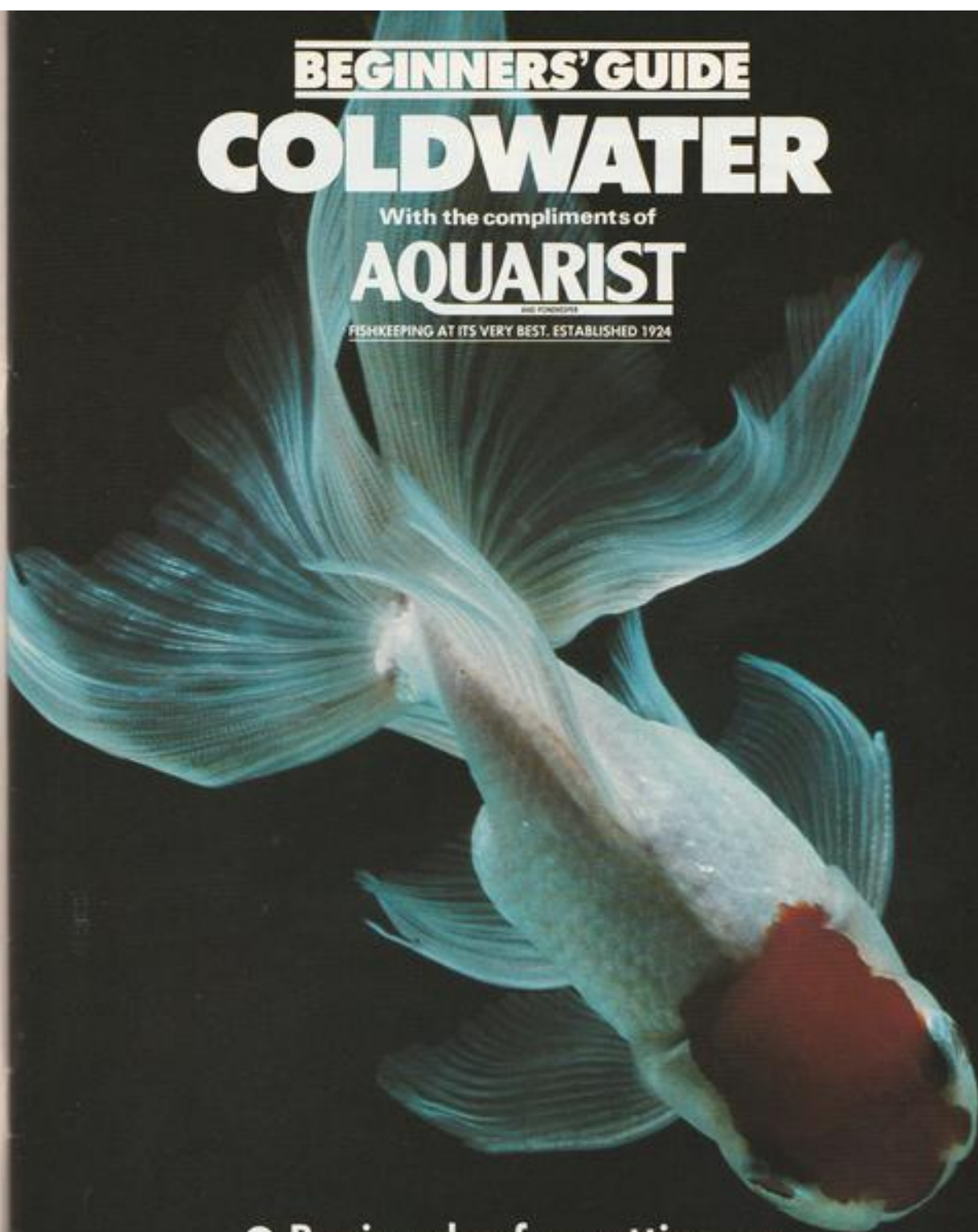
**BEGINNERS' GUIDE**  
**COLDWATER**

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- Basic rules for setting up
- Beginners' guide to Goldfish
  - The healthy aquarium
- Best coldwater aquatic plants



# BEGINNERS' GUIDE TO COLDWATER

## SETTING UP A COLDWATER AQUARIUM

Pauline Hodgkinson lays down the basic rules of setting up and maintaining a coldwater aquarium

If well placed and maintained, an aquarium can become not only a living piece of furniture, but a point of interest — a chance to witness a tranquil underwater world which can give a tremendous amount of pleasure and enjoyment.

The type of aquarium you choose is purely personal, whether it is built to your own particular specifications, or one of the tanks which come in a standard size; it could be plastic, angle-iron framed or the more popular all-glass type.

### Size is important

It is important to give a lot of thought to the size of an aquarium. Coldwater fish are happier with plenty of swimming space but, in addition, there are other very important aspects which are influenced by the size of a tank.

For example, Goldfish are able to tolerate a wide range of temperatures, but problems arise if temperatures fluctuate rapidly, as they do in small volumes of water. This effect on a continual basis would prove eventually devastating to the fish. The effect can, perhaps, be more easily understood if we ourselves were to be subjected to rapid changes in our own climate from

intense heat to bitter cold. If this situation were to prevail for days, weeks or months, it is doubtful if any of us would remain healthy for very long.

Pollution, and the serious problems it causes, take longer to take effect in a larger volume of water and, therefore, provide another good reason for avoiding a small tank. The best advice is to buy the largest tank possible for your circumstances. Choosing anything smaller than 24in x 12in x 12in is almost certainly bound to result in disaster.

### Siting the tank

Where to position the aquarium is very important, for if it were to be situated close to radiators or a fire the temperature of the water can be badly affected. Avoid window locations as this will allow excessive sunlight to fall onto the water and will encourage algae to flourish, covering the aquarium and making the water green. A location in a dark recess can be even advantageous as the amount of light given to the tank can then be controlled by artificial lighting concealed in the hood of the aquarium.

A location close by an electrical power socket is also advantageous as the filter and lights will need to be connected. Allow

enough space for easy access for tank maintenance, though.

It is very important to bear in mind that water is very heavy, so a strong support for the tank is necessary. It is interesting to note that 1 gallon of water weighs approximately 10 lbs, so it is easy to see why the support must be well able to withstand the overall weight that a volume of water, plus tank and all the contents can constitute. For extra protection for the tank, a cushion of expanded polystyrene will absorb any unevenness in the surface that the tank is to stand on.

### Catering for the needs of the fish

Providing for the needs of the tank inmates will, of course, be the top priority. It is essential that the water is kept clean, fresh and in the best possible condition; otherwise the fish cannot thrive. It takes only a little time for water to become contaminated by waste products from the fish or from tiny particles of food which have turned sour and started to decay. Not only does the water need to be clean, it also needs oxygen. It, therefore, makes sense to use artificial aids to help oxygenate the



Left, small Koi are hardy and can be kept in well-filtered aquaria. However, they grow to a very large size, even in confined spaces. Right, the Common Goldfish is the most popular pet in the world.

# BEGINNERS' GUIDE TO COLDWATER

water, filter out harmful waste and to maintain crystal clear, clean conditions. However, filtration should only be used as an aid, and not in place of proper tank maintenance, or to correct bad conditions caused by neglect.

## Aeration

Aeration by means of an air-pump is very beneficial because it circulates the water around the tank. A constant stream of air bubbles brings water from the bottom layers into contact with the surface so that oxygen can be absorbed and carbon dioxide expelled. However, it is unwise to believe that because the water has an increased amount of oxygen due to the assistance of an air-stone that it is safe to over-stock.

The type of pump will depend on the job it is to do; for instance, it can be used to operate an air-stone and a filter. Quite small models are able to provide adequate power for as much as a 30-gallon tank. Manufacturers give specifications with all their models and these will assist in the final choice. Many of the larger models have built-in adjustable air-flow controls so the output can be regulated. One very important point to look for in a pump is one which is a silent runner because a noisy pump can take much of the enjoyment out of a home display.

## Filtration

Filtration is, again, a matter of personal choice, but the main types to choose from are based on three different principles:

- (i) **MECHANICAL:** water which has suspended waste matter is passed through a medium, such as filter wool, nylon floss or foam pads. Solids are collected by the medium and the cleaned water is returned to the aquarium.
- (ii) **CHEMICAL:** such filters make use of materials with porous surfaces, eg charcoal. The harmful substances are absorbed and, again, the cleaned water returns to the aquarium.
- (iii) **BIOLOGICAL:** these filters put to work harmless bacteria which establish themselves within the filter and break down and nitrify toxic organic wastes. One important thing to remember with this type is to keep it running 24 hours a day, otherwise the bacteria will be starved of oxygen and will die.

## Lighting

Because natural light is so unpredictable, we can install artificial lighting and use it to our best advantage in controlling the amount most suitable for both fish and plants. Light is essential for the growth and propagation of the plants. It is, therefore, vital that they receive the right amount and strength of illumination so that they may flourish. For the best effect the light should be directed down into the aquarium so the ideal place to install the lighting is in the hood of the tank.

Fluorescent tubes are perhaps the most popular form of lighting in the aquarium. Their lifespan is quite long and they give a nice even spread of light. They are also cool-running. Tungsten lamps are the cheapest type of illumination to install, but their life is somewhat shorter, though this can vary considerably from bulb to bulb. One drawback is that they do give off quite a bit of heat.

## Setting up

After selecting the location for your tank, and before commencing the setting up procedures, check with a spirit level that the tank sits level as a slope in the level of the water can be rather an eyesore later. If undergravel filtration is to be installed this will be the first piece of equipment to set up.

A display aquarium will need a bed of gravel where the plants may be rooted and the concept of a natural underwater environ-

ment can be achieved. Aquarium gravel and other media are obtainable from aquatic stores in preweighed bags. Gravel is inexpensive and will not contaminate the water, providing that it is washed thoroughly. Wash in small amounts to make the task easier. A bucket and washing-up bowl are ideal utensils for this purpose, along with plenty of boiling water for the first wash and lots of running water to dislodge the dirt and debris. Continue to wash until the water runs clear, never scrimp on this procedure as any remaining dust will later cloud the water in the set-up aquarium.

Spread out the cleaned gravel carefully, adding small amounts at a time until the desired effect has been achieved. Slope the depth from the back to the front; this will help give the aquarium a sense of perspective. The depth of the gravel at the rear will be between 2-3 inches (minimum) giving a good depth for adequate anchorage for the plants.

Rocks can also be used to good effect, but



Above. Weather Loaches are tough, adaptable fish which respond to drops in barometric pressure by becoming extremely active.

## Recommended stocking levels for a coldwater aquarium

SURFACE DIMENSIONS		APPROX NO. OF FISH	
Inches	Centimetres	2-3in (c. 5-7.5cm)	3-4in (c. 7.5-10cm)
24 x 12	60 x 30	5	3
36 x 12	90 x 30	7	5
48 x 15	120 x 37	12	10
60 x 18	150 x 45	18	13

**NOTE:** Never introduce all the fish in one go, particularly into a new tank. Start off with no more than 50% and add the rest little by little over a period of several weeks.

**Useful Book:** A Fishkeeper's Guide to Coldwater Fishes.  
By: Dick Mills  
Published by: Salamander  
Price: £4.95

According to the **KENT KOI KALENDER** (just a few of which are still available at £4.95), March is soon to be followed by Spring when our Koi ponds should start to warm up and the inhabitants resume manure production. Unfortunately the micro-organisms that claim to deal with this are not so keen on the British climate and prefer to keep their heads down for just a little longer.

Whilst we have every sympathy, the trouble is that algae is not so choosy and there's now't better than a good Spring dressing of ammonia to produce a vigorous green flush, as any farmer will tell you.

Don't wait till you have to fit fog lights to your koi. Get down to Kent Koi now to get your POLYBAC, the best way for you to take control before the algae gives you a very persistent headache.

We have to admit that we would not be surprised if you found other things to interest you as well.

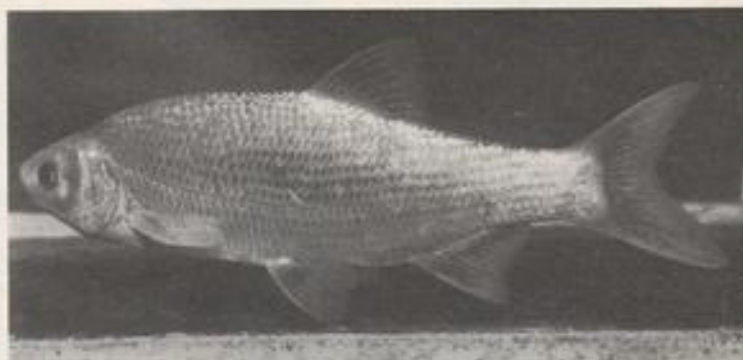
Where are we? Now that you have remembered "M25, Junction 4", it is as easy as 1 2 3 . 1st roundabout - 1st exit, 2nd roundabout - 2nd exit and then 300 yards on your left.

See you there.



**KENT KOI KO**  
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## BEGINNERS' GUIDE TO COLDWATER



The Golden Orfe is an attractive, fast-swimming fish which needs plenty of space.



Right, the Bitterling is a beautiful, lively, small fish which requires the presence of a Freshwater Mussel for breeding. The photograph shows an adult pair during spawning.



Left, Sticklebacks are common in many ponds but are usually heavily infested with parasites and should not be introduced into aquaria without first being thoroughly quarantined for several weeks.

they must not have any sharp edges and they must be safe and not give off toxic substances which will poison the fish. Rocks which are safe to use are Westmoreland, granite, waterworn sandstone and slate. Place rocks into position, working them a little into the gravel to give a natural look. Pieces can even be stuck together with aquarium sealant to give pleasing effects.

The tank can now be filled with water. Do this with care so as not to disturb the gravel. Plants can be added next, starting with the tall specimens and planting them at the back and sides. Group them in clumps as this gives a pleasing and more natural effect. Leave an area at the centre and front of the aquarium free from rocks and plants so that the fish can have space to swim freely and be viewed without obstruction.

Next the air-stone, or box filter can be added, or any other means of filter system such as outside or power filter.

Allow the tank to mature and the plants to settle down before the fish are introduced. This will take about 5 days to a week (but

can be speeded up with the aid of water conditioner).

### Maintenance

Maintenance should be carried out in the shape of two or three small partial water changes per week in a Goldfish tank. These will help to keep the water sweet and fresh. A more thorough clean-up should take place once a week.

(i) Clean off the algae from the front glass of the aquarium.

(ii) Siphon the debris off the floor after first disturbing the gravel.

(iii) If filter boxes are in use, give the medium a swill through and replace the water with fresh which should be at approximately the same temperature. By carrying out proper maintenance procedures, the set-up should remain in tip-top condition and the health and well-being of the fish will not suffer. Instead, the aquarium will always look at its best, giving a great deal of pleasure and enjoyment, both to you and all your visitors.

# BEGINNERS' GUIDE TO COLDWATER

## GOLDFISH FOR BEGINNERS

The Goldfish is the most popular pet in the world. Stephen Smith introduces some of the best-known and beautiful varieties suitable for beginners.

It would be safe to assume that a vast majority of fishkeepers were first introduced to the hobby by the acquisition of a Common Goldfish — probably a souvenir of an evening of enjoyment at the local fairground.

Unfortunately, and for various reasons, the majority of these fish are destined to live only for a few days. Consequently, any interest in the hobby of fishkeeping often dies with the fish.

However, and thankfully, many new fishkeepers do manage to survive those early days or weeks and may even eventually graduate to other areas of fishkeeping: perhaps lured by the thought of a colourful tropical aquarium in the corner of the room.

If that has happened to you, or is about to — do stop for a moment to ponder the vast range of colour, beauty and elegance provided by your very own pioneer of fish — the Goldfish.

Well over 100 recognised varieties of Goldfish are available — many of them British-bred — while new strains are introduced every year from Japan and China.

Hundreds of Goldfish of exceptional

quality are exhibited at several major cold-water shows held throughout the season up and down the country; while a number of societies specialise in embracing the interest of Goldfish keepers throughout the British Isles.

So let's take a look at some of these varieties and consider three main questions for the beginner:

- (i) Which types of Goldfish should I start with?
- (ii) Where can they be obtained?
- (iii) Do I really need to spend a fortune?

Before I go any further, let me answer the last question first . . . NO!

As with any hobby, the extent of your involvement depends entirely upon yourself. A simple set-up consisting of tank, undergravel filter and airpump can be perfectly adequate for a couple of small Goldfish and is surprisingly inexpensive.

Good quality Fancy Goldfish can also be obtained for only a modest outlay, though if you wish to obtain Goldfish of championship quality, then you must, understandably, be prepared to pay a premium.

### SCALE TYPES

For the newcomer to Goldfish keeping, terms such as scaleless, matt, and calico, for instance, sometimes serve only to confuse — especially when it is discovered that even "scaleless" Goldfish have scales!

There are three basic scale types for Goldfish. These are: metallic, matt, and nacreous.

- 1 Metallic scales have a mirror-like appearance and are the type found on the Common Goldfish. The colouring of metallic scales is usually orange, although yellow, silver and pink are also to be found.
- 2 Matt scales are without any shine at all. In light-coloured fish these appear almost transparent, giving the fish a "scaleless" appearance.
- 3 Nacreous. This is defined by the Goldfish Society of Great Britain as "with a dull mother-of-pearl shine". Goldfish with nacreous scaling have a mixture of scale colours, usually on a pale blue overall background. As in the case of top-quality Shubunkins, there should be no metallic scales present.

Goldfish which are otherwise nacreous but with occasional metallic scales are often referred to as "calico".

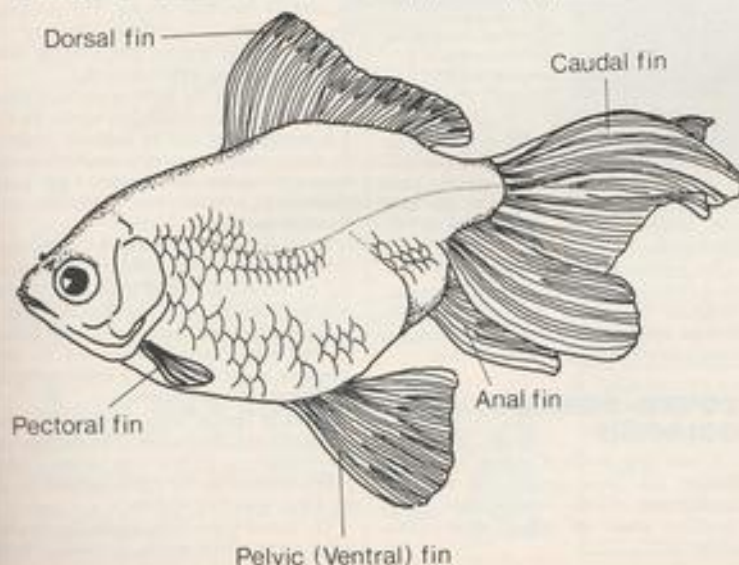
### TYPES OF GOLDFISH

In general terms, the Goldfish can be divided into two main types: long-bodied singletail, which are ideal for the garden pond; and round-bodied twintail, which are bred for viewing from the side and are ideal aquarium fish.

**Common Goldfish.** Just about every home has had one. The fact that thousands of this popular pet have survived the rigours of a glass bowl is testimony to the hardiness of the Goldfish (regular readers will know that I am not greatly in favour of the "spherical chamber"!).

There is also a calico version — the **London Shubunkin** — of this normally bright-orange fish. Body and fin characteristics are identical, being cigar-shaped and with short finnage, especially the caudal (tail) fin.

In show-standard examples, the body



# BEGINNERS' GUIDE TO COLDWATER



Above, the Chocolate Oranda is increasing in popularity in Britain, and is a hardy fish for the beginner. This example has not yet developed the "hood" characteristic of the Oranda. Left, despite its stubby finnage the Lionhead is full of character. Although not a beginner's Goldfish, it remains a firm favourite among Goldfish keepers.



depth should be no greater than half the length. (The length of Goldfish is measured from the point of the nose to the root of the tail — the tail itself is not included in the measurement of length.)

**Bristol Shubunkin.** This is a highly popular variation of the Shubunkin, and in my opinion is more suited to the pond than the aquarium if it is to develop its full potential.

Body-shape of the Bristol Shubunkin is itself similar to that of its London counterpart, but it is in the splendid tail that this fish is prized.

As a result of specialised breeding over many years — particularly by members of Bristol Aquarists' Society — the caudal fin has been elongated and, in perfectly-formed specimens, the end of the fin resembles the rounded shape of the letter "B". The

topmost ray should be quite erect, thus the fin fans out fully without folding.

**Comet.** This is another popular pond variety, which was developed in the USA and should not be confused with the Shubunkin.

Body-shape is similar again to the Common Goldfish, but finnage is exaggerated, especially the dorsal (back) fin and the familiar long forked caudal fin. Colouring is usually bright orange or red-and-white.

## ROUND-BODIED GOLDFISH

A vast new world of colour, shape and finnage has been opened up with the development of the round-bodied Fancy Goldfish, which are almost always twin-tailed.



The Calico Fantail is one of the most attractive Goldfish available. The finnage of the fantailed varieties is shown perfectly by this young fish, which is well-balanced and colourful.

These, along with the long-bodied types outlined previously, are the result of careful and highly-selective line breeding over the past few centuries.

Although different strains of Goldfish will cross, to interbreed them would, without doubt, be a tragic waste of the dedication of generations of breeders and is a pointless activity.

However, if you are thinking of extending your interest in Goldfish keeping into breeding then select the best specimens you can afford, either from an established enthusiast or reputable retailer. The resultant fry will contain far fewer numbers of inferior fish; so proving that starting with inferior parentage is false economy.

In considering the types of round-bodied Fancy Goldfish available, the novice Goldfish keeper could well be confused initially by the number of varieties available, some bearing glamorous names such as **Pom-pom**, **Pearlscale**, **Globe-eye**, **Bubble-eye**, **Tosakin** and **Jikin**.

These are just a few examples, each exhibiting their own characteristics and providing an individual set of challenges to the dedicated breeder (and to his/her patience!)

For the beginner, however, it is far better to start with Goldfish which are no less attractive and will provide a highly rewarding introduction to the hobby.

**Fantail.** This is still a favourite of even the established enthusiast. The finnage of the Fantail is, in my own opinion, the perfect balance for the round body shape of the Fancy Goldfish varieties.

The paired lobes of the caudal fin should, when viewed from above, be divided by a

# BEGINNERS' GUIDE TO COLDWATER

split which extends at least half-way towards the root of the tail. From the side-view, the caudal fins should be forked, describing a bold "V" shape. This is assisted by the top rays of the caudal fin being held erect so that the fins give the appearance of being quite rigid.

The dorsal fin should not be over-pronounced, but should also be "held high". The pectoral and pelvic (ventral) fins are of medium length and almost paddle-shaped; while the anal fins should be short and quite distinctly paired.

Colouring of the Fantail is usually the same as that of a Common Goldfish, but a most attractive variation is the Calico Fantail.

This is one of my personal favourites and has a "jewelled" appearance making it a colourful complement to the indoor aquarium.

Ideally, the background colour of the Calico Fantail should be light blue, with several individual colours including reds, browns, blues and oranges splashed over the body. Some of these coloured scales may be metallic — giving the fish its jewel-like quality — although some fishkeepers prefer no metallic scales at all.

The calico colouring is completed by an even sprinkling of black speckles all over the body and fins.

**Veiltail.** This is considered by many to

be one of the most attractive varieties of Fancy Goldfish. The body-shape is similar to that of the Fantail, but there any similarity ends.

Finnage is highly exaggerated: the caudal fin sweeps downwards from the caudal peduncle in a graceful curve to finish with a squared-off veil-like appearance.

The dorsal fin is also extended and should be "held high". Pectoral and pelvic fins are more pointed and flowing than the Fantail, while the paired anal fins can sometimes be seen to extend beyond the "veil" of the tail.

The preferred colouring of a good Veiltail is metallic orange, although orange-and-white and silver Veiltails can also be obtained.

**Oranda.** The finnage of the Veiltail is usually preferred for the Oranda type of Fancy Goldfish, especially if it is golden-coloured; while the Calico Oranda has particularly stunning appearance.

In addition, the Oranda has the distinctive characteristic of an attractive "hood" growth, which is also a major feature of the Lionhead.

Alternative Oranda colourings, such as the **Redcap**, **Chocolate Oranda** and **Blue Oranda**, have achieved increased popularity over recent years. These are defined as fantailed varieties and are extremely hardy

and attractive Goldfish for pond or aquarium.

Finally, two further popular Goldfish strains should not be overlooked: the **Lionhead** and the **Moor**.

Both of these varieties present greater challenges for the breeder, with their diverse contrast of characteristics — the Lionhead with its stubby finnage, complete lack of dorsal fin, and "hood" development; and the Moor with its jet-black colouring, bulbous eyes, and veiled finnage.

I would not recommend these two as the perfect introduction to the hobby, but I feel sure that having become familiar with some of the previously mentioned varieties, it will not be long before you will wish to find space somehow for, at least, one fine Lionhead and Moor.

## KEEPING GOLDFISH

There are no hard-and-fast rules about how best to keep Goldfish. Good husbandry is basically a matter of common sense: use whichever methods work for you and your Goldfish, and with which you feel comfortable.

Similarly, it doesn't really matter whether or not your favourite fish is of "show standard": if you like it, that is all that matters.

Most importantly... enjoy the hobby.

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# BEGINNERS' GUIDE TO COLDWATER

## PLANTING THE COLDWATER AQUARIUM

Barry James of Everglades Aquatic Nurseries selects some of the best plants for a coldwater aquarium and summarises their most outstanding qualities.

**T**he aquascaping of aquaria which are unheated and contain fishes and invertebrates from temperate latitudes follows the same rules and utilises the same materials as tropical aquaria. However the plants used in such aquaria must, obviously, be able to tolerate a lower temperature range normally, this being the ambient temperature of the room in which the aquarium is situated. Rooms, therefore, which are constantly centrally heated will be able to accommodate a rather wider group of species than, say, a bedroom in the upper floor of the house which is heated only by day.

Plants from temperate latitudes are known as "long-day" plants, as the sun in high summer may be shining for up to 16 hours per day. For this reason, few of our native plants have a long life indoors, as few of us would illuminate our aquaria for this length of time in winter.

In addition to this, many of our finest native aquatics are naturally found in fast-running cold streams and do not acclimatise to the more cosy environment of indoor aquaria. Most of the plants we choose for temperate aquaria, therefore, are drawn from sub-tropical latitudes, where the natural photoperiod is shorter and the water warmer than further north.

### Positioning of the Plants

It is important to plant the various species in the correct areas of the aquarium, since they each have a different mode of growth, and attain different heights. One would obviously not put very tall plants in the front of the tank, as this would hide the fishes from view. It is customary to divide the plants up according to the position they finally occupy in the planting scheme. Four groupings are recognised, namely:

#### 1. Background or Bunch Plants

These are all tall-growing types reaching 15in (c. 38cm) or more. They are normally planted in bunches. Five plants of the same species are bunched together with lead wire and planted in the gravel.

#### 2. Middleground Plants

These average from 4in-8in (10-20cm) in height and are placed in the middle of the aquarium, as their name indicates.

#### 3. Specimen Plants

These are large, imposing specimens which grow quite tall but also have a wide spread, growing in the form of a rosette. They are placed in the middleground and slightly off-centre.

#### 4. Foreground Plants

These are dwarf plants growing up to 4in (10cm) high, but are often smaller. They are planted towards the front of the tank. Many "grass-like" species form a lawn.

**Note:** You may find difficulty obtaining some of these plants in your local shop. However, you will find specialist plant companies in any edition of the "Aquarist and Pondkeeper" and you will have no difficulty getting what you want from these sources.

### Background Plants

#### (i) *Egeria densa* (Giant Anacharis)

Coming from high altitudes in Central and South America, this is the most commonly available aquarium plant. It tolerates a wide temperature range from around 45°-77°F (7-25°C). Its thick green stems are sparsely branched with three or four narrowly lance-like leaves. The plant varies from pale to dark-green depending on temperature. It is extremely fast-growing and will need pruning regularly.

#### (ii) *Lagarosiphon major* (Elodea crispa)

This South African species is now widely naturalised in pools and canals in this country. Very similar to the last-named species, it may be distinguished by its thicker stems and recurved leaves. Preferring cooler water, it should not be exposed to temperatures higher than 68°F (20°C) or it will tend to grow long and spindly.

#### (iii) *Cabomba caroliniana*

The genus to which this species belongs is distributed in both North and South America. It will succeed in a temperature range of 55-77°F (13-25°C). The handsome submerged foliage consists of pale to dark-green, finely divided leaves, carried in opposite pairs on long, thin stems. It needs regular pruning as it is capable of reaching 6ft (c. 2m) long if unchecked.

#### (iv) *Ludwigia mullertii*

A beautiful plant, it will grow up to 15in (c.



As can be seen from this photograph, *Egeria densa* grows to great lengths under good conditions.

38cm) and tolerates a wide temperature range. It has multi-branched stems bearing elliptical leaves up to 1in (2.5cm) long and 1/2in (c. 1cm) wide. The foliage is wine-red below and dark-green above.

#### (v) *Vallisneria spiralis* (Tapegrass)

This grass-like plant needs a minimum of 59°F (15°C) to thrive, when it will reach a height of 24in (60cm). However, it should never be pruned but allowed to grow along under the surface of the water. It increases itself quickly by producing runners.

### Middleground Plants

#### (i) *Vallisneria spiralis*

Similar to the above species but much shorter reaching only 8in (20cm) high. The leaves are tightly spiralled, dark-green in colour and these characteristics contribute to the unfailing popularity of this variety.

#### (ii) *Sagittaria subulata* var. *subulata*

Another grass-like plant, this one has slightly recurved leaves and provides dense cover in the middleground. It grows rapidly and spreads by runners. Very low temperatures are tolerated by this species.

#### (iii) *Didiplis diandra* (Water Hedge)



## Recommended Lighting for Coldwater Plants

(Minimum period: 12 hours/day)

Tank Size		No. of Fluorescent Tubes	Length of Tubes
Inches	Centimetres		
24×15×12	60×38×30	3 × 15 Watts	18in- 45cm
36×15×12	90×38×30	2 × 25 Watts	30in- 75cm
48×15×12	120×38×30	2 × 40 Watts	42in-107cm
60×18×18	150×45×45	3 × 40 Watts	48in-120cm



Top, the Giant Sag (*Sagittaria platyphylla*) grows into magnificent specimen plants up to 16 in (40 cm) tall. Tapegrass or Vallis (*Vallisneria spiralis*) is an old favourite which never requires pruning. *Cabomba caroliniana* is an attractive background plant which may require regular pruning.

Although growing up to 12in (30cm) high in tropical aquaria, *Didiplis* seldom exceeds 8in (20cm) in cooler water. From southern North America, this pretty little plant has pale-green linear leaves borne on a thin multi-branched stem. It flourishes in crowded tanks under light shade.

(iv) *Eleocharis acicularis* (Dwarf Hairgrass) This delightful, tufted little plant is always in great demand. It reaches a height of 8in (20cm) — often smaller — and grows as rosettes of rich-green, hair-like stems. A little clay pushed around its roots is greatly beneficial.

(v) *Acorus gramineus* (Japanese Rush) *Acorus* species are native to Eastern Asia where they are found growing partially or fully submerged at the edges of ponds and watercourses. *A. gramineus* grows from 8in-12in (20-30cm) in height and has spiky leaves in fan-shaped clumps. It is very stiff and wiry and will put up with a lot of rough treatment from more boisterous coldwater fishes. It grows best in the low 60°F's (15-18°C). There is a smaller cultivar *A. gramineus* var. *pusillus* which reaches

only 4in (10cm) and is suited to the last section (see Foreground Plants).

### Specimen Plants

(i) *Najas japonicum* (The Japanese Spatterdock)

This is a large plant related to the water lilies and growing up to 24in (60cm). From a creeping, tuberous rootstock arise long-stalked arrow-headed leaves. These are submerged, light-green in colour and up to 12in (30cm) long and 4in (11cm) in width. A really dramatic plant, it has several relatives which are equally suitable. *N. lutea* our native "Brandybottle" is also suitable if young plants can be obtained or, for rather smaller aquariums, *N. pusillum* might be more suitable.

(ii) *Sagittaria platyphylla* (Giant Sag) This stout plant grows up to 16in (40cm) high with strap-like leaves up to 3in (2cm) wide (normally smaller). The colour of the leaves varies from reddish-brown, through pale-green, to dark-green according to temperature and light. Use two or three plants planted close together to form a fine centre

piece. It propagates itself from underground runners.

(iii) *Saururus cernuus* (Lizard's Tail Plant) Although used extensively in the water garden as a marginal aquatic *Saururus* grows well underwater for several months. The stiff stems bear alternate light-green heart-shaped leaves up to 4in (10cm) in length. Use several plants close together to create a nice specimen.

### Foreground Plants

(i) *Samoletis parviflorus* (Water Cabbage)

Really this plant resembles an underwater lettuce but, unfortunately, the name had already been used for a tropical aquatic floating plant. It grows to a height of 4in (10cm) and up to 6in (15cm) in diameter. Of easy culture, it grows well in cooler water, in spite of its sub-tropical origins.

(ii) *Sagittaria subulata* var. *pusillus*

This is the pygmy of the family growing only 1in-1½in (2.5-3.5cm) tall and forming a dense turf. It prefers a very fine grade of gravel which does not block the progress of its numerous runners. The leaves are less than a millimetre in width. The colour is pale to grey-green.

(iii) *Lilaeopsis novae-zelandae*

This tiny aquatic plant from New Zealand has gained increasing popularity over the last few years on account of its versatility and hardiness. It grows up to 3in (c 8cm) in a very rich substrate but only half this height in pure gravel. Like the previous species, it forms a thick turf. The leaves are ribbon-like, with slightly expanded tips. The leaf colour is a rich-green.

### Closing Remarks

1. The above is no more than a selection of the many plants that can be used in coldwater aquaria. Space, however, dictates that other species, such as the magnificent *Myriophyllum* and *Hornworts*, can only be mentioned in passing. Details of these can be found in one or other of the aquarium plant books available.

2. It is always advisable to help plants along through the regular use of a good proprietary fertilizer and the use of adequate lighting (see chart).



# BEGINNERS' GUIDE TO COLDWATER

## FISH HEALTH IN THE COLDWATER AQUARIUM

Dr Chris Andrews of the London Zoo Aquarium explores the most common health problems of coldwater aquarium fish and offers expert advice on how to prevent them and overcome them when they arrive.

**C**oldwater fishkeeping has, in recent years, been enjoying an increase in popularity, helped no doubt by the general hardy nature of many coldwater fish and the availability of a greater range of aquarium species and varieties (especially from North America and Eurasia). As with all branches of the hobby, coldwater fishkeeping can be subject to a number of fish health related problems, although most of these can be prevented by correct aquarium care and regular routine maintenance. The fish health problems which occur in coldwater aquaria can be divided into two broad categories: *non-infectious, including water quality problems, and infectious diseases.*

### Non-infectious problems

Before considering one or two water quality problems, mention should be made of swimbladder disorders (particularly of Fancy Goldfish), "pop-eye" and external or internal growths or tumours.

**Swimbladder disorders** usually manifest themselves by the inability of the affected fish to maintain its position in the aquarium, whereby it either floats to the surface or sinks to the bottom. In less severe cases the fish may swim with a pronounced "list". Sudden changes in temperature are often cited as a cause for swimbladder disorders, although Fancy Goldfish seem particularly prone to the problem. This is likely to be related to the deformed shape of the swimbladder in the more fancy varieties. The condition does not appear to be infectious.

There is no reliable cure for this problem, although maintaining the fish in shallow water a few degrees warmer than the aquarium sometimes offers some respite. However, fish suffering from this problem that are no longer able to feed, should be painlessly destroyed.

"Pop-eye" is an apt name for a condition which may affect a range of fish species. One or both of the eyes protrude from the head of the fish in a very unnatural fashion.

This problem is rarely infectious, and

often seems to cause the fish very little discomfort. Since there is no reliable treatment, and so long as the fish continues to feed and behave normally, no action is required from the hobbyist. Alternatively, the fish may have to be isolated and, if in obvious discomfort, painlessly destroyed. Improved water quality often brings about a partial or total cure.

**Growths or tumours** may affect goldfish, and appear as obvious "lumps" on the outside of the body, or as a hard swelling among the internal organs. These are rarely infectious, and although external tumours can be removed surgically by a veterinarian, treatment of internal growths is almost impossible. However, there is at least one parasite infection that produces a condition termed "kidney blot" in goldfish, where the kidneys swell and the belly of the fish takes on a grossly distended appearance. Since this is infectious, and more or less impossible to treat, and since this disease could easily be confused with the generally non-infectious internal tumours, all fish showing similar tumour-like growths should

**Below.** Goldfish with severe fin rot.  
**Bottom.** Goldfish with 'kidney blot' caused by *Mitraspora*.



be isolated from the rest of the fish. So long as the first continue to feed and otherwise behave normally, they should be maintained in isolation and observed for signs of improvement. If at any time the fish appear to be suffering unduly, they should be painlessly destroyed.

**Water Quality** A number of problems can develop from incorrect water conditions in the coldwater aquarium.

To a greater or lesser extent, most hobbyists rely on tapwater to fill their aquaria. Tapwater is, of course, intended for drinking rather than fishkeeping, and a number of problems can result if it is not first conditioned before aquarium use. The use of a good quality "complete" conditioner (which removes chlorine, chloramine, metals, etc.) at every water change is recommended, as is the need to avoid sudden changes in water temperature. Tap water can be easily brought to room temperature using a little boiling water from a kettle (not from the hot water tap).

In the aquarium the nitrogen-cycle takes nitrogen-containing waste products from the fish, uneaten food and plant fragments, and converts them to ammonia, then nitrite, and eventually nitrate. Ammonia and nitrite are more toxic to fish than nitrate, and nitrate is used by plants (if present) as a food. This whole process is made possible by the activities of various helpful bacteria, and forms the basis of biological filtration in (for example) undergravel and sponge filters.

In newly established tanks, however, only small numbers of these helpful bacteria are present, and until their numbers build up (which can take several weeks) quite high levels of ammonia and nitrite can be recorded, and result in what are known as "new tank syndrome" losses.

Once the tank and its filter(s) are established, a number of factors can adversely affect the normal efficient running of the nitrogen cycle, (including shortage of oxygen, chemical treatment and low temperatures), and perhaps cause at least temporary peaks of toxic ammonia and nitrite.

In order for the helpful filter bacteria to function properly, they must be continuously provided with well-oxygenated water. Hence filters carrying out biological filtration (eg undergravel filters and sponge filters) should be left running for most of the time, although occasionally turning them off for an hour or so will not cause too much harm. Since such filters usually become clogged with accumulated debris as time passes, their regular cleaning is important for long-term, efficient filtration.

Certain disease treatments (eg some antibiotics, methylene blue) also adversely affect the non-disease producing bacteria in the filter. Therefore, disease treatments should not be used in a heavily-stocked tank that relies on biological filtration, unless it is known to be safe to do so. Fortunately, many of the proprietary brands of disease

treatments have been developed for use in the set-up tank, without harming the helpful filter flora.

The bacteria responsible for converting ammonia to nitrite and then nitrate function best in warm, neutral to alkaline water, and they do not carry out their task particularly well in cool (less than 10-15°C), acid (less than pH 7.0) water. Consequently, a check on ammonia and nitrite should be kept in very heavily stocked tanks. In such situations, regular partial water changes and/or the use of zeolitic compounds to absorb ammonia, may be employed to help ensure stable water conditions.

### Infectious Diseases

Fish are, of course, susceptible to a huge range of parasites and other infectious diseases, the effects of which are usually increased by overcrowding and inadequate aquarium care.

**Fungus** (as caused by *Saprolegnia* and *Achlya*) is a common disease among aquarium fishes, although it usually only affects fish that are already in poor condition for some other reason. The spores (or "seeds") that give rise to the fungal infection are extremely common in water, but can only penetrate the skin of a fish that has been damaged by rough handling, fighting, spawning activity, or attack by other parasites.

If left untreated the off-white or grey cottonwool-like fungal growth can spread

## BEGINNERS' GUIDE TO COLDWATER

rapidly across the body of the fish, eventually killing it. Consequently, prompt treatment with a proprietary brand of fungus remedy is recommended. Choose a remedy which is added to the aquarium, as this is probably less upsetting for the fish. Very badly affected fish will have to be dipped into a strong solution of a fungal treatment, but this should only be undertaken in extreme cases.

**White Spot Disease** is caused by the protozoan parasite *Ichthyophthirius*, which has a direct, fish-to-fish life cycle, and can hence build up quickly within the confines of a well-stocked aquarium. It is relatively easy to diagnose, as it appears as small, white pimples (about the size of a sugar grain) on the skin, fins and gills of fish. Heavily infected fishes will also scrape against rocks in an irritated fashion, and may suffer from secondary fungal or bacterial infections.

White Spot is usually introduced into an aquarium with new fishes, or with livefoods or plants. Thus, the quarantine of all new

fishes for, at least, one but preferably two or three weeks (along with a treatment with a proprietary brand of White Spot remedy) is a good preventative measure.

Fortunately there are a number of safe, effective White Spot treatments available from aquarium shops, and prompt treatment usually brings the disease under control.

**Sliminess of the skin** is a disease which is related to the presence of large numbers of skin (and sometimes gill) parasites. These include protozoans such as *Chilodonella*, *Cotia*, *Trichodina* and even White Spot (*Ichthyophthirius*), as well as flukes like *Gyrodactylus* and *Dactylogyrus*. When present in large numbers these parasites irritate the skin of the fish, causing excess mucus production (hence the name of the disease), with the fish rubbing against the aquarium gravel or decorations in an agitated fashion. Other symptoms may include reddened areas on the body, closed fins and increased gill movements.

Sliminess of the skin can cause mortalities, or weaken the fish to permit the entry of other disease organisms. Prompt treatment with a White Spot remedy or a broad spectrum anti-parasite remedy (both available from aquarium shops) is recommended.

**Fin Rot** is usually the result of a localised bacterial infection which can be brought on by a number of factors, including fin-nipping, overcrowding, unhygienic tank conditions, and too low water temperatures (when keeping more delicate coldwater fish).

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Goldfish with 'Hole in the Body' disease.

The fins appear split and ragged, and may be streaked with blood or show reddening at the fin bases. As with all diseases, prompt treatment is very important, and there are a number of proprietary brands of general fish tonics which are active against Fin Rot.

Both Fin Rot and Fungus can be good indicators that conditions are less than satisfactory in the aquarium, and that they require immediate attention.

**"Hole-in-the-body" Disease** is often caused by a systemic bacterial infection (which spreads through the body of the fish), and manifests itself as ulcers, reddened areas on the skin, raised boils, and reddening at the fin bases and the vent, along with listless behaviour, lethargy and loss of appetite. Such a disease may be brought on by incorrect care, although recently acquired and recently spawned fish are also particularly susceptible.

Fish showing signs of this disease should be isolated from apparently unaffected fishes, and treated by feeding an antibiotic medicated flaked food or by adding antibiotics to the water. Large aquarium fish can be

## BEGINNERS' GUIDE TO COLDWATER

injected with a suitable antibiotic preparation. Antibiotic treatments must be carried out with the co-operation of a vet, and once the symptoms subside, and the fish begin behaving normally, they can be returned to the aquarium.

**Mouth "Fungus"**, which is caused by the bacterium *Flexibacter*, often occurs in newly acquired fishes, or those kept in unhygienic conditions. The disease organism can destroy the mouth region of badly affected fish, so prompt treatment is vital.

Mouth Fungus may respond to treatment with proprietary remedies from an aquarium shop, although more difficult cases can usually be successfully treated by adding antibiotics to the water.

**Fish Pox** is a problem which frequently occurs on Koi, perhaps less frequently on Goldfish and other species. The symptoms are a white, pinkish, even grey, waxy growth on the skin and fins. The growth tends to appear, develop and then disappear, perhaps to recur at a later date.

The growth is produced by a viral infection in the cells of the fish's body. The



Roach with a severe case of fish pox. A viral infection that does not appear to pass easily from fish to fish.

infection may lay dormant for many months and, unfortunately, we do not fully understand what triggers off viral multiplication and the characteristic "pox" symptoms.

However, Fish Pox does not appear to be very infectious and does not seem to pass easily between fish. The disease is not very pathogenic and rarely, if ever, does any harm. It is unsightly rather than dangerous and hobbyists must learn to put up with it for the time being, since there is no reliable treatment.

### Conclusions

Coldwater fish are, in many ways, ideal subjects for the home aquarium, and appeal to both the beginner as well as the experienced hobbyist. Although many species are relatively hardy, this should not be used as an excuse to provide them with sub-optimal aquarium conditions — correct care and maintenance are very important in actually preventing most problems. Further information on the aquarium care of coldwater fish can be found in "A Fishkeepers Guide to Coldwater Fishes" by Dick Mills (Salamander, 1984).

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## Best filtration for plants

I am setting up a new aquarium and am keen to get a good growth of plants. What sort of filtration system would you advise me to buy?

Undoubtedly, your bet would be a powerfilter. If funds are short, or you would have difficulty locating an outside filter, then a submersible system would be the next best thing. However, in an outside power filter you can use a number of different filter materials such as mechanical, chemical or biological. With an inside type you are at present restricted to using a sponge.

## Coldwater

### Loss of colour

Two of my goldfish have slowly lost all their colour over a period of two to three months and are now white. They appear fit and otherwise normal. I would welcome your comments.

Colour loss is quite a common occurrence in goldfish and is most disappointing if the fish happen to be otherwise of show quality. It is not a disease, just purely the loss of pigmentation, and there is nothing that can be done to prevent or halt the process.

However, it is more likely to happen in fish which have been bred from strains where there are large numbers of red and silver fish, with some of those which were self-red later gradually losing their colour, as yours have done. Some may retain some of their colour, while others may change to white completely.

## Freshwater Crayfish

I recently purchased two Freshwater Crayfish, both about 20" long. They are housed in a 3ft tank with an Eheim 2009 internal power filter. The water is kept at room temperature 60-65°F (15.5°C-18°C). I would be grateful for any advice on keeping these fascinating creatures. Also, do you know of a good book on Crayfish?

Freshwater Crayfish are most interesting creatures which grow to about 4-4½ inches when kept in aquaria. They are a coldwater species so the temperature which you are providing is about right.

Crayfish must have clean, well-aerated water and a varied diet. Food should never be left if uneaten, but quickly re-

moved, or it will cause water pollution, which, in turn, will result in health problems.

You should provide plenty of shelters in your tank so that each animal can take up residence, making conditions as near to those in the wild as possible.

I am afraid that I do not know of any book dealing speci-

fically with the Crayfish. However, I am enclosing a copy of an article written by Dylan and Pugh, first published in *Aquarist and Pondkeeper* in June 1978.

By the way, I think that Crayfish are best kept with their own kind. Housing them with fish will only prove how capable they are at catching their own dinner.

## COMPETITION RESULTS

### £500 Lahaina Competition Winner

We were absolutely swamped with entries for this exciting competition. It was great! Thank you for your tremendous support. Unfortunately, there could only be one lucky winner.

A £500 Lahaina System goes to: Steve Harvey, 7 The Dell, The Coppice, Aylesbury, Bucks.

The correct answers to the three questions we asked you were:

1. Constant Water Level; 2. Visual Sight Gauge;
3. Unmerciful Sun.

How did you do? Thank you all once more for entering our competition in such huge numbers. Thank you Lahaina for your generous sponsorship.

### 'Atlantis' Silhouette Competition

Correct answers were: A-J: Angel; G-C: Discus; H-B: Platy; D-F: Piranha; E-1: Goldfish.

Winner of a super 'Atlantis' Power Filter is G. Middlemiss, 21 Queens Road, Walthamstow, London E17 8PY. Watch this space next month for another 'Atlantis' winner.

### Underworld Anagram Competition

Solution: Rotifer Culture; Algae Grow; Underworld. The lucky winner of the Rotifer Culture Kit is B. C. Cleary, 44 Coalway Avenue, Sheldon, Birmingham B26 3JS. Thank you Underworld.

## NEXT MONTH

### Coming up in April

- £250 worth of prizes in our Waterlife competition.
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## Tropical

### Hemiodus — but which one?

I have a Hemiodus in my tank. It is similar in shape to a Silver Shark. It has a silver body and the lateral line shows a green colour in a certain light. There is a black spot on the centre of the body just behind the dorsal fin and the lower lobe of the caudal fin is almost black. Any advice, including correct identification, would be much appreciated.

There are three *Hemiodus* (*Hemiodus*) species *H. gracilis*, *H. quadrimaculatus* and *H. semistriatus*. The first is called the Slender Hemiodus and the last, the Half-lined Hemiodus, Flying Swallow or Silver Hemiodus. *H. quadrimaculatus* has no common name because it is not normally found in the aquarium fish trade.

Your description is not precise enough to decide which fish you own.

Look at the caudal fin. If it has a blue-red band on the bottom lobe you have the Slender Hemiodus. If this is missing, you have the Silver Hemiodus. If it is the Silver one, you have a problem because it grows to 20cm or more, even in captivity. The Slender Hemiodus can grow quite large too — up to 16cm.

Both fish are found in the Amazon where they bask in sunlight eating any insects that land on the brightly lit surface. Hence, the preferred conditions are open swimming space with a bright overhead light. Feed on chunky meats, fish and worms. Water chemistry is not important but should be warm 77-82°F (25-28°C). There are no obvious sexual differences and no reported breeding in captivity.

# PRODUCT ROUND-UP

BY DICK MILLS

## WATER TREATMENTS

**R**eaders of this column last month will still be fresh from unravelling the mysteries of water test kits, and may be wondering how to deal with their new-found knowledge.

It is very tempting to add "water testing" to the list of regular aquarium maintenance chores, but this need not always be the case in (perhaps) the majority of freshwater situations. Unless you are preparing a specially set-up aquarium for breeding or keeping a particularly difficult species there is no reason to become over-obsessed with the need to know every minute-degree of pH, hardness or nitrite changes that may occur from day to day. The marine aquarist, however, will need to know more about the condition of the aquarium water and regular monitoring is very important and should not be neglected.

Water treatments fall into four categories: (i) additives which render tapwater more suitable for immediate use (Dechlorinators etc); (ii) those which are added to change, or stabilise, the conditions of the water after results of previous tests having shown the need for adjustment (pH adjusters, water softeners etc); (iii) those which remove ammonia-based substances dissolved in the water; (iv) those which add extra elements in an effort to recreate the conditions of the fishes' natural habitat.

Despite the ready availability of products to change the water conditions, you must not expect instant successes, neither must you attempt too much too soon. You may like to try more simple water treatments first by using peat in a filter body to acidify water, for instance, or experimenting with softening water by the addition of rainwater. However, while the majority of freshwater aquarium fishes are quite hardy and manage to tolerate the changes we aquarists force upon them quite well, isn't it a coincidence that the very fish we have to set up special conditions for, just happen to be more delicate species, and are more likely to succumb to any hamfisted attempt on our part to make their living happier? The moral in all this is to make progress slowly; if you thoughtfully acclimatise fish to a set of new conditions for spawning, are you equally thoughtful to acclimatise them back to their former conditions once they have obliged?

The same thing applies when treating disease in a hospital aquarium, it's no good curing the ailment if the transfer back to the main aquarium stresses the fish to death!

### Dechlorinators

#### Manufacturers:

**Aquarian** (Dechlorinator — removes chlorine; Tapwater Conditioner — neutralises metal ions, minimises chemical shock, also acts as pH buffer) Tanksafe — removes chloramines).

**New Technology** (Aquasure — removes chlorine, halogens and heavy metals. Reduces stress during transportation. Available in larger size for pond use).

**T.A.P.** (All-in-One — removes chlorine/chloramines, toxic materials in tapwater, reduces nitrite poisoning, adds vitamins and phosphates to help reduce stress).

**Tetra** (Aquasafe — new formula — initial water treatment in new aquariums; removes chlorines, chloramines, encourages fishes' protective mucus coating).

**Waterlife Products\*** (Haloex — tapwater neutraliser)

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

### pH adjusters and Buffering solutions

The use of pH adjusters must be undertaken with utmost caution, with changes being made in the smallest possible steps to prevent stress occurring. Adjustment of pH is sometimes only successful once the hardness of the water has been adjusted first, ie when creating a soft acidic water environment, say for Discus or Characins, get the water soft first and then adjust the pH; hard

Three easy-to-use water treatments designed to provide optimal conditions for fish.



water is usually well-buffered, i.e. resists change in pH. Maintaining a high pH is vital in marine aquariums; this can be achieved by the use of buffers, but regular buffering indicates a partial water change is required.

#### Manufacturers:

**Aquarian** (Tapwater Conditioner — see Dechlorinators)

**New Technology** (Marine Buff — use to maintain high alkalinity reserve; pH Reducing Pillow — produces soft acid water; pH Stabiliser — use to acidify normally alkaline tapwater).

**T.A.P.** (Marine Buffer — maintains seawater pH; pH acid and alkaline adjusters).

#### Waterlife Products

(Acid and alkaline pH Buffers for freshwater; Seabuff — corrects pH of seawater; Seabuff "AN" — supplementary buffer to be used in association with Seabuff).

#### Hardness adjusters

Provided that the aquarist has access to a source of soft water (i.e. collected unpolluted rainwater) the overall hardness figure of the aquarium water can be lowered by simple dilution. Another way to produce softer water is by using ion-exchange resins but be sure to use only those specifically designed for aquarium use; others may produce harmful by-products.

Increasing hardness is achieved by the addition of calcareous substances into the aquarium — usually ordinary aquarium gravel will contain these anyway. Calcareous

rocks (or the use of crushed coral or coral sand) will help maintain hard water conditions necessary for freshwater fishes such as Rift Valley cichlids.

#### Manufacturers:

**Interpet** (Water Guardian — water softener; Hobbyist and Professional models: latter rechargeable).

**New Technology** (Water Softener and pH Reducing Pillow — see pH adjusters)

**Noova** (Water softener).

#### Ammonia removers

The removal of ammonia-based substances can be brought about by nitrifying bacteria in biological filtration systems or by the use of rechargeable (re-usable) resins sandwiched in between filter media in power filters.

#### Manufacturers:

**Fluval** (Zeolite additive for use in power filters).

**New Technology** (AquaZorb — ammonia-removing resin, rechargeable).

**T.A.P.** (Ammonia remover — resin can be used indefinitely).

**Interpet** (Nitrex — filtration medium).

#### Water tonics/additives

The following help reproduce more natural water conditions (often specific to certain fish groups) and replace natural trace elements missing from artificial sea mixes.

#### Manufacturers:

**Aquadel** (Tropic River — blackwater tonic)

**New Technology** (Marine Vita — supplement to reduce stress and ensure vitality;

**T.A.P.** (Instant Amazon — special water conditioner for South American fishes; Trace Element Plus — enhances colour and condition).

**Tetra** (Blackwater Extract — adds natural extracts suitable for South American fishes).

**Waterlife Products** (Humaquat — blended concentrate of tropical vegetation to condition fish and stimulate breeding; Seatrace — replaces trace elements; SeaVita — freshwater and marine vitamin supplement).

Despite the undoubtedly thoroughly-researched reliability of water treatment products, they should not be used as an excuse to neglect established aquarium management techniques; the cleaning of filters, together with partial water changes should still be regarded as very necessary responsibilities on the part of the hobbyist.

#### TECHNICAL AQUATIC PRODUCTS

The above company would like to point out that the products referred to as "Merck (T.A.P.)" in last month's article should have read "Technical Aquatic Products (Aquamerck)". They would also stress that their various test kits are designed for both Freshwater and Marine use. The new address for Technical Aquatic Products is: 1 Meadow Lane, Avonmouth BS11 9AS. Telephone: 0272 822452.



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# Coldwater jottings



Stephen J. Smith

## Spring's hopes eternal

The coldwater season — at last — is with us again. For me this is one of the most exciting times in the fishkeeping calendar.

My own brood fish were brought into the fish-house just before the worst of the winter to give them the best possible conditioning for spawning. Males and females have been housed in separate aquariums and fed on such delicacies as chopped liver, grated heart, and earthworms as part of their diet.

The result — healthy fish with a good development of roe in the females and already-prominent tubercles on the gill-covers and pectoral fins of

the males.

Having provided the best possible conditions for the parent fish, it only remains for me to pair the appropriate fish. The quality of the spawning is then in the hands of Mother nature...!

## Feeding

For the fish which have remained in the pond throughout the winter, very little feeding — if any — will have taken place.

In their near-dormant condition, pond fish rely on their reserves of foods built up during the autumn. Up to 20% of their body weight will have been lost over the winter, so the fish will be weak as they begin to stir with the first signs of spring.

Feeding should be introduced only gradually throughout the month in order that the digestive processes can become accustomed to handling any kind of diet.

By the middle of April the fish will be in "full flight" once again and, given some reasonable weather, will have begun the spawning process.

## In the basket

A simple idea for trouble-free planting in the pond was spotted on my travels recently and is particularly effective for Koi-keepers, who tend to have ponds which are deeper and with steeper sides.

Plants such as Iris, Parrot's feather, and even Lilies, are

planted in their baskets in the normal way — but instead of resting them on the bottom of the pond, the basket is hooked over a couple of brackets which are fixed to the inside wall of the pond.

The brackets can be fitted at any convenient height and make maintenance so much easier. A word of warning though — when fitting the brackets do make sure that you seal the pond wall around the fitting. Silicone aquarium sealant is ideal, but give it plenty of time to cure before refilling the pond.

## By any other name?

I am often perplexed by some of the advice given by some retailers to novice goldfish keepers. Confusion can often arise when different sources use different names in describing the same fish.

For example, I have seen the term "Oranda" applied to virtually every twintailed variety of goldfish available from shops; while it would appear that any singletailed goldfish which is not metallic orange could be termed a "Shubunkin".

One of the worst examples I have seen recently was a tank full of "goldfish" which had long bodies, golden metallic scales, and long comet-like but TWIN tails — labelled FAN-TAILS...!

And these were priced at a few pounds each, despite the fact that many specimens had

further severe fin deformities such as spines where the dorsal fin should be.

I fail to understand the attitude demonstrated by this kind of retailer. It is disrespectful both to the customer and to the fish. In addition, it shows a lack of responsibility towards their fellow pet retailers — most of whom do care about their animals and their customers.

And the hobby itself suffers, which has to be a tragedy when there are so many thousands of people who enjoy keeping goldfish — including those who have dedicated themselves to improving the welfare and quality of goldfish strains.

## Reference

There is no shortage of reference material available for the newcomer to the coldwater scene, as well as for the established hobbyist.

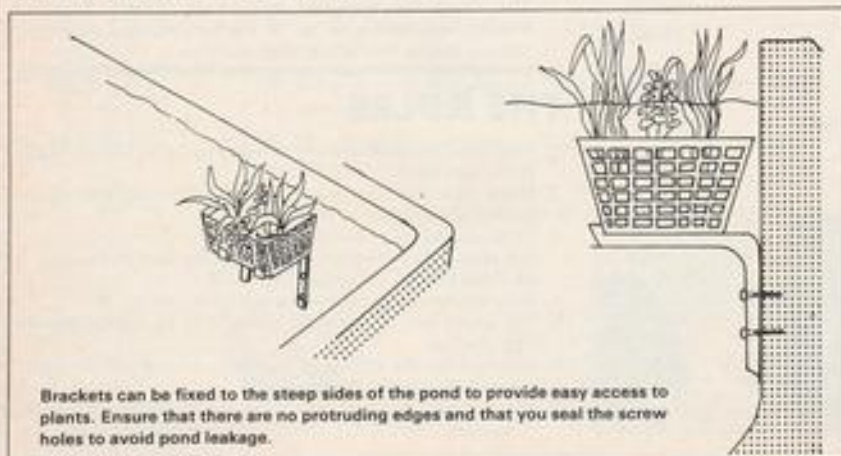
"Aquarist and Pondkeeper" itself provides features throughout the year for the advice and guidance of the coldwater fishkeeper; while several up-to-date books have been published over recent years dealing with coldwater fish, pond construction, and the coldwater aquarium.

By far the most valuable source of information available for the coldwater fishkeeper is from a society. There is no substitute for experience, and the majority of members of coldwater societies are only too pleased to pass on their own experience of keeping fish and to encourage the development of the hobby.

There are several coldwater societies throughout the country, while most tropical fish societies also have a coldwater section.

Even if there is no specialist society in your area, you can still gain a great deal of information by enrolling as a member of a "general" society.

Fees are usually only a few pounds per year and some of the larger societies have members from all over the British Isles, who perhaps are only able to attend the annual open show — when some of the best fish in the country are on display.



Brackets can be fixed to the steep sides of the pond to provide easy access to plants. Ensure that there are no protruding edges and that you seal the screw holes to avoid pond leakage.

# Tomorrow's aquarist

## Shop Window Competition Sponsored by Interpet Ltd.

We recently received a letter from **Andrew Grant**, one of T.A.'s regular contributors, in which he says:

"While looking through the *Aquarist and Pondkeeper*, I noticed the large variety of shop adverts there were, and it gave me an idea for a competition. Why not ask readers to submit designs of advertisements for a fictional aquatic shop, thinking up a good name and slogan. I've enclosed an example of what I mean . . ."

Andrew, as you can see from his advertisement, thinks big! His 'shop' obviously caters for aquarists with extremely large tanks. What will your shop cater for?

We thought we'd give our younger readers a chance this time, so this competition is limited to **Under-sixteens**



Left, Andrew's example of the sort of idea he has in mind for the competition. Right, just some of the wonderful prizes, courtesy of Interpet, to encourage you.

only. We would like you to send us your aquatic shop adverts, with the emphasis on humour and originality. Remember, advertisements are no different to shop windows — they must catch the eye and

invite you in. And don't worry if you're not too good at drawing. We are looking for adverts with some kind of illustration but entries will be judged on the wording more than anything.

Interpet have come up with some wonderful prizes to encourage you:

- **First prize:** An Interpet Mini-Powerstream filter, capable of handling up to one-metre tanks; The Interpet Encyclopaedia of Tropical Aquarium Fishes, by Dick Mills and Gwynne Vevers plus a day out at the London Zoo Aquarium.
- **Second prize:** The Encyclopaedia, plus a day out at the London Zoo Aquarium.
- **Third Prize:** The Interpet Encyclopaedia of Tropical Aquarium Fishes.

With those prizes up for grabs, we expect to be snowed under! So get cracking and send your entries to: **Shop Window Competition, Aquarist and Pondkeeper, 58 Fleet Street, London EC4Y 1JU**, to reach us by the last post on **Friday 27 March 1987**.

To continue our occasional series on setting up a community tank, this month we tackle lighting. Aquarium lighting offers the hobbyist a confusion of choice: tungsten bulbs, a wide variety of fluorescent lighting, a mixture of both, and new, revolutionary bulbs appearing every year. However, most people settle for fluorescent tubes, which give either a pinkish light throughout the tank or white light which is as near natural daylight as you can get and shows the fish's true colours, without emphasising the red tones. However, the price of these fluorescent

## Beginners' Corner

tubes is considerably higher than that of tungsten bulbs, of course.

If you prefer tungsten bulbs, remember two things: they are cheaper to buy but more expensive to run and they get hotter than fluorescent tubes, so watch your hands.

Whatever your choice, try to stagger the lighting, especially if you have plants in all corners. Should you wish for dark areas, where the fish can rest, you can arrange these with your lighting, but don't put any plants

(other than Crypts) there as they'll hate you for it!

Fluorescent lights need ballast and starter units, compatible to their wattage, and your local dealer will advise you on these. When wiring these in, you might like to add an independent switch to control one of the lights. The newer ballast units already have a switch incorporated in them. This will enable you to reduce the lighting gradually before turning it right off, which eases the stress on your fish. Being able to turn

off just one light, either at the back or front of the tank, can also produce some interesting effects in the tank, giving it either added depth or highlighting a particular feature.

A word of warning when siting the ballast units — if you fix them inside the hood of the aquarium, the condensation can do irreparable damage. Place the lights themselves as near the water level as you can and invest in cover glasses to separate them from the water.

How much lighting do you need? A simple guide to wattage can be found in the Table. As to how long the lighting should be on, the general rule of thumb is 10-12 hours a day.

Finally, bear in mind that your fish are as stressed by sudden changes as you are. If you switch on the lights before going to work or school, ease the burden on the fish by switching on the room light first and leaving it on for a few minutes. This will give the fish time to adjust. Then you can switch on the aquarium lights. The same applies to turning the lights off . . . in reverse, of course!

RECOMMENDED MINIMUM LIGHTING REQUIREMENTS*			
Approximate Aquarium Length		Wattage	
Inches	Centimetres	Tungsten	Fluorescent
18	45	1 × 40	1 × 8
24	60	2 × 40	1 × 15
36	90	3 × 40	2 × 20
48	120	3 × 60	2 × 30
60	150	5 × 40	2 × 40

(\*Manufacturers of halogen and other types of specialist lighting provide their own details of recommended wattage levels for their various models.)



# Helping hand

## PROJECT POND

I only needed to fall into my sunken pond once to come to the conclusion that a raised pond is a much safer bet where disabled people are concerned. That was some years ago. Since then, I have been wanting to try out my ideas on a larger scale, and "in the field", i.e. I wanted to install a pond somewhere where it would be used regularly by disabled people.

I found the ideal site in Malmesbury, Wiltshire, just a few miles down the road from where I live.

Burton Hill House School is a former country mansion belonging to the Shaftesbury Society, a benevolent organisation dedicated to the welfare of the disabled and the elderly.

The Society has three residential schools, all of which are designed to meet the educational needs of children whose handicaps are too severe for them to benefit from integrated education within the state system.

Burton Hill House School is currently taking things a stage further by building a special centre to house 40 handicapped adults and children.

The Principal, Philip Drake, was delighted when I approached him with my proposition. The pond would not only give them an ornamental feature in the school grounds, but, much more importantly, it would provide the children with a long-term study project which could be used to learn aquatic plants and animals in a way that they had never been able to do. Since the pond would be raised at a suitable level, it would allow the children to work and touch organisms, something that had always been out of their reach.

The ideal pond would be big to accommodate a group of children in wheelchairs around it, and deep for maximum flexibility of use.

Something that fitted the bill beautifully was the 'Shikoku', a reinforced glassfibre

pond measuring 16' x 9' x 4' (deep), manufactured by Deepools. The suggestion was received with great enthusiasm by the proprietors, Rob and Norma, and arrangements were set in motion without delay.

On a cool Friday evening in October, the pool arrived from Cornwall accompanied by Rob and Norma and 'Helping Hand' for the weekend Chris Wingrove. We were underway.

Sunday, 10.00 a.m. — the first job was to find the best spot for the pond. We needed a flat location that would be within a short distance of the main school building and which could be easily negotiated by the children in their wheelchairs.

Next, came the digging. Chris set to in



NICK LUSHCHIAN

This shot gives a good idea of the depth of the pond and the shape of the excavation into which the deepest section would later be lowered.



NICK LUSHCHIAN

Above, Rob and Norma, with some enthusiastic help from the children, put on the finishing touches to this stage of the project. As you can see, the height of the pond edge is just right for someone in a wheelchair.

Right, by lunchtime on the second day, the pond was already full, contained some plants and was ready to receive the log surround.



NICK LUSHCHIAN



ROB CHARMAN



NICK LUSHCHIAN

Above, the Larch-Lap log roll comes in one-metre, easy-to-install lengths. In this case, they were fitted under the pond lip to provide extra support.

Left, the finished pond, photographed in December. In total, it took only 14 work-hours to achieve this result.



## Special Report

By Nick Lushchan



Far left, the pond — and the school. Left, the chosen site had to be near the school (on near side of the path) and easily accessible to wheelchairs.

great spirits and soon came across what we thought were foundations, but what, in reality, was a "Wiltshire Nerdell" — a block of compressed gravel that proved quite difficult to shift. We could have done with "X-ray, Nerdell-spotting" vision — but no such luck.

Anyway, the excavation continued down to a depth of two feet and the pond aligned to fit in the hole.

The dinner bell came as a very welcome break and we left the pond propped up with timbers, ready for lowering into position. The robust nature of the extra-thick fibreglass was really appreciated to full value at this stage.

By teatime, the pond had been installed, levelled and supported, and was ready to take the water.

Filling up was a very slow process indeed. In fact, we couldn't finish the job before dark and had to restart the following morning which, in typical British autumn fashion, was bitterly cold.

Nevertheless, the job was completed and several plant baskets were lowered into position.

The finishing touches were also supplied completely free of charge by two well-known companies.

Cyprio, from Peterborough, donated a large external Biofilter which was powerful enough to handle the large volume of water with energy to spare.

The pond surround was donated by Larch-Lap. The log roll comes in the form of one-metre-long stretches which are very easy to install, producing a striking, neat and robust finish.

Once the pond season gets underway, a small selection of large, quarantined goldfish which can easily be identified by the children will be provided by Bath Aquatic Supplies to complete the set-up.

In total, it took 14 work-hours to install the pond from start to finish — a remarkably small time investment for something that

will, hopefully, provide many years of pleasure.

As can be seen from the photographs (some taken in the depths of winter), the completed project is one that would enhance the appearance of any garden, not just one designed for the disabled.

The school is, I am happy to report, delighted with its new-found pond, and the children are raring to go as soon as the weather improves.

Watch this space for a progress report at a later date during the pond-keeping season.

### ACKNOWLEDGEMENTS

We would like to extend our most sincere thanks to the following companies for their various contributions. Without them, the project would, obviously, have not been possible:

Deepools, Unit 1A, Rosevear Road, Bugle, St. Austell, Cornwall.

Cyprio Ltd., 133 Eastgate, Deeping St James, Peterborough.

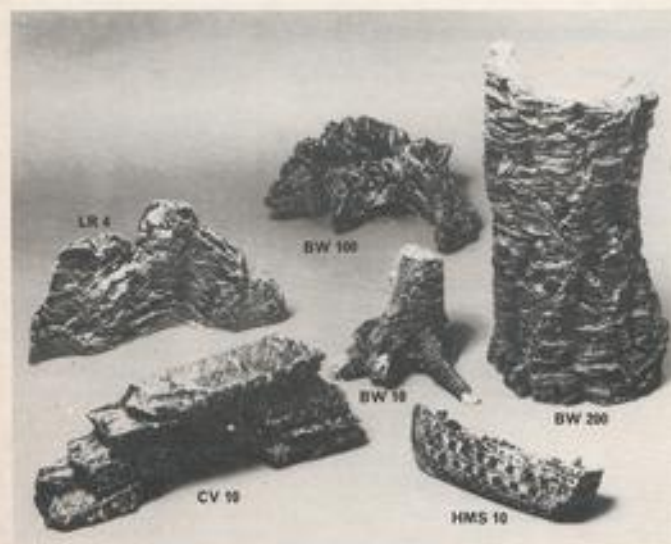
Larch-Lap Ltd., P.O. Box 17, Lichfield Street, Stourport-on-Severn, Worcestershire.

Bath Aquatic Supplies, Unit 5, Cotterell Court, Monmouth Place, Bath, Avon.

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