

DECEMBER 1990

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# AQUARIST

AND PONDKEEPER

EUROPEAN  
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INDIAN  
EXPEDITION

A NEW LIVEBEARER  
FROM MEXICO

BREEDING  
ORANGE CHROMIDES

48 PAGE BEGINNERS'  
QUESTION/ANSWER  
SUPPLEMENT



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# AQUARIST AND PONDKEEPER

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## EDITORIAL

### PERSONAL THOUGHTS ON PERSONAL THOUGHTS

An editor's life is an 'interesting' one. At least, it's varied! Where else could you, on one and the same day, be praised to the skies by a reader who maintains that *A & P* is the best magazine in the world, and then be threatened with castration by another for publishing a particular article?

Yes, you read it right — castration. Now, decapitation, I have a head for, and evisceration I can just about stomach(!), but castration ... well, that's hitting below the belt, isn't it?

The very welcome praise came from a reader who believes that the breadth and depth of coverage we currently offer, provided by many of the world's top writers, is precisely what the thinking aquarist and pondkeeper is looking for.

The far-less-welcome threat came from a reader who objected in no uncertain terms to the publication of David Sands' **Reflections** in last month's issue of *A & P*.

As I have said on numerous occasions before, we are always receptive to personal thoughts on all aquatic, herpetological and conservation matters. We may not necessarily agree with these opinions, but that's a separate issue altogether.

If something is presented as *fact* in an article, then it is our duty to check it out as thoroughly as possible and even withhold its publication if the statements or figures ... or whatever, turn out to be false, misleading or incorrect.

When it comes to personal thoughts/opinions, though, we are in a different ball game. In such cases, we make every effort to ensure that what we do publish, appears as a 'Personal Thoughts on ...' type of item. We will also subsequently do our best to publish other readers' reactions and opinions, of course.

Perhaps it is a sign of the enormously successful year which we've enjoyed, that so many people ring, write or approach us at shows to express their views on the magazine. Perhaps it is also a sign that we tend to get most things right in the eyes of most of our readers when we consider that the recent suggestion that I be deprived of a somewhat delicate part of my anatomy is the first of its kind that has ever come to our notice. Hopefully, it will also be the last.

Hopefully, too, I will be back — in one piece(!) — next month to launch into our 1991 programme which promises to be even more varied and comprehensive than our highly successful 1990 one.

In the meantime, thank you all most sincerely for a fantastic 1990.

Merry Christmas.



John Dawes  
Editor

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## CHRISTMAS THOUGHTS ... AND FISHES

As Jason Endfield gears himself up for Christmas with something less than an over-abundance of enthusiasm, he offers some timely advice about the dangers of neglecting our tanks and fish in the excitement and haze of the festivities.



**C**an you believe it? Christmas again already! I don't know about you, but I can't bear it — all that spare time, as much food as one can consume, sherry trifles (Mmm!), Christmas Pudding — tortuous isn't it? And then we have to go through much of it all over again a few days later to welcome in the New Year. Terrible. You know, if it wasn't for the Perry Como Christmas Special to liven everything up, well I don't think I could cope with it all!

Guess what I saw this year? A tinsel decoration in the shape of a fish. Made in China. It was quite enchanting in a tacky sort of way, though I did wonder what relevance it had to the Christmas story. Perhaps I didn't read my Bible thoroughly enough — did the Wise Men, I wonder, bring gold, frankincense, myrrh... and a fish? Or was it frankincense, myrrh and a gold-fish? Who knows. I, for one, would be grateful for a Christmas fish or two as a seasonal gift (hint, hint!), in place of, let me see, either the red socks or the plastic Santa with real felt attire, but any gift is nice to receive really, isn't it?

All this, of course, raises the question of what to buy our fish for Christmas. Whatever I get for mine this year will be an improvement on my usual offering... nothing... I generally use the excuse that where they come from, Christmas isn't celebrated anyway, so what the heck — but some very clever person reminded me the other day of his theory that many of my fish will

have been born and raised in Britain, so they are technically British and therefore are entitled to a seasonal treat as much as any other pet!

Asked what gift is suitable for a fish, he replied, "How about a Yule-Frog?!", which he thought was very funny indeed. Anyway, I'm not getting them anything, I've decided. British or not, they're only fish, and besides, they never get me anything.

Christmases are generally fishy enough anyway and this Christmas looks like being as busy as ever. There's the obligatory annual tour of the tanks to all uninterested parties visiting the house, and I will really have to get round to setting up the new tank that my brother was good enough to buy me for my birthday... three months ago...

Even without all that, fish turn up quite unexpectedly sometimes. A couple of Christmases ago I pulled a cracker with someone over the Christmas table. Out fell a green plastic fish with the words, 'Taiwan, Patent Pending' embossed on its side. Nobody quite knew what to say, and the joke which fell out of the cracker after the fish was about Santa Claus and a parrot and seemed to make even less sense than somebody wanting to patent a plastic fish. But I digress.

One important point about Christmas and fish is that it can be easy to neglect our tanks at this time of year, and while we slump on the settee digesting too many mince pies and thrilling to the sounds of Carols from Winchester Cathedral (recorded in June), we may

have forgotten to switch on the tank lights. Or worse still, little Billy may have found a way to pick the lock on the fish room door and is 'giving the fishes some Christmas Pudding' on your behalf.

So please don't forget to pay extra special attention to fish, tanks, and especially little house guests this month. Otherwise your festive goodwill might be stretched beyond its limit. And that's never nice to see or experience.

Anyway, I'll take my leave now and allow you to continue making your own seasonal plans. I bet you can't wait!

I hope Santa's pixies bring you much merriment for the coming year, and I wish you all continued fishkeeping success and enjoyment. And once again, please don't neglect the fish this Christmas.

Quickly, before I go, I overheard a member of my family discussing a Christmassy gift for yours truly recently. I couldn't resist asking: "Is it something fishy?". A wry smile acknowledged my question and confirmed my hopes. But what? An Oscar for the new tank? Perhaps some much-needed plants? Or the ultimate fishkeeper's gift — a year's subscription to *A & P!*

No alas, I think I know what it will be. Well, I could grow to like a tinsel fish decoration. It may be compatible with my green plastic fish. I wonder if they ever did patent that...?

Merry Christmas.

# Tomorrow's Aquarist

By David Sands



This column has been going for quite a while, but I've been the current writer for about a year. I'm not sure if we have achieved any great heights in the past 12 issues, but the column has been lively.

I would like to take this opportunity to thank all those fishkeepers who took the time to write to me over the past year. I must admit that I have replied to most of them through the pages of this column rather than directly, and I hope that they did not mind. I receive so many letters these days that it is nearly impossible to write back to everybody, even though I know that I should.

John Cuvelier (AGP contributor) wrote me a heart-warming letter after my boxer dog had prematurely died and I was grateful for his kind words in agreement with my sentiments etc.

I received some great, and not so great, poems after my request for some rhymes from the readers of this column.

Paul Hardy's letter in this month's AGP Letters came about through both my columns and it is always a pleasure when others feel the same way, whether it is about fishes or any living creature.

## TELEVISION TALES

A month or two ago, the producer of *Fish People* telephoned me to see if I knew any keen young fishkeepers because he was considering a similar programme on *Tomorrow's Aquarists*. I went through my letters file and gave him a few pointers although it was difficult because most of you are incredibly enthusiastic. Not all programme ideas get off the

ground and very few totally fish-oriented programmes are made. Would you like to see a specific fish subject made into a TV programme? I would like to see one made about Red Tailed Catfishes, but I doubt if one will ever be made.

## IN PERU

I saw quite a few bare foot children wandering about the streets of Cuzco in Peru. Often they had to spend the mornings and evenings selling trinkets to tourists so that they could afford to attend school in the afternoons. They could be seen after the break of dawn and, often, after darkness had fallen.

They wanted to learn English, probably so that they could communicate better with foreigners and therefore sell them more things, so the whole idea is probably not great. Could you imagine having to sell goods on the streets so that you could attend school? They liked to read, but books were in short supply in a country where a million of their unit of cur-

rency would only just buy a packet of sweets!!

They all had nick-names and sometimes a small boy would come up to me and Nigel, my expedition buddy, and say, "My name is Charles Bronson. What's yours?" Many famous names were used, including world cup heroes and Arnold Schwarzenegger!

## FATHER CHRISTMAS

One of the last jobs of this year is to announce who has won certain prizes (it's a chance for me to feel like Father Christmas) and I have the pleasure to state: **James Andrews**, from Beverley, in North Humber-side, sent me the best list of fishy type clowns and therefore he wins a super prize that the editor can choose and send out!

(Editor's note: I have chosen a copy of *An Interpet Guide to South American Catfishes* by, guess who? Here's a clue: his initials are DS.)

John Dawes

The winner of the official Aquarian Peru Expedition, 1990 Tee-shirt Competition is: **Ben Kinsey, Northwich, Cheshire.**

The correct answers to our October mini-quiz were:

- (1) *Corydoras araguataensis*
- (2) *Corydoras nijssenii*
- (3) *Corydoras trinitatis*

Seven runners-up will each receive a signed copy of my *Corydoras* book, **Keeping Aquarium Fishes**. They are: **David James** (Hemel Hempstead); **Peter Jones** (Dundee); **Miss E Davies** (E Sussex); **Matthew Bond** (Warwick); **Natalie Sayers** (Standford-le-Hope); **Lyndsey Wilson** (Notts); **K J Pike** (Exeter).

## NEW YEAR

I would like to receive letters from TA readers who wish to communicate à la 'pen pal' with others (this was suggested in November by **Joanna Beal** from 50 Cross Street, Spalding in Lincs PE11 2YG) so get writing to Joanna and me!

I'm not sure if we will publish a list or just highlight a few readers every month. I think it's better to have a subject in common with a pen pal, and fish-keeping is as good as any.

You will probably find out everyone loves the New Kids On The Block as well but, being a reader of TA is a start!

I would also like to hear from anyone who feels they have enough involvement in our hobby to be on a TV programme — not just looking after a tank with Mum and Dad, but anyone who has tanks of their own. I would be happy to say hello to any of you who get along to the various fish shows next year. I am usually with **Dr David Ford** on the 'Aquarian' Advisory stand. I met a few of you at Yorkshire, Sandown and Manchester this year, so I hope to meet even more of you next year!

If you have any suggestions for this column, don't be afraid of letting us know — as I said in my first month of TA — It's your column.

Happy Christmas, fish-keepers!



Colourful street trader in Peru. Here, even children have to sell souvenirs to be able to afford to go to school.



# Koi Talk

By John Covelier

## COMMON COLOUR CHANGES

My description of a colour-changing Koi in a recent article evoked a response from no less than Tony West, current chairman of the B.K.K.S., who informs me that this type of Koi, though rare at one time, is now quite common.

He goes on to say that a Doitsu scaled fish which changes colour with the seasons is known as a Kumonryu, whereas a fully scaled type is a Matsukawa-bake. Now, the latter type is mentioned in *Modern Nihikigo*, that excellent book by Takeo Kuroki, but I didn't feel that his description of colour change matched my own experience, but needless to say, I could more easily be wrong than right. We are, after all, still learning about these mysterious fish with which we seem to be besotted!

## CHLORINE FILTER

I've mentioned more than once in these pages the awful problems we experience with chlorine in my area. The season

just ended has seen a worsening of the situation, with an average residual in our tapwater of a disgraceful 0.8 mg/l (ppm). Repeated appeals to Welsh Water having fallen on deaf ears, and doing a normal 10% water change has become problematical to say the least!

Not being in the fortunate position of being able to afford one of the commercially available 'in-line' filters, some alternative method of chlorine removal was kicked around in my mind for some time.

Luckily enough, a friend who makes his living installing and servicing swimming pools came up with quite a respectable solution in the form of the carcass of a redundant diatomaceous earth filter in stainless steel, ideal for modification into a chlorine filter. All that was required was the making and installation of two perforated plastic discs to contain a quantity of activated carbon granules and the fitting of suitable 1/2 inch unions for connection to the water supply.

The result is a filter which enables me to have a constant trickle of fresh and safe water

running into my pool, far better than a one-off water change. Because of the relatively small flow through the tiny unions, the contact time of water with carbon is effective and ensures a reasonable length of life for the medium. It will take a considerable quantity of carbon to fill the thing, but this is certainly a cheaper alternative.

Of course, not everyone will have access to an old swimming pool filter, but needs must, etc, and a suitable vessel such as an old milk churn would probably do the job just as well.

Incidentally, for those of you who like collecting bits of useless(?) information, the difference between carbon and activated carbon is that the latter is obtained by carbonising vegetable matter in the absence of air, the resultant material being capable of absorbing large quantities of gases and other impurities. So there, now you know why the stuff is so expensive, or do we?

A word of caution when using this material. Once exposed to the atmosphere, this useful material immediately begins to absorb impurities present in the air, so an opened pack must be returned to an air-tight container, otherwise its useful life will be reduced, which is wasteful, as well as expensive.

## RUNAWAY COSTS

The running costs of our hobby seem to be escalating at an incredible rate, this being brought home to me with some force while browsing around a Koi centre recently. I spotted some small bags of moulded plastic filter medium priced at an amazing £25 per bag! A quick mental calculation told me that my own two filters would have required approximately 80 such bags! What on earth is happening to us?

## FOODS FOR THOUGHT

I've had an opportunity to try out Interpet's *Koi Seasons* food on my Koi and, knowing how finicky they have been in the past when faced with a change of diet, fully expected some resistance, but not a bit of it.

These hooped shaped morsels were immediately accepted in true hungry Koi fashion, and I understand that a larger size will soon be making an appearance, which will be good news for the larger size of Koi.

Those cylindrical tubs which Tetra Koi sticks come in have been found to be most useful for storage and modelling purposes at our local infants' school and are placed on one side for collection as they are emptied. The last collection totalled no fewer than 13 large-sized tubs, a horrifying amount when the cost of purchase is considered, but let's face it, our Koi must be worth it or we wouldn't do it, would we?

## WINTRY ADVICE

By the time you are reading this, another Koi season will have ended and our fish should be all settled down ready for winter, which we all hope will not be too severe, in view of our having escaped lightly for the past two years. I can't help feeling some slight trepidation over the effects upon our Koi should winter really hit us hard this year.

The best advice to those whose pools contain no place for Koi to shelter is to make some temporary form of pool cover, even a sheet of 4-inch thick polystyrene floated on the surface would be of some help in reducing heat loss from the surface. These sheets are available from builders' merchants, the most useful size being 8 x 4 feet, large enough for any pool, two or more being used for the king-sized pool.

If you've a mind to, a few small holes can be bored in the sheets to ensure adequate ventilation for those pools which have not been cleaned properly prior to winter (naughty!).

And, inevitably, as it's that time of year, I'd like to wish all my readers the very best for Christmas and the New Year. As long as you keep reading, we'll keep writing, even if we don't always please everyone.

What would I like Santa to bring me this year? The £47,000 Koi I heard about wouldn't go amiss, apart from the worry and sleepless nights knowing it was in my pool!



My solution to the chlorine problem — home-made, but very effective.

## COVER STORY — CHALK BASS

(Photograph: Max Gibbs, *The Goldfish Bowl*, Oxford)



The Chalk Bass or Caribbean Blue Bass (*Serranus tortugarum*) has achieved considerable popularity among tropical marine hobbyists, particularly (it seems) in recent years.

In the wild, this delightful and small (maximum length around 3 inches — c 7.6cm) serranid is generally found over a sand or silty substratum, often hovering in shoals over a pile of coral rubble or an old conch shell (John E Randall in *Caribbean Reef Fishes*, published by T.F.H.).

This factor should, of course, be borne in mind when providing aquarium accommodation for this fish, i.e. both adequate cover and an open sandy patch should be provided.

The Chalk Bass is a peaceful fish which is suitable for most community set-ups. It will eat a relatively wide range of foods which should include frozen and, if possible, small live foods. Recommended temperature: around 26°C (c 79°F).

## Fishfeed



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# Coldwater jottings

By Stephen J. Smith

## WAKIN DEBATE HOTS UP

**C**oldwater Jottings has stirred quite some debate among Goldfish enthusiasts up and down the country. I have received a number of comments throughout my travels, as well as several letters. Good stuff, keep them coming: one of the main functions of *Coldwater Jottings* is to provide a forum for matters coldwater. Everyone is entitled to their opinion and there are no rights and wrongs in fishkeeping (well, hardly any). Healthy debate, such as this, can help us all to learn more about the hobby, which can only be a good thing in the long run.

Returning to the Wakin debate itself: David Silk, whose Wakin was featured in a previous *Coldwater Jottings* (see *Plea for Wakin Partner, Coldwater Jottings*, June 1990; and *Standard aWAKINing, Coldwater Jottings*, September 1990), has written with his insight into the origin of the variety.

David explains that, not only is the Wakin a legitimate variety of Goldfish, but that it is also the most popular Goldfish in Japan. "The Wakin is the Common Goldfish of Japan, but is rarely seen outside its homeland," explains David. "If it were not for the Wakin, there would be no such fish as the Ryukin and Jikin, for example," he says, and concludes by recommending the excellent reference book by Dr Yoskiichi Matsui, *The Goldfish Guide*.

Bryan McHugh's response in September's *Jottings* took the debate onto a different tack for Graham Cragg of Crawley, West Sussex. Bryan had expressed concern that show standards in general could be eroded by the threat of the Nymph (twintail body/singletail finnage) on the show bench, and this is taken up in Graham Cragg's letter. Graham remarks that the Nymph is a most beautiful pond fish which pondkeepers have enjoyed keeping for some considerable time, although they are not "officially" recognised (my inverted commas). "It is mentioned in several books in my

library and, in one first published in 1937, it is most accurately defined as a single-tail Veiltail," remarks Graham.

Quoting Graham's letter verbatim, he continues, "Many pondkeepers would welcome more varieties, not fewer. After all, tropical enthusiasts have literally hundreds of species to choose from, and Fancy Goldfish keepers have a range of bizarre creatures to keep them happy. However, as many of these are grotesque in the extreme, it is perhaps just as well that most such hideous creations are not sufficiently hardy to survive a British winter in an outdoor pond".

He concludes with a humorous point, but with serious intent: "Are these abominable creatures really Japanese, or was Baron Frankenstein a secret (Gold)fish breeder?"

My own response is this: the hobby of Goldfish-keeping and breeding is far more sophisticated than it was 53 years ago, in 1937. Great strides have been made in aquatic research, resulting in more knowledge being available in every aspect of aquarism, including Goldfish genetics.

It has long been established that a single-tail progeny from a twin-tailed Goldfish variety is

nothing more than a throw-back to its ancestral form and, for the purposes of line-breeding, is not a 'good' fish. Crossings from these 'Nymph' forms will, themselves, produce twin-tailed and Nymph offspring, which is contrary to the objectives of refining the twin-tailed variety from which the Nymph arose.

All this is not to say that the Nymph form should not be kept — they do make sturdy pond fish and, after all, fishkeeping is all about personal preference, regardless of what the 'experts' or 'officials' may think.

## CLASSIC TREAT

I find it difficult to resist the tradition of recommending aquatic Christmas presents for your aquatic-minded spouse, friends, or colleagues — or even as an aquatic treat for yourself. This year is no exception, but I have just one recommendation: a lavish tome entitled *Chinese Goldfish*.

Now, don't let the price put you off. OK, so it will set you back £25.50, but if this were a Koi book, it would cost you twice the price and contain only half the information. In this case, you really do get what you pay for.

*Chinese Goldfish* is published by Foreign Language Press, Beijing and, as far as I am aware, it is only available in the UK from *Classic Aquatics* in Derby, whose proprietor, Terry Guy, imported the book from his recent visits to China.

No fewer than one hundred pages of informative text and fabulous colour photographs are included between the hard-back covers, making *Chinese Goldfish* a book which would stand proudly, not only on the shelf of the Goldfish hobbyist, but also sit on the coffee table of even the most disinterested.

Of course, there is page after page of colour photographs depicting some of the most exotic Goldfish varieties. These are complemented by numerous colour representations of Goldfish in Chinese art and culture, as well as eye-opening shots of Goldfish farms.

Unlike some translated books on Goldfish, the text of *Chinese Goldfish* loses little in its translation. Topics such as the origins and development of Goldfish raising in China, breeding, and prevention and treatment of diseases, are all covered in some detail and are accompanied, where appropriate, with line diagrams.

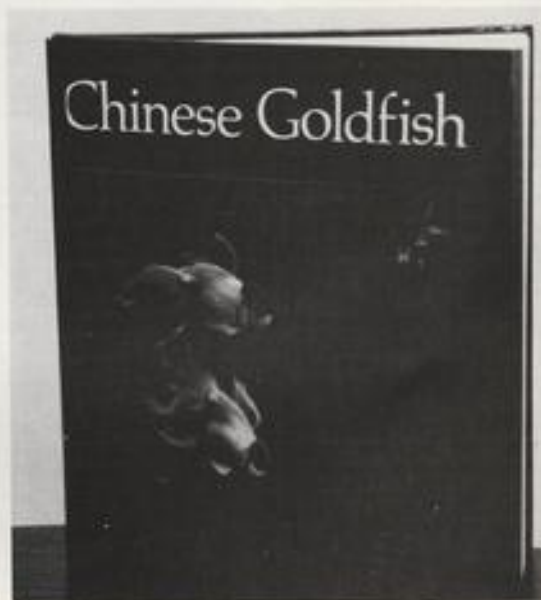
So this book serves two purposes: firstly it is a picture book (and how!), while it also serves as a useful reference. Therefore, you really are getting first-class value for your money.

*Chinese Goldfish*, Foreign Languages Press, Beijing. Price £25.50 from *Classic Aquatics*, 129 London Road, Derby DE1 2QN. Tel: 0332 2936866.

## GREETINGS

Finally, to all readers of *Aquarist & Pondkeeper*, including the many correspondents to *Coldwater Jottings*, and to all involved in this pleasurable pursuit of fishkeeping, a very merry Christmas.

FOR MORE  
BOOK REVIEWS,  
SEE PAGES  
85 and 86





# OUT AND ABOUT

## STATE OF THE ARTIS — AMSTERDAM'S AQUARIUM

by Dick Mills

(Photographs by the author)

Upon entering Artis Aquarium for the first time you might be forgiven for thinking at first, as I did, that you're in the wrong building. The immediate impression is one of space, something that we're perhaps not used to in our public aquaria. If you can imagine a typical, high-ceilinged museum building, complete with marbled pillars and wide staircases, and add very large display tanks, then you can nearly say you've been there. (The architectural design is very much of the period, the building being opened in December 1882.)

An added virtue of the high ceiling is that it allows more than adequate illumination for walking around without detracting from one's ability to see into the tanks, and it also helps to dissipate conversation noise from the visitors! It is very much like being in an art gallery (and being in Amsterdam, I'd already visited the Rijksmuseum to brush up on my Rembrandts), the difference here being that all the 'pictures' are living masterpieces.

Almost as if to prolong the art gallery analogy a little further, immediately inside the entrance hall the walls are covered with masses of children's coloured drawings of the Zoo's many inhabitants. However, once up the wide staircase, you could be in no doubt — it is indeed an Aquarium but, what's this? The very first exhibit looks suspiciously like an unlit tank! It was, but for a very good



Inside this imposing building are stored the living treasures of Amsterdam's Artis Zoo Aquarium.



The Archer Fish know exactly where to look for their next meal — on any overhanging leaf of this magnificent paludarium.



Among the Far Eastern 'heavies' on display are *Osphronemus*, Tinfoli Barbs and *Pangasius catfishes*.

reason: inside, swims a small shoal of Pinecone-fishes (*Monocentris japonicus*) and the unlit tank enables the outside viewer to see their glowing luminescent organs (situated under each eye) to good effect. In startling contrast, the next few tanks are brilliantly-lit, all containing an excellent collection of marine invertebrates.

The range of fishes (there's around 2,000 in this, Holland's oldest and largest public aquarium) include coldwater/semi-tropical/tropical marine fishes and freshwater tropical species. An obvious omission is European native fishes, but problems with maintaining their water at sufficiently low temperatures makes the decision to omit them more understand-

able. As it is, the present-day coldwater marine displays need to be kept constantly chilled at between 10-12°C (50-53.5°F).

In plan view, the display areas are laid out in the shape of a long 'T', the vertical leg containing larger coldwater / tropical marines and freshwater tropicals; the shorter, top cross-arm has a multi-tank display of tropical marines (arranged as an island exhibit) within what is otherwise a tropical freshwater hall.

The exhibits are well-labelled, and, again, because of the relatively high light levels, you don't have to peer closely at them to see what they say. There are also occasional informative panels. The ones showing how the water is fil-

tered and fed to the tanks are especially welcomed, but the one that everyone gathers round, not only shows information visually, but also very audibly! This is the 'meter' that measures the strength of electrical voltages being generated by the Electric Eels — and when they square up to each other, the reading is then genuinely 'off the scale'!

Being in Holland, you won't be surprised to see some of the displays being treated as paludariums, and two in particular stand out. One houses Archer Fishes (*Toxotes* sp), with the 'above water' vegetation providing perching places for insects (making handy target practice for the Archer Fish) while another features a shoal of Four-Eyes, *Anableps anableps*. The presentation of this latter display is especially effective as the water level is adjusted to be at the outside viewer's own eye level, so that the particular characteristic of the fishes' simultaneous 'above-and-below-water' eye construction, and function, is easily seen.

Again, being Dutch, it is no surprise to find fishes from its former colonies in the Far East (*Osphronemus*, *Barbus schwanenfeldi* etc), but there are also large aquariums of some South American species, *Osteoglossum bicirrhosum*, *Serrasalminus*, *Leporinus* and some very hefty-looking cichlids. African Lake cichlids are featured in a wonderfully rocky display and Artis was the first to achieve the breeding of *Nyassa* (Malawi) species soon after their discovery.

Breeding has been one of Artis' main pre-occupations over the years; in addition to breeding the more popular species (in order to reduce the need to import wild-caught display stocks), the Aquarium took pride in achieving the breeding of previously-unbred species: among these were *Anableps*, *Malpalmus kreiseri*, *Xenentodon caucila*, and Indian Knife-fish (*Notopterus* sp).



Water for the aquarium comes from two sources: the freshwater aquariums use domestic Amsterdam tapwater, demineralised to some extent before general use, and further so for the more exotic (Discus and Killifish) exhibits. The marine aquariums still use natural seawater (from the Atlantic). Twice a year, 200 tonnes of seawater are delivered to Amsterdam by a drinking-water ship, free of charge, the only real expense being the cost of transporting it the further

couple of miles from the harbour to the Aquarium.

All the display tanks are on a recirculating filtration system, something pioneered by Frank de Graaf when he took over Artis in 1955. Until then, the water was recirculated but not in conjunction with a filtration system. Incidentally, Frank retired from the Aquarium in 1987, which was rather a pity in some ways, for I had written to him at the Aquarium just before my recent visit!

Fortunately, my letter had

been passed on to him by Mr Wilhelm, the present Director, and I was able to have a chat to Frank about Artis before I returned home, and have more than gratefully included information obtained during our conversation in this article.

On the ground floor, as if to complete the whole spectrum of aquatically-associated wildlife, there is a comprehensive display of amphibians. Again, presentation is of the highest quality and, as far as this visitor could see, the state of the Artis

continues to be what it always probably has been — superb. Should you find yourself in old Amsterdam, you can find the Aquarium within the Artis complex (there's a Zoo and Planetarium too) at Plantage Kerlaan, only a short tram ride from Central Station. The Zoo itself is a delight, although for me, the Aquarium was best, and I'm not just saying that because there was no extra admission fee to get in. Anyone would willingly pay — especially after they'd seen it!

## A CHAMPION SHOW

By Dr David Ford (Senior Consultant to 'Aquarian')  
(Photographs by the author)

The British Aquarist Festival has finally chosen the ideal venue. Bowlers Leisure Centre at Manchester (by junction 4 of the M63) was chosen in 1989 as an alternative to G Mex and proved successful and popular, but would hobbyists return every year? The 1990 show (27 and 28 October) showed it was definitely on the aquarist's calendar as visitors poured in, despite appalling weather.

This was the 39th year of BAF, organised by the Federation of Northern Aquarium Societies with support from *Aquarist & Pondkeeper*. The magazine sponsors the **Champion of Champions** competition where only winners of 'Best Fish in Open Shows' throughout the year are allowed to enter the grand final. The winner receives the prestigious *Aquarist & Pondkeeper* solid Gold Pin, and the top three receive a commemorative plaque and cash awards.

This year the 'Champion' was a large Cichlid, *Cichlasoma fenestratum*, the Window Cichlid owned by S & T Derrick of Halton AS. In fact, the



Colin Rumbold and Paul Corbett of Isle of Wight AS, who drove their van all the way to success at Manchester.

Derricks were also the exhibitors gaining the most awards. Second was another large Cichlid, *Cichlasoma bifasciatum* owned by independent exhibitors Mr and Mrs Byrom, and third, a huge Eel, *Anguilla anguilla* owned by M and R Day (Select AS). There were 13 top-winning fish in the Champion of Champions display.

**Best Fish in Show** was a pretty Swordtail, the rare *Xiphophorus nigrensis*, owned by L Graham of Workington & DAS. Halifax AS again won the highest number of awards, but the best tableau was by the Isle

of Wight AS with a working model of the Channel Tunnel.

Strood & DAS came second in the tableaux with a giant Thomas the Tank Engine and third was a life-size Postman Pat, complete with a Post Office van, called Robin's van, because it was by Nottingham AS (Robin Hood and all that). Scorpion came fourth and Macclesfield AS came in fifth. All these tableaux also won cash prizes (from £100 down to £40) donated by A & P.

In addition to the 26 tableaux, 20 trade stands did brisk business with many species of fish for sale at special prices for the show, while, for the second year running, Schott Glass attended to promote Siporax, their open-pore sintered glass filter medium. Aquatop were selling a brand-new product — a colourful carved rock from the USA (see **Product Round-up**). The *Aquarist & Pondkeeper* stand sold their whole poster range and the informative complete Supplements, both of which went like the proverbial 'hot cakes'.

The 'Aquarian' Advisory Service was present to deal with fishy problems and on their stand David Sands was selling author-signed copies of his newly revised Volume 1 of *Catfishes of the World*.

Throughout both days there was entertainment by Stewart Peters, the Children's Magician. Lectures were given by John Dawes (Editor of *Aquarist & Pondkeeper*) on his trip to the Rio Negro, Dr David Pool (Tetra Information Centre) on Fish Diseases, Brian Walsh (FNAS) on Characins, while I

chipped in with a session on Fish Nutrition on behalf of the 'Aquarian' Advisory Service. At 3 pm on the Sunday, prizes were given by Fred Mulla in the 62 classes at the show.

At only £2 for adults and £1 for children, the British Aquarist Festival was good value, not only for all the entertainment and bargains, but the excellent facilities. Anything from a simple sandwich to a three course meal was available in clean, warm and attractive surroundings, about as different to Belle Vue as you can get! Congratulations to the BAF committee on a Champion show, and on their plans to expand and develop the **Champion of Champions** competition further in association with A & P.



Part of the Champion of Champions display.

### MAJOR B.A.F. TROPHY WINNERS

#### TABLEAUX

1. ISLE OF WIGHT AS
2. STROOD AS
3. NOTTINGHAM AS
4. SCORPION AS
5. MACCLESFIELD AS

#### CHAMPION OF CHAMPIONS

1. *Cichlasoma fenestratum* owned by S & T Derrick (Halton AS)
2. *Cichlasoma bifasciatum* owned by Mr & Mrs Byrom (Independent)
3. *Anguilla anguilla* owned by M & R Day (Select AS)

#### BEST FISH IN SHOW

- Xiphophorus nigrensis* owned by L A Graham (Workington AS)

#### EXHIBITOR GAINING MOST AWARDS

- S & T Derrick (Halton AS)

#### HIGHEST POINTED SOCIETY

- Halifax AS

# BREEDING ORANGE CHROMIDES

Easy to keep — not so easy to breed. That's William Ross' verdict on this small, variable, generally peaceful cichlid.

(Photographs by the author)



This golden pair (the male is the lighter fish) are guarding a 'dispersed' batch of eggs.

According to Goldstein, *Eretmodus* is the only genus of Asian cichlid, one which is apparently derived from a salt-tolerating primitive form. Only three species are known: *E. maculatus*, *E. swatensis* and *E. canarensis*. This article is about *E. maculatus* (Bloch) — the Orange Chromide — which is the most common species seen in the hobby. Almost, if not all, the Orange Chromides seen in the hobby today have been produced in fish farms in Florida and Singapore.

*E. maculatus* is one of the more peaceful cichlids around. It is small, rarely exceeding 7.5cm (3in), and is usually tolerant of other fish. Although it is primarily a brackish water fish, it can be maintained and spawned in freshwater. These attributes make it a suitable inhabitant for the community aquarium.

As is usual with commercially produced aquarium fish, colour variants have occurred. Through the dedicated work of fish breeders, these colour variants have been line bred into fixed colour strains which are now produced in commercial quantities. The Orange Chromide has been no exception to this exploitation.

## COLOUR VARIATIONS

### Wild-type

Ward and Barlow (1967) studied the coloration and patterns of adult fish, but found little consistency. The dramatic difference in the coloration of a pre-spawning pair and an individual fish are fairly well demonstrated in the accompanying photographs. In one, the female is the partially hidden fish.

The darkening of the lower rays of the tail is one of the few physical signs that can be used to sex these fish. Usually the upper rays are also darkened.

### Gold variant

The gold-coloured *E. maculatus* illustrated were produced in Singapore. The male is the lighter coloured fish, in the photograph (he is pinkish in colour compared to his yellow-coloured mate).

In Dr Axelrod's *Atlas of Freshwater Aquarium Fishes, Second Edition*, page 608, illustrations 5 and 6 are Golden Orange Chromides. These illustrations show a variation in the colour of the fishes. Although the gold strain is fixed and breeds true, there is still a degree of colour variation in it.

### Blue variant

Blue-coloured fish do not appear to represent a line bred strain, but occur among normal-coloured fish. The fish illustrated was found with a few others among a shipment from Singapore.

An illustration on page 351 of *Dr. Sterba's Aquarium Handbook* appears to be a sexually mature female of this variety.

## PERSONAL EXPERIENCES

### Accommodation and original stocks

Six specimens of *E. maculatus* (gold variety) were purchased. These were housed in a 76 x 33 x 38cm (30 x 13 x 15in) deep freshwater aquarium with undergravel filtration (the addition of some salt is, nevertheless, beneficial). Temperature was maintained at 25-27°C (77-80°F). Bunches of *Ceratophyllum demersum* weighted with lead strips were used as decoration and cover; two halves of a plant pot were added to act as caves for the fish.

Orange Chromides are timid fish and, as such, seek shelter when threatened. The fish were fed on a good quality flake food, plus a vegetable conditioning food which they ate greedily. The young fish supplemented this flake diet by eating Malayan Snails (*Melania tuberculata*) and some of the soft-leaved plants which were present in the aquarium. This habit of eating snails is, basically, the habit of young fishes and ceases when they grow older; the consumption of green plants continues throughout their lifespan.

Six months later, a further six *E. maculatus* were bought; these were four normal-coloured fish and two blue ones. They were housed in a similar set-up to the one outlined above.

### Spawning Orange Chromides

Spawning Orange Chromides of any variety is a fairly simple achievement, but breeding (spawning and rearing of the fry) is a different matter. I agree with Wainwright (1976), that this is not a particularly easy species from which to breed. Goldstein (1973) quotes a description of breeding Chromides by Ward and Barlow (1967). Wainwright (1976) also describes the breeding behaviour of these fish. The



behavioural scientists Wyman and Ward (1973) describe the behavioural changes found in developing fry.

Some of these publications mention that, in the first week of life, following the exhaustion of the yolk sac, the fry gain sustenance by consuming mucus from the sides of the parents' bodies (as in *Discus* and *Uarus*). There is no indication as to what to feed them following this stage, however.

The six Golden Orange Chromides I referred to above, were left together until a pair bond formed between two of them. This occurred after a fair amount of aggression, following which two fish settled down together and defended a territory against the remaining four; this territory contained a half plant pot. The four unpaired fish were removed, leaving the pair with the aquarium to themselves.

The pair cleared some gravel out from below the plant pot and some effort was made in cleaning up the inside. These domestic chores took about 48 hours. Following this, the female laid her eggs on the inside of the roof of the plant pot. Both parents took it in turns to guard the eggs, which were never left unattended. Two days after spawning, both parents were seen excavating small pits in the gravel. The following day, they transferred the wriggling fry from the roof of the plant pot to a pit in the gravel. One or both parents remained with the fry continuously. Over the next five days, new pits were excavated and the fry were moved from one to another (probably an anti-predatory measure).

Around the eighth day, the fry became free-swimming but remained close to a parent. Some of the fry were observed nipping at the flanks of both parents, presumably feeding on the mucus produced by the glands in the parents' skin. At this stage, Liquifry for egg-layers was added as directed on the package. On the 12th day, the diet was enhanced by the addition of Biodin PL, followed by crushed growth food.

At 24 days post-spawning, the parents were seen to be glancing off each other. This became more frequent over the next 24 hours. Richter (1989) noted similar behaviour but, as yet, no explanation has been found for it. The parents were removed on the 25th day post-spawning.

The fry continued to shoal for another four days, then spread out as individuals. They continued to grow well on a varied diet of flake and freeze-dried food.

At 105 days post-spawning, the young fish were showing aggressive behaviour. The number of fish in the rearing tank was therefore reduced to 12 when they were 128 days old. This was done to improve the living conditions of the remaining 12 fish and to facilitate the study of their behaviour. The above description relates to the most successful spawning which I have experienced to date.

In 18 months the Gold *E. maculatus* spawned 31 times. Of these, only two spawnings produced fry which reached maturity. Most of the spawnings had disappeared by the fifth day. One spawning was removed from the parents and an attempt was made to



A wild-type pair of Orange Chromides (the female is partly obscured by the male).



Tightly clustered spawns such as this one appear to result in a higher percentage of fertile eggs.



Proud parents and offspring.



rear the eggs artificially, but this failed on the ninth day. There was a period when the female laid her eggs spaced out, rather than tightly clustered together. These spawnings produced many more infertile eggs when compared to 'normal' spawnings.

Over a period of eight months, the normal-coloured Orange Chromides spawned 12 times. No fry survived beyond 35 days.

The interesting behaviour of these fish has drawn the attention of many behavioural scientists, see Goldstein (1973). When maintained in groups, they can be very aggressive towards each other. Once a pair bond has formed and the pair have taken over a territory, life in the aquarium can become quite difficult for the other Orange Chromides. If kept in small groups, life can be intolerable for the submissive fish and may end in their demise. In large groups, there are more candidates to 'absorb' the aggressive attacks, thus avoiding any one of them being over-harassed.

### CLOSING REMARKS

The genus *Etoplus*, along with *Uaru* and *Symphysodon*, are representative of fish that produce body mucus for the nourishment of their offspring. A recent report by Dawes (1989), adds the catfish *Hypostomus* and *Pterygoplichthys* to this collection of mucus-feeding fish.

Looking at this short list of body mucus feeders, none of them are easy to breed. At least, *E. maculatus* is readily available, is

reasonably priced and fairly easy to maintain in aquaria. Therefore, I would recommend them to anyone who wishes to breed a fish

that nourishes its fry in this fascinating manner. In a way, Orange Chromides could be considered as the "poor man's" Discus.

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The blue form of the Orange Chromide sometimes occurs among wild-type shipments.



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**Herpetology,** Julian Sims. **Koi,** Roger Cleaver. **Tropical,** Dr. David Ford. **Coldwater,** Pauline Hodgkinson. **Plants,** Barry James. **Discus,** Eberhard Schulze. **Marine,** Graham Cox.

## COLDWATER

### LONDON SHUBUNKIN HUNT

*I cannot find anyone who could supply me with good London Shubunkins. Can you help?*

There are, in fact, a few hobbyists who are breeding good-quality London Shubunkins. The best way to get in touch with these people is to contact the secretaries of one of the Goldfish societies. I think some members of the two following societies may be able to help you:

- 1 Northern Goldfish and Pondkeepers Society. Secretary: W Ramsden, 18 Ainsdale Road, Bolton, Lancs, BL4 0LZ.
- 2 Goldfish Society of Great Britain. Secretary: R Saltrick, 38 Herent Drive, Clayhall, Ilford, Essex, IG5 0HE.

### OVER-STOCKING/MIXING PROBLEMS

*I have a 36 x 15 x 12in tank. It has an undergravel filter which seems to get blocked very quickly. I then have to empty the tank completely and start again from scratch.*

*At present I have approximately 30 Zebras, 14 Orandas, and two Loaches. Can I add any more fish? I have been told at my local shop that I can safely add up to another six Orandas.*

*I am feeding the fish on Tetra Pond Floating Sticks twice a day. Twice a week, I also give the fish a feed of red worms and, about four times a week, tablet food. Is this OK?*

*One of the Loaches is continually getting Fungus. It clears up after treatment, but then returns after a few days. Is there anything I can do to get rid of it permanently?*

Let us begin with the question of stocking, both the number and the type of fish you have. It is not a good idea to mix tropical fish with temperate types, such as the goldfish and its varieties. Many tropical fish are only able to live if the water chemistry is suitable for their particular needs, the temperature of the water being very important; many are unable to survive below a certain temperature. Therefore, the needs of all these fish are different and quite separate and, in my opinion, should be kept so.

I must admit that I was quite shocked to learn how many fish you are attempting to keep in your tank. In fact, most newcomers to the hobby make the fatal mistake (well, fatal for the fish, that is) of attempting to keep too many fish in too small a tank. The problems due to this state of crowding are frequent and there are many fatalities. Allow at least 1 inch of fish per 24-30 square inches of surface area.

I am also shocked that your local dealer has told you that you may add more fish! If I were you, I would not welcome this advice and would certainly look around for a new place where to do my shopping.

Overcrowding is just one of the reasons why the tank needs to be stripped down so often; that, and the fact that your tank maintenance is done not nearly as often as it should be. Small partial water changes should be done at least twice each week in a goldfish tank, even when a filter is in operation. The gravel should be given a gentle stir to dislodge the waste and then siphoned away. Top up with clean water of approximately the same temperature.

There are no secret methods in maintaining the best conditions for the fish, other than keeping to the rules, which are:

Never over-stock, feed a good balanced diet, never introduce newly-acquired fish into your tank without first keeping them in quarantine (for at least five or six weeks in my view), and carry out regular, frequent, partial water changes.

Your fish cannot remain in good health if they are kept in crowded conditions. They suffer stress just as we would if we had to endure similar conditions. Stress causes ill health, and outbreaks of disease are common. Fin Rot and Fungus Disease are a sure sign that conditions are poor. It is very difficult to have control over water quality in over-stocked aquaria and, unless the quality of the water is good, the fish cannot survive, let alone thrive.

Many people do incorporate an undergravel filter with a powerhead. It really is a matter of choice. However in a balanced, under- rather than over-stocked tank, even the most simple box type filter can be very effective.

The diet you are feeding is fine, but you can vary it even more by offering chopped earthworms, white worms, brown bread and a good flake food.

Improve your tank conditions and, once cured of Fungus, the problem will not return for your Loach. At the moment, all you are doing is repairing the damage, but, as the conditions are far from good, the Loach simply falls prey to this condition again, and will continue doing so until you change your approach.



Good-quality London Shubunkins are hard to find.

## TROPICAL

### INTELLIGENT ELEPHANT NOSES

*I would be very grateful if you would supply me with some information on the keeping of the Elephant Nose Gnathonemus petersii.*

*Gnathonemus petersii*, or Peter's Elephant Nose, will eat any small livefoods, although *Tubifex* is its favourite. Try the frozen foods sold to the marine hobbyists as well.

The fish is a typical Mormyrid with its long nose and the preference for evening feeding. The base of the aquarium must not be sharp; river sand is best, but small rounded gravel is acceptable. The fish likes plants to hide in, but may uproot them — use pre-potted ones.

There are no reports of successful breeding in aquaria, but hobbyists do comment on the fish's high intelligence.

### RIGHT TIGER — WRONG COUNTRY

*Would you please supply me with some information on the African Tiger Fish (*Datnioides microlepis*)?*

*Datnioides microlepis* is not the 'African Tigerfish', because it comes from Thailand, Cambodia and Borneo; it is actually called the Siamese Tigerfish.

It originates from dark, brackish waters where it is a predator. Therefore, in the aquarium, it prefers subdued lighting (or a pot to hide in), some salt in the water (2 tablespoons/10 litres) and a diet of raw fish and meat.

The specimens in the trade



*Datnioides microlepis* — an attractive brackish water predator.

are wild-caught young fish because this species has not yet been bred in captivity. As it is a member of the Lobotidae, it should lay eggs on a stone. The eggs would then be guarded by the male, but there are no reports of aquarium breeding to confirm this.

### SALT OR SALTS?

*Should salt be added to the water of a community tank as a matter of course? What good, if any, does it do? Do all fish tolerate salt? What is the difference between 'salt' and 'salts'?*

No, salt should not be added to aquaria as a matter of course. Not all fish tolerate salt (many Tetras for example), whereas

some species are unhappy without it (Mollies, for example). You should study the water chemistry requirements of your chosen fish to see if salt is necessary, but mixed Community Tropicals are best without any additions.

Many fish require Salts, that is, Seasalt mixtures or Hardness Salt mixtures. These are blends of chemicals that contain many compounds other than Common Salt (sodium chloride), and are best bought as commercial mixes (e.g. Marine Salts or Cichlid Salts).

Common Salt is normally used as a remedy (medicine) for the treatment of Fungus, freshwater protozoa (*Chilodonella*, *Costia*, *Ichthyophthirius*, *Trichodina*), ectoparasitic worms,

flukes (*Dactylogyrus*, *Gyrodactylus*), Leeches, Crustacea (*Argulus*, *Lernaea*), at a dosage of 10 to 15 gm/litre for 20 minutes or 25 grams/litre for 15 minutes if the weaker solution is not effective.

For a long-term bath, 27 grams per gallon — 4.5 litres — (0.7% solution) is used on day 1. Increase on day 2 by replacing half the water with a 42 grams per gallon — 4.5 litres — (1.1% solution) mix. Day 3 replace half water with 50 grams per gallon — 4.5 litres — (1.3% solution). This slow build-up prevents osmotic shock to the fish and can be maintained at the higher level for 2 or 3 weeks, after which time even Leeches give up. Then reverse the process by dilution with freshwater over 3 days.

Do not use Table Salt; it may be mixed with iodine compounds (good for humans at the tiny amount used on our meals, but not good for live fish at high concentrations). Some Table Salts also contain 'flow compounds' to help it dispense from salt cellars — harmless, but it complicates weighing out for treatment. It is best to use Rock Salt, Cooking Salt, pure salt (medical quality) or the Remedy Salt sold in aquarium shops.

**HAPPY  
CHRISTMAS  
TO ALL  
Aquarist &  
Pondkeeper  
READERS**

## MARINE

### DEIONISING RATES

*How much water can be passed through a deionising unit before the resins need recharging/replacing? I would also like to know the rate at which a deioniser produces pure water.*

① **Amount of water treated.** This depends on a great

number of inter-related factors. The most important are:

(i) How good is the quality of tapwater going in?  
(ii) What is the pre-determined 'shut-off' point?

By this I mean that the resins don't suddenly cease to deionise. Rather, their performance tails off gradually. You have to decide at what degree of water quality the deionised water is

no longer suitable for your purposes.

(iii) Which ions are you interested in removing most?

By this I mean that, if the water in your area is very calcium/magnesium-rich (i.e. a lot of 'fur' in your kettle!) and you are mainly interested in softening the water, then you would probably only get 30-40 gallons (135-180 litres) of zero

hardness water with some models of deioniser. However, if you are a marine aquarist and are only interested in removing nitrates/heavy metals, then you could probably get 80-100 gallons (360-450 litres) per recharge.

② **Rate of production.** Approximately some 5 gallons (around 22 litres) per hour — a mere drip-feed.



## HERPETOLOGY

### UNNECESSARY COD-LIVER OIL

*Do terrapins need to be given cod-liver oil on a regular basis?*

Treating the food given to terrapins with cod-liver oil makes the glass of the tank and basking rocks very dirty extremely quickly. If you feed your terrapins on a wide variety of food, which includes 'freshly purchased' pellets, there is no need to use cod-liver oil. This only provides an additional source of vitamins A and D. Instead, you could provide your terrapins with extra vitamins and minerals (especially calcium), by dusting their food with Vionate powder (refer to *Herpetology Matters* in the July 1990 edition of *Aquarist & Pondkeeper*).

Further details can be obtained from the new manufacturer:

**Ciba-Geigy Agrochemicals, Whittlesford, Cambridge, CB2 4QT.**

Not only is it unnecessary to use cod-liver oil as a source of vitamins, but you should avoid feeding fish flesh, including whitebait as a source of protein. Terrapins tend to pull their food apart with their claws, and fibres of fish flesh sink to the bottom of the tank and quickly cause the water to become cloudy and polluted. Tinned cat food would have the same effect and must not be used.

As a further precaution in the prevention of infecting your terrapins with *Salmonella* bacteria, a group of rod-shaped bacteria which cause food poisoning, do not feed aquatic rep-



JOHN DAVIES

As long as terrapins are fed a healthy diet, they don't require additional cod-liver oil.

tiles with any chicken or pork products — either raw or cooked.

However, an entire well-washed cuttlefish bone should

be placed in the tank as a source of calcium needed for healthy skeletal and shell growth. Terrapins bite into the cuttlefish with their powerful jaws.

## PLANTS

### NON-FLOWERING LILIES

*I've had a problem with my lilies this past season — they didn't flower. They looked healthy enough, though. One of the lilies was actually flowering when it was given to me but stopped when I replanted it. The other one was bought from a garden centre. How can I prevent the same thing happening next year?*

It is not unusual for water lilies to stop flowering when transplanted. The plants suffer a shock when moved. The garden centre plant may well be slightly immature.

Lilies are gross feeders so use a fertiliser every year. Providing your plants are producing plenty of healthy leaves, there is

no reason to be concerned, as they will certainly produce flowers in future seasons.



Lilies require plenty of nourishment — and little disturbance — in order to flower properly.

### DISINTEGRATING LILIES

*Something appears to be eating my lily pads this year — they have been disintegrating. I have three Common Goldfish, three Fantails, three Shubunkins and two Golden Orfe. Could they be responsible for the damage?*

There are several possible causes for water lily leaves disintegrating. It can be due, for example, to the larvae of the *Nymphula* moth. Snails are another possibility. Finally, there are several diseases caused by fungi and bacteria; these cause tuber rot which manifests itself first of all in the edges of the leaves rotting away.

As your letter arrived so late

in the season, I would wait until new growth appears in the spring and, if the problem persists, write in again and I will try to get a more detailed description from you then.

Incidentally, none of the fish you have would have been responsible for the damage.

**OUR KOI Q/A SECTION WILL BE BACK IN JANUARY WITH JOHN CUVELIER TAKING OVER FROM ROGER CLEAVER**





# Spotlight

## SILVERSIDES

Never one to shirk a challenge, Gordon Kay plunged into the world of the Silversides and came up with some very interesting facts and figures.

(Photograph: Jeff Foot/Bruce Coleman Ltd)

**W**hen our editor, John Dawes, rang to say that he had acquired the wonderful picture which you see here and asked me to write a Spotlight on this family, little did he know what a tough assignment he was setting. The silversides must be the least documented families in the world!

However, I am nothing if not persistent, and so wouldn't let a little thing like that put me off. Anyway, I must now be one of the world's leading authorities on silversides(!), so I give you here everything which I have learned on the subject.

The Atherinidae are rather small fishes which are found throughout the world in both tropical and temperate seas. Some species are even found in freshwater. For a long time, they were thought to be closely related to the Grey Mulletts because they look so much like them, having an anterior dorsal fin composed of a few slender dorsal spines. However, they are now considered to be related to the toothcarps (Killifishes) and that would seem to make sense to me.

The silversides — sometimes called sand smelts — are shoaling fishes which, largely, live in coastal waters. They are relatively abundant and are fished commercially in some waters. Most of the family lay eggs which have filaments on their surface by which they can adhere (on touch) to each other or to seaweeds or flotsam. Some of the more important seawater species are:

### Californian Grunion (*Leuresthes tenuis*)

This species, the subject of our Spotlight photograph, is found only along the coast of California, between the bays of Monterey and San Juanico. It has the most unusual of spawning habits.

When spawning begins (in February or March), Grunions are actually, literally, found on the shore! A female Grunion will spawn between four and eight times during a season — which will usually last until early September.

The fishes strand themselves on the high spring tides (at night) high up the intertidal zone where spawning takes place. As the females bury themselves in the sand 'up to their waists', males will wrap themselves around the more-upright bodies of their mates and will remain there until the eggs

have been released (under the surface of the wet sand) and they — the males — have fertilised them. Once this has been accomplished, the fish are washed back down the beach, into the surf.

The eggs stay buried for around ten days, when the next high tide uncovers them and they hatch — the young being carried into the water. The eggs can remain viable for as long as a month, so, if the first high tide fails to uncover them, the next one will.

Spawning is communal, so all the spawning Grunion attract their fair share of predators to the shore. In fact, this species remains prey to a variety of predators (including man) throughout its life. This unusual fish grows to a maximum of 7in (c 17.8cm) long in the wild.

### Hardhead Silverside (*Atherinomorus stipes*)

Smaller than the Grunion (about 5in — 12.7cm), this species is widely distributed along the south coast of the United States, from Florida, through the Caribbean to Brazil. It is by far the most abundant silverside in the West Indies.

The Hardhead's colouring is variable, according to the time of day. During daylight hours, it is almost transparent, with only a narrow silvery stripe on its side; at night it becomes darker with the back and tail fin becoming 'dusky' and with the silver stripe being obscured.

### *Atherina mochon*

This small fish (without a common name) is about 4.5in (11.4cm) long and comes from the Mediterranean and the Black Sea. It is in the latter area that a distinct sub-species, *A. mochon pontica*, is recognised.

*Atherina mochon* doesn't care overmuch about the salinity in which it lives, being found in the full salinity of the sea, in brackish lagoons and in virtual fresh water.

It reproduces during May and June, anchoring its eggs to algae. The larvae are pelagic and dart about in dense shoals at the water surface. I think it was probably this species we saw swarming around the beaches of Corsica last year. Oh, happy days...

### Atlantic Silverside (*Medinia medinia*)

Another long, slender fish with a rounded

body, short head and large eyes, this species reaches a maximum length of around 5.5 in (c 14cm). It lives on the eastern coast of America and Canada, from the Gulf of St. Lawrence to Chesapeake Bay. It lives in schools around the inshore tidal regions in bays and estuaries but ventures — with the high tide — over flooded salt marshes.

Atlantic Silversides spawn in May and June in schools, at the low water mark over sandy bottoms. The eggs have sticky filaments by which they stick to each other and to seaweeds in strings. On hatching, the fry are about 12mm (c 0.5in) long. As with all silversides, this species is a major part of the menu for larger, predatory fishes.

### Common Hardyhead (*Pranesus ogilbyi*)

As I said earlier, this family stretches all around the world, and so, there just had to be an Australian member. However, this species is not confined to Australian seas, but is also found around New Guinea and the Pacific Islands.

It lives on sandy flats in bays and estuaries. It is a rather deep-bodied fish with a relatively large head but, in other respects, it shares the same characteristics as its cousins, with two dorsal fins. It has a rather nice colour pattern, being pale green above — each scale being dotted with black — and white below, with the mandatory silver stripe running from head to tail.

This is a comparatively large member of the family, being about 6in (15cm) long.

### Whitebait (*Atherina breviceps*)

South Africa is home for this species, which is found from the Atlantic coast, round the Cape, to Natal. It is found only inshore and in the mouths of estuaries, where it swims in massive shoals, with its snout almost out of the water.

Many birds naturally find this species easy prey. Of course, humans also find them easy prey, so they are commercially fished. They grow to almost 5in (12.7cm) in length and need absolutely no description from me.

### Sand Smelt (*Atherina presbyter*)

Growing to about 6in (15cm) long, the Sand Smelt is common and widely distributed in the eastern Atlantic — from Scotland round to Denmark in the north, down to the Mediterranean and the North African coast in the south. It becomes more common in the north during the summer and spawns in high-shore pools when the weather is warmest.

The fry are about 7mm (c 0.3in) long on hatching and stay in the pool until they measure about 5cm (c 2in). The Sand Smelt feeds on tiny crustaceans and even on smaller fishes but is, in turn, preyed upon by larger fishes and seabirds.

### CONCLUSION

Well, now you know as much as I do about the silversides. Not a family for the aquarium, granted, but nonetheless interesting in its own right. Whitebait will never be quite the same again...!







# Seaview

By Gordon Kay

Incredible though it may seem, it's that time again. Christmas is coming fast and everyone is thinking about presents. Traditionally, at this time of year, I suggest one or two presents myself, and this year is no exception. During the last twelve months, I have bought several really good books and I can think of nothing better to give an aquarist for Christmas, so I shall suggest a few of them here. As usual, I will save the best one until the last, although that does not mean that this list is in any order of preference.

1 **Sharks** (Merehurst Press). Consulting editor, Dr John D Stephens, with a team of international experts.

With all the hoo-ha about sharks, which seems to proliferate, it's refreshing to find a book which is both educational and entertaining, without being sensationalist. This is such a book. It has everything one would want from a book of this type, from good in-depth knowledge to wonderful photographs and line drawings.

The text is split into three sections, the first of which tells us exactly what a shark is, from evolution to species distribution and shark biology.

The second section deals with shark attacks around the world, with many accounts of attacks in waters of Australia, the U.S., South Africa, New Zealand, and the Tropical Pacific Ocean all accounted for in separate chapters. This makes quite interesting reading, but does not in any way read like the script of a Jaws film. Quite the contrary in fact, because you finish reading this section feeling that sharks are much maligned and much misunderstood, and that they are nowhere near as dangerous as they are reputed to be.

The third part covers subjects like shark legends, the use of sharks by man, and watching sharks at close quarters. Remarkably enough, for a volume of some 240 pages, I bought this book for around a tenner!

2 **Coral Reef**. By Les Holiday (Salmoner Books).

Les wrote this book in consultation with Dr Elizabeth Wood, and the result of their

teamwork is a magnificent volume which anyone would love to receive in their Christmas stocking. Some of the most stunning photographs I have ever seen are printed in a book which covers, in Part one, the ecology of a coral reef, and in Part two, an account of dives on various sites around the world.



Stunning photography and excellent text makes this book an ideal Christmas present.

Besides this, however, are short sections on aquarium care of families of corals and this combination makes the work an absolute joy. Again, I cannot remember exactly how much I paid for this book but it was less than £20, and anyway, even if it cost £100, he or she would love you forever.

3 If stunning photography is what turns him or her on, then you can do a lot worse than a book called *Exploring Australia's Great Barrier Reef* by Lester Cannon and Mark Goyen (The Watermark Press). I would bet that there isn't an aquarist anywhere in the world who does not know about the Great Barrier Reef, and I have yet to see a better book on the subject than this one. Instead of me prattling on about the book, let me quote what it says on the inside cover.

"*Exploring Australia's Great Barrier Reef*, is a unique and exciting experience. For the first time, here is a book which presents, not only the spectacular natural beauty of the Reef, but also gives detailed information on what to do and where to stay. This book takes you through the evolution of the Reef over millions of years and provides stunning original

photographs of the abundance of life, the diverse relationships and its colourful and often bizarre inhabitants. This book offers up to date information for anyone interested in fishing, diving and snorkeling, or in taking a relaxing holiday in one of the most beautiful areas of the World. *Exploring Australia's Great Barrier Reef* is an education — a fascinating look at the growth of a coral reef and its amazing inhabitants, and the role of each creature in the one enormous and complex eco-system. It is a study of beauty, captured in some magical photographs, of coral, and of weird and wonderful life forms; it is also a story of pioneer explorers of the Great Barrier Reef, of the ships that never left, but coral-encrusted, rest in their watery grave and the traditions and industries that depend on the Reef. Finally, it is a guide to the means of discovering and exploring the Reef, for the joy and wonder of seeing it at first hand."

I could not have put it better myself. Incredibly, I bought this book for £9.

4 Once in a while, one comes across a book which is a revelation. Such a book for me was *Whale Nation* by Heathcote Williams (Jonathan Cape). I am not particularly fond of poetry (but I know what I like!) but this book is so wonderful that I found I could not put it down. It was distressing, enraging, sad and yet joyous, sometimes all at the same time. Providing the reader keeps an open mind, (s)he will never read a more enriching book. The book will cost about £10, but in my book (!) money does not come into it.

Continuing the subject of Whales, I reviewed a book called *Whales and Dolphins* on this page in October. I suggest that you refer to that review for that, too, is a fabulous book.

5 **And now to my book of the year.**

Earlier on this year, I plucked an idea from nowhere for a book about dolphins. The book would tell of the last two dolphins on Earth and how they met up, mated, lived their lives together and finally met their

end. I spent some considerable time nurturing this idea. I did all the planning and research until I was on the verge of starting what was to be my first big work.

Then I wandered into W H Smith's. On the shelf labelled "New Releases", I found that someone had beaten me to it! However, after reading *The Last Whales* by Lloyd Abbey (Transworld Publishers Limited) I have to admit that he has made a far better job than I probably would have done.

It is a memorable book. Apart from the fact that the animals concerned were whales rather than dolphins, this is the book that I would have written. It is about an old Blue Whale which is driven nearly mad by mercury poisoning, and which, weakened by parasites, which vainly to his mate and their last surviving calf.

Thousands of miles away, a young cow, newly-matured and eager for a mate, responds to his calls. The bull, hoping his family are still alive, recklessly crosses the invisible boundary between the northern and southern hemispheres, a divide no Blue Whale has crossed for thousands of years. When they meet up, their mating is ecstatic. However, gradually, their life together becomes handicapped by the bull's instinctive terror of the foreign southern seas. Their descendants are destined never to know the freedom of the ocean deep, but, rather, to experience the suffering incurred through radiation poisoning and the upheavals of an ocean warmed by the greenhouse effect.

*The Last Whales* is an exciting book which teaches us about the whales' threatened environment, about the whales' habits and habitats and — as the cover note says: "Draws us as close as we can possibly come to these immensely powerful, sensual, extraordinary animals". Again, to quote the cover note, "Their is a world of tragedy and destruction, a world charged with emotions and unexpected vulnerability". This book represents probably the best £7.99 you could ever spend.

On that note I will close by wishing you all a very Happy Christmas and peaceful 1991.





Crescent Zoe biotope.

## THE CRESCENT ZOE

(A NEW GOODEID LIVEBEARER FROM MEXICO)

Derek Lambert of Viviparous — the Livebearer Information Service, introduces a brand new species discovered during his latest Mexican expedition  
(Photographs by the author)

**E**very once in a long while, a new fish comes along which is something REALLY special. The Crescent Zoe is just such a fish. It was discovered by Dr M L Smith, C Rodriguez, L Butler and me in February of this year. At the moment, we are not certain if we are dealing with a new species or just a colour morph of the better-known *Zoogoneticus quitzeensis*. Mike Smith and company are working on that side of things, so I will leave the question of the scientific name to the scientists.

Until they have completed their work I cannot reveal the collecting site, of course. Suffice it to say, at the moment, that it was a river in Mexico. This river was crystal-clear,

with an abundance of plants growing along the banks and in the water. It was about 10m wide and 1.5m deep and absolutely teeming with Goodeid livebearers.

### Earlier failures

A number of other scientific collecting teams have visited this location but none have found the new Zoe. There are a number of reasons for this. Firstly, most scientists spend a very short period of time at a collecting site, something that has often led to them missing one or more species of fish that live in a particular habitat. Secondly, most scientists collect with seine nets that gather many more fish but are prone to miss

those which live among the plant roots or are hiding in caves. Pat (my mother) and I re-discovered *Habbina turneri* (another Goodeid livebearer) after several scientists had declared it extinct for this very reason.

### Distinctive colour patterns

When we pulled the first male Crescent Zoe out of the water I knew straightaway that we had found something special. The body coloration was a dark mottled green overlaid with reflective spangles. The dorsal and anal fins were a deep green, terminating in bright lemon yellow crescents at the edges. The caudal fin was also green for about  $\frac{1}{3}$ ths of its length and bordered in a bright orange

crescent. The very edge of the fin was clear. It was for the distinctive crescents in the unpaired fins that we christened our new fish the Crescent Zoe.

The females were basically similar in body coloration, except that there were gold highlights down the body and few, if any, spangles. The fins were the same colour as in the males, except very much paler; indeed, this colour has only really become visible since the fish have been maintained in an aquarium. Unlike many other Goodeids, the wild colours have not only been maintained in the aquarium, but have even been heightened.

### Need for live specimens

My job on this collecting trip was to look after the living fish and make sure they arrived back in New York alive and well. The reasons for this was, in part, because scientists now require living fish for some of their work, but also because Mike Smith is not just a scientist but a very concerned conservationist as well. He believes, as many knowledgeable scientists do, that the only way of securing the longterm future of endangered species of fish is to set up breeding colonies in captivity.

We arrived back in America with about 40 live fish from this collection point (all but two of the live fish we collected) and I returned to England with a few of these to start off my own breeding colony.

Once back in England I placed them in a 24 x 10in (60 x 25cm) tank with a pot of aquatic plants at the back. I fed them my normal diet of live Brine Shrimp twice a day and extra feeds of dry food, beef-heart, frozen Blood Worm and an occasional feed of *Daphnia*. The tank received a large water change every week. Within twenty-four hours of arriving back home, the Crescent Zoe's were eating everything in sight. To say that they adapted well to tank conditions would be the understatement of the year!

### Potential problem

The biggest problem with this fish, both for scientists and aquarists alike, is that it is found with *Zoogoneticus quitzeensis* in the



Male Crescent Zoe, showing the characteristic fin markings responsible for its common name.



Female Crescent Zoe — virtually indistinguishable from *Zoogoneticus quitzeensis*.

wild and the females are very difficult to tell apart. To verify that we did, indeed, have a new species and not a colour morph of *Zoogoneticus quitzeensis*, it was decided to save the fry from gravid females caught in the wild and to see if they only produced one type of fry. The first fry were born on my way home and numbered some 24. Of the five females I had, only two had live fry after the stress of being moved so close to term. Both broods proved to be 100% Crescent Zoes.

I have continued to save fry from these two females, but allowed nature to take its course with the other three. Of these, two have become gravid on a regular basis, and one has not. The female which has not become gravid also has the normal *Zoogoneticus quitzeensis* coloration which leads to the conclusion that some natural mechanism is preventing the two species from hybridising.

The evidence for this is still far too flimsy to prove or disprove anything.

The two females which produced healthy fry were both quite large and have had broods of greater than 20 babies every eight weeks. However, smaller females will obviously have smaller numbers of fry. The youngsters sexed out at about four weeks old, by which time they had started to develop their distinctive colours. The first brood of second generation babies were born when the females were only three months old, which means that the males have been sexually active at the ripe old age of six weeks!

### Aquarium behaviour

In the aquarium, the Crescent Zoe has behaved in a similar manner to *Zoogoneticus quitzeensis*, being a little pugnacious with males of its own species. So far, it has not been a problem when kept with other fish, although in general, I have maintained this species on its own. The first pairs of this beautiful Goodeid were distributed at the Viviparous Summer Show. Time will tell just how successful it will be in the aquarium, but if looks are anything to go on, it should be a smash hit.



Dr Mike Smith, right in it!

**Acknowledgements:** I am grateful to Dr M. L. Smith of the American Museum of Natural History for inviting me on this collecting trip, and Robert McKeand of Viviparous for acting as my host while I was in America.  
For further details about Viviparous — The Livebearer Information Service, contact Nigel Hunter, 60 Barry Way, Brighton Hill, Basingstoke, Hants. Tel 0256 471568.



# Letters

## Reaction to "100 Weeks to Extinction"

Re: The editorial in the October edition of *A&P*, 100 Weeks to Extinction: a number of species only exist in our aquariums, as wild populations have come under commercial stress. I, myself import German Discus, and breed them. I also support the Environmental Investigation Agency.

I am not sure who's the hypocrite, me or the German Government. I quote (Tropical Fish Hobbyist, Sept '90 page 122): "In Costa Rica, a portion of important nesting beach for Leatherback Sea Turtles has been purchased by German Developers and conservationists fear that construction and increased human traffic will drive the turtles away."

This is the area that the German Government should be putting its time and resources into.

Thank you, John Ferguson, for your concern and for doing some practical thinking. More letters, please to VDA, Hans Stiller Luxemburger Str. 16, D-4630 Bochum, Germany. (The German Aquarists Association).

Wayne Tobin  
Cardiff Central Discus

## 100 Weeks . . . further reaction

Ref Editorial in the October issue (page 3): John Ferguson is absolutely correct in seeing the possibility of the aquarists' hobby disappearing in 1992.

However, the exhortation for aquarists to support the German VDA, while it does no harm, and certainly may help the German cause, will not save OUR hobby.

The various countries who are members of the EEC are now fully aware of the dangers which exist and, believe me, they are real, and are mobilising to a greater or lesser extent against them.

It would make for greater sense for our aquarists to motivate themselves to protect our own hobby in this country. It would be sad if their efforts were to result in a better situ-

ation for another country, while our own happily banned the hobby completely!

Let me try to explain: The current wave of hysteria sweeping the world with regard to conservation is at the root of the problems.

Governments are like fences: they bend or collapse under continued pressure. The pressure currently applied is from the conservationists, always right to some degree, but not always understanding the full end result of achieving their often desirable ends.

We, the aquarists, and all involved in the trade, are on the other side of the fence, apparently fast asleep. Since Government only hear those voices which are raised, we do not exist.

If we are to save our hobby to any extent at all, ALL aquarists and ALL those involved in the trade MUST throw off our apathy, and attack. Write to and, better still, telephone your MP and continue to do so; be persistent. As a co-ordinated group which is capable of defending their rights, OFIUK is the only organisation at this time willing to do this. Give them your support.

Remember, those of you who think that you are only one, and "what is one letter, one telephone call, or one member of an organisation worth": There are THOUSANDS of us thinking the same thing. Look how much stronger an organisation would be with your help. Imagine the state of MPs who receive so many letters, and even worse, so many repeated telephone calls, or so much heckling at their meetings.

Get letters into print; FLOOD the media with YOUR views. These are the ways pressure MUST be applied by individuals. While this is going on, OFI can fight on a different level via negotiation, but your efforts, continued and persistent, will give them more with which to negotiate. I admit freely that, until of late, I was perfectly happy to let the world do its thing while I did mine. Now it's on the cards that I will no longer be able to do my thing, and so, I must come out and fight. If there is to be any form of our hobby remaining

after 1992, we must ALL fight, and this includes the 90% or so of private aquarists and trade, some of whom can find time to write beautiful letters to the magazines, but do little or nothing to protect the hobby they profess to love.

DO SOMETHING POSITIVE, AND DO IT NOW. It's uncomfortable UNDER the wrong side of the fence when it gives under pressure. Remember, like charity, the protection of our hobby starts at home. Brussels will hear our views from MPs and directly from OFI. These will colour their attitude to the lawmaking which will affect the whole EEC.

Dr A Eastwood  
Iethys - Aquatic Wholesalers  
Yeovil,  
Somerset.

## Alternative view on imports

I am writing in connection with an article that you published in November's issue of *Aquarist & Pondkeeper*.

It was written by David Sands and was headed **Personal Views on Fish Imports**. In the article, Mr Sands asks for comments on whether we believe that fishkeeping will become anti-social. It is my view and that of my staff that the only way the hobby will become anti-social is if any more misinformed articles such as his are published in a magazine which is on sale to the people who keep our trade going, the public.

I would be the first to speak out if I thought that fish as well as customers were suffering by the imports from Singapore. As it is, at this precise moment in time, it is completely the opposite, as the fish I have been receiving from Singapore via my respective suppliers are the best I have had for a good number of years. Also, I have to add, that the angels which I have received recently have been of exceptional quality.

If Mr Sands is having so many problems with his shipments, may I suggest that he change his present suppliers and stop supporting those who are obviously not up to standard? However, if Mr Sands

really does suffer the losses of fish that he states in the article, then maybe he should leave the trade to those who know how to keep fish alive! If we, here, suffered the losses ludicrously suggested by Mr Sands (75% of all farm-raised fish dying three months after being held in captivity), we, and many other companies, would be out of business tomorrow!

Mr Sands has done no good to the trade by writing the article and has just produced those ignorant people who wish to stop the keeping of exotic fish with more fuel with which to light their fire.

Mr Sands also wrote an article for *Pet Business World*, the Trade magazine, which totally contradicts his article in *A & P*.

The Management and Staff  
of ASHFORD AQUATICS

## Imports and zoos

I read with interest David Sands' article (**Personal Views on Fish Imports**) in the November 1990 issue of *Aquarist & Pondkeeper*. I hope that my article in the same issue, along with Part 2 in a subsequent issue, on the **Ornamental Fish Trade and Fish Conservation** will be of some relevance to this discussion.

However, we must be careful to distinguish between "conservation" and "animal welfare". I believe it can be argued that the aquatic trade need not/does not have any major negative effects on the conservation of fish, and may, in fact, have some positive effects. If Dave's figures are correct and represent a widespread situation, then the aquatic trade clearly has an appalling animal welfare record. Furthermore this problem, if indeed it is a real one, must be tackled with all urgency by the trade itself or an "outsider" will do it for them.

I was also rather intrigued by Dave's sweeping comment that "zoos are now a thing of the past". I had hoped that some of my other articles in previous issues of *Aquarist & Pondkeeper* had shown that public aquaria (and zoos) have a number of



very important roles to play, especially with regard to education and conservation (including captive breeding).

Most modern facilities do, however, recognise their shortcomings and are taking steps to reflect, not only a better understanding of the real needs and requirements of animals in captivity, but also the changing public perception of what those needs and requirements might be.

We must never fall into the trap of allowing our children (or their children) to "appreciate" wildlife solely from re-runs of an Attenborough blockbuster. After all, if that happens, surely instead of keeping live fish at home, future "fish hobbyists" can just slip a coldwater / tropical / marine video into their VCR and then they have got an instant aquarium with none of the problems — or challenges, or understanding, or vital beauty — of the real, live animals.

Dr Chris Andrews  
Curator, Aquarium,  
Invertebrates & Reptiles,  
London Zoo

### Advert accuracy

1990 has seen unprecedented growth and development of the interest in the hobby of Koi-keeping, with some stunning Koi exhibited at shows all over the UK, some of the best being exhibited at the UK dealers' show — Nishikigoi '90.

The 1990 dealers' show was unique in that there were, in effect, two shows in one, a dealer's show and a hobbyists' show with, consequently, two winners in each class — a hobbyist winner and a dealer winner.

Two especially impressive Koi that spring to mind were the two stunning adult Koi champions at Nishikigoi '90 which were both Shows: the dealers' champion owned and entered by How Kang Koi of Portsmouth, and the hobbyists' champion supplied by Infiltration and owned by Joe Wilmington.

In the Infiltration advert in the excellent August Koi Supplement published in A&P, a photograph of the 'Hobbyist Adult Champion' was included. The caption, however, referred only to the Shows being the 'Adult Champion'. The caption, to be totally accurate, should have read 'Adult Champion Hobbyists' Class'.

The featured Shows was supplied by Infiltration and is, I understand, fed on Sakura food which was clearly the object of the advert. There is, obviously, no intention to mislead, but to be strictly correct, the Shows featured was specifically the Hobbyist Adult Champion Koi, the accolade for the Dealers' Adult Champion going to the superb Shows belonging to How Kang Koi.

It is, of course, important in the interests of all concerned, that this point be clarified. What is, perhaps, more important, is that both Koi are superb and that they contributed greatly to the show.

Phillip Edwards  
(BKKS Judge)  
Stockport  
Cheshire

### Living praise

I feel that I had to write to you regarding one of your advertisers The Living World Ltd of

Armley Road, Leeds.

In May of this year, I purchased a complete 4ft tropical set-up and cabinet from them and, not only was it delivered to me at 10.30 pm because it was convenient to me, the customer, but I recently had a problem with the air pump supplied, and after contacting them, have been asked to return the pump which will be replaced free of charge.

One hears so many stories about poor customer relations, that I felt a pat on the back was very much deserved by Peter Hemingway and his staff.

Your magazine is also excellent reading, being very helpful and informative to a newcomer to fishkeeping.

F E Atkinson  
Hull

### Plea to so-called animal lovers

Since reading the July edition of *Aquarist & Pondkeeper*, some thoughts have been nagging at my mind. Referring to David Sands' *Reflections*, he quoted from his book *Catfishes of the World*: "We do not own the animals under our charge and protection, but we have taken them from nature. Therefore it is our duty to provide the best conditions for all animals in our keep."

I wish these words could be inscribed on the minds of all so-called animal lovers of this world. In the past, I've attended dog shows (including Crufts), bird shows and fish shows, and have always come away with some feelings of disappointment — not with the animals themselves, but, rather, with the exhibitors. There seems to

be an attitude of: "This animal is representing me and not its species or breed."

What a great pity. I've even heard it said that a particular dog ought to have been thrown out with the rubbish; in other words, with the ones that were eliminated early on. Are these people real dog lovers? I love all dogs and other animals, not one being rubbish in my eyes.

Sad to say, certain impressions do throw doubts on the morality of some fishkeepers, especially when one sees those cramped conditions and the obvious stress the creatures have to suffer. I have yet to see a fish behave naturally in these exhibits.

One has to ask the question — what is the fish representative of, the aquarist, the society, or the species? And let's remember, too, that the show is representing the hobby and ought, really, to show all that's good aquatically-speaking.

Many people have their first insight into this marvellous pastime at shows, so it's down to us to show the responsibility involved in caring for our charges. There are many plus points to fish shows, but let's stop living in the past — back in the days when most animals on show in zoos, etc, were living in cramped quarters. The modern everyday person views this as cruel.

David Sands, I agree with you one hundred per cent!

Also, please accept my commiserations over the loss of Jasper. I, too, have recently lost my dear pal, Rocky (a Bulldog) after nine happy years. Thanks A & P.

Paul Hardy  
Sheffield



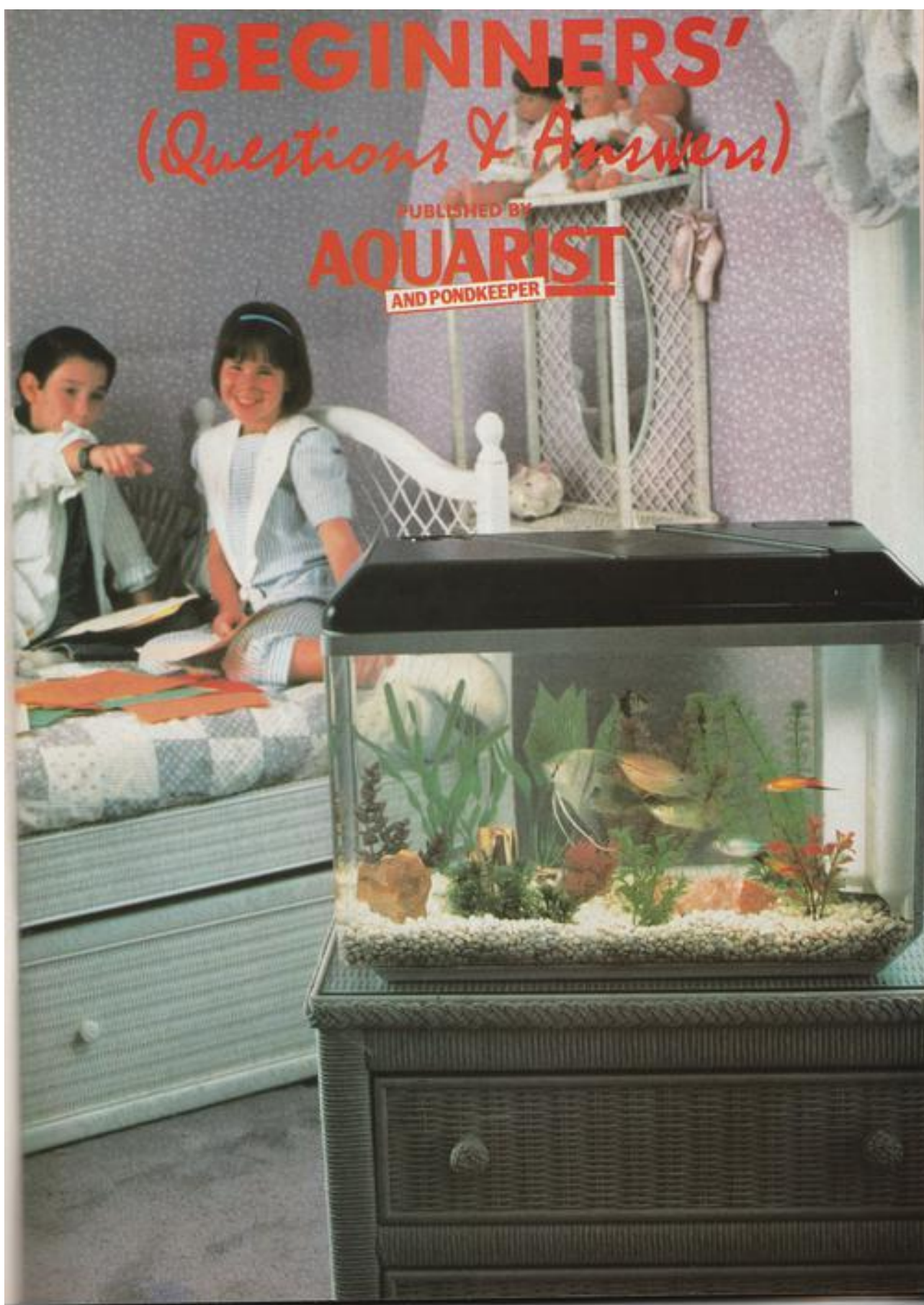


# BEGINNERS'

*(Questions & Answers)*

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AND PONDKEEPER



# GETTING STARTED

## EARLY CONSIDERATIONS, MAIN TYPES OF AQUARIA, PONDS, AQUARIUM CHOICES, TROPICAL COMMUNITY FISH, PONDFISH CHOICES, MARINES, AQUATIC SHOWS AND SOCIETIES

Dr David Ford — Senior Consultant to 'Aquarian'



AQUARIAN FISH FOODS

The Common Goldfish — by far the most popular species of fish kept by aquarists.

**S**o you want to be a fishkeeper? Here are a few thoughts and pointers which you should consider before you make a start.

### EARLY CONSIDERATIONS

**Q** *Is it difficult to keep fish in the home? The Goldfish bought for our Goldfish bowl never seem to survive long!*

**A** No, it is not difficult, providing a fundamental truth is understood: fish have to swim in their own 'loo'. This means the liquid excreta (the invisible solubles, mainly ammonia) will poison them as they — the waste products — build up in their water. You must have filtration to remove this toxin and have a tank large enough to give dilution of excreta so that they are less damaging. If you put one large, or worse still two, Goldfish in a small bowl, of course they won't last long.

With a proper aquarium (at least 24 x 12 x

12in — 60 x 30 x 30cm) plus continuous filtration, the fish will live in clear, clean water and be happy. Happy fish do not get diseases.

**Q** *What about fish in the garden?*

**A** The same truth applies, but ponds are much bigger than aquaria. Therefore, the dilution of excreta means there is less of an ammonia problem. Only if the pond needs to

be crystal clear and densely stocked with Koi can toxic water problems develop, but, again, this is overcome by proper continuous filtration.

**Q** *How many species of fish can be kept in home aquaria?*

**A** Thousands! However, these can be grouped into types of compatible fish requiring an aquarium containing specific water temperature and chemistry. There are four such groups — the coldwater aquarium, the tropical aquarium, the marine aquarium and special types.

The specials include water of particular chemistry for a given species (or group of species) such as cichlids (e.g. hard water for African Cichlids) or brackish water for brackish fish (Monos and Scats etc). Special designs are also available such as the paludarium (mix of water and land plants and animals) or indoor ponds with water fountains for decoration.

**Q** *With such a wide choice, how do I know what type of aquarium is right for me?*

**A** Do not buy on impulse... it is wrong to visit, say, a Water Garden Centre for plants but leave with a small tank and a plastic bag of Goldfish. Visit the local aquarium shop (there are more than 3,000 in the UK so there must be one near you) and see what is available. Many of the larger aquarium stores have a video for free hire called 'Beautiful underwater Worlds' to tell you all about the choices. All will have cheap paperback books or free advertising literature to take home and study.

### MAIN TYPES OF AQUARIA

Type of Aquarium	Type of Water	Approximate Temperature	Species of Fish
Coldwater	dechlorinated tapwater	room	Goldfish (many varieties) Orfe Bitterling
Tropical	dechlorinated tapwater and/or rainwater	24°C/75°F	North American fishes Community tropicals
Marine	tapwater, plus seasalt mix	26°C/79°F	Coral fish



You can get a free beginner's guide from me by just sending your name and address (postcard will do) to 'Aquarian', PO Box 67, Elland, W Yorks, HX5 0SJ.

## PONDS

**Q** Does the same apply to ponds?

**A** Initially, where you place a pond is more important than the fish, so visit a Water Garden Centre rather than the aquarium shop. Some of them are so large, and there is so much to see, it can be a family day out, e.g. Stapeley Water Gardens at Nantwich (the largest in Europe), the Midland Water Life chain, and so on... see the magazine advertisements. Read at least some of the publications for essential knowledge before starting any work.



Pond Building need not be difficult. Here, a sloping garden (mine!) is walled and concrete-lined to create two ponds.



### POND AND WATERGARDENING LITERATURE

#### Books

*John Davies' Book of Water Gardens*, TFH Publications No. H-1104 (1989) ISBN 0-86622-662-1.

*The Stapeley Book of Water Gardens* by Stanley Russel, David & Charles Ltd (1985) ISBN 0-7153-8649-2.

*The Landscaped Rock and Water Garden* by Frank Orme, Nimrod Press Ltd (1986) ISBN 1-85259-006-5.

*Rock Gardens and Water Gardens*, New Orchard Editions Ltd (1986) ISBN 1-85079-050-7.

*The Lotus Book of Water Gardening* by Bill Heritage, Hamlyn Publishing Group Ltd (1984) ISBN 0-600-37026-7.

#### Catalogues worth sending for:

*Cypris Catalogue* from Cypris Ltd, 133 Eastgate, Deeping St James, Peterborough.

*In-filtration Catalogue* from In-filtration, Unit 12 & 13, Killingford Industrial Estate, Bridge Street, Golbourne, WA3 3QE.

*Stapeley Water Gardens Catalogue*, Stapeley, Nantwich, Cheshire, CW5 7LE.



Livebearers, such as Platies, generally make good tropical community fish.

## AQUARIUM CHOICES

**Q** I want a 'living ornament', so what is the simplest home aquarium to set up as part of my home decoration?

**A** A coldwater aquarium measuring 24 x 12 x 12in (60 x 30 x 30cm), preferably 36 x 15 x 12in (90 x 38 x 30cm) or even 48 x 18 x 15in (120 x 45 x 38cm), with integral hood and lighting, power filtration and an airpump, with plastic plants and Fancy Goldfish, is the simplest effective system (i.e. not a Goldfish bowl!).

As regards decoration — there is no point in placing the tank in a hallway, under the stairs or in the spare room. The beauty of an aquarium is in the viewing. It is good for your health to sit in front of a tank and look into the aquatic world. Your heartbeat goes down, blood pressure falls and jangled nerves are soothed.

To view the aquarium it must be in an area where you can sit, or even stand, and appreciate the beauty of the fish for a long time. This can be coupled with the home decoration by choosing a dark corner, so the lighted tank enhances the whole room.

Install for easy maintenance from the start by having space for a good filtration system that is hidden from view. Therefore, a cupboard base is far better than a shelf. Site away from any radiator for proper temperature control, or bright window to avoid a constant battle with algae.

**Q** A simple Goldfish bowl has no electricity. What is being advocated above needs a mains supply, so what about safety, especially with children involved?

**A** Electrical safety is a (legal) feature of modern equipment, but commonsense will also ensure a safe system. Hide the switches and cable tidy in the cupboard or tuck away behind the tank so little fingers do not find them. Always fit a circuit breaker to the mains socket supply. Most DIY stores sell these gadgets now at prices between £10 and



Angels are not over-aggressive but will pose a very real threat to fish which are small enough to swallow.



Paludariums offer hobbyists the opportunity of creating a rainforest scene in their living rooms.



£20, a small price to pay for your own safety as well as that of others.

Remember that a tank of water is heavy... very heavy. A full 36in (90cm) long aquarium weighs as much as a large man, so check that the cupboard or other furniture can take the weight of a man before installing the aquarium.

If a metal stand is used, check that the feet are over joists, or spread the load by placing planks under the legs. The small metal feet will cut a carpet so use a metal disc under them... the old penny is ideal for this (the ever-smaller modern coins are useless!) and two or more can be stacked to level a frame on uneven floors.

**Q** I want something more exotic than Goldfish. What are the choices for the tropical aquarium?

**A** Most of the alternative species to Goldfish are smaller, so the choice of tanks can start at 18 x 12 x 12in (45 x 30 x 30cm). A heater stat to give warm water would obviously be needed.

The traditional mix of warmwater fishes is called the 'Community Aquarium' and the fish are known as Community Tropicals, because they are compatible. There are hundreds, if not thousands, of tropical fishes that can be mixed in the community tank. The problem is that some mix better than others, so be guided by your aquarium shop trader.

Another factor is that an attractive community tank should look totally busy... which means fish should be swimming all over the tank. A collection of livebearers will give all top swimmers and a *Corydoras* collection will give all bottom dwellers. Therefore, a community collection should include top, middle and bottom swimmers. A clue here is



African Rift Lake Cichlids require special water conditions.



Among tropical marines, Trigger Fish are popular, but can be unpredictable.

the mouth of the fishes... an up-turned mouth indicates a top swimmer, a down-turned mouth (as seen in the Catfishes) is a bottom swimmer.

Mouths that are forward facing, especially on torpedo-shaped fish, indicate fast-

swimming, mid-water species. Hence, by choosing a collection of community fish from differing habitats, the aquatic scene will be active and interesting at all levels.

## TROPICAL COMMUNITY FISH

**Q** What is the best choice of tropical community fish for my area? I plan to use just tapwater?

**A** First decide if the local tapwater is hard or soft. Easy-to-use kits are available at most aquarium or water garden shops. Water is considered soft if the value obtained is 100 ppm (parts per million calcium carbonate) or less, moderate at 100 to 200 ppm, and hard over 200 ppm.

In a hardwater area install livebearing fishes such as Platies, Swords, Mollies and Guppies.

For softwater areas use a pH adjuster to give 6.5 to 6.8 and install Tetras, Barbs and South American fishes such as Dwarf Cichlids, *Corydoras* catfish and Angels.

### Most popular choices

The most popular choice among beginners is the 'Mixed Community' based on medium hardness water buffered to pH 7.0. If the local tapwater is hard it can be diluted with collected clean rainwater. Softwater can be made harder by adding salt mixes from the aquarium shop.

The fish may be taken in any combination from the following groups of fishes:

#### ① Surface swimmers

Pearl Danio (*Brachydanio albolineatus*)  
Zebra Danio (*Brachydanio rerio*)  
Giant Danio (*Danio malabaricus*)  
White Cloud Mountain Minnow (*Tanichthys albanoides*)  
Golden Panchax (*Pachypanchax playfairii*)  
Silver Hatchetfish (*Gasteropelecus laevis*)  
Glass Catfish (*Kryptopterus bicirrhus*)

#### ② Midwater swimmers

Honey Gourami (*Colisa zota* [chuna])  
Dwarf Gourami (*Colisa lalia*)  
Lace Gourami (*Trichogaster leeri*)  
Three Spot/Blue Gourami (*Trichogaster trichopterus*)  
Black Widow (*Gymnocorymbus ternetzi*)  
Glowlight Tetra (*Hemigrammus erythrozonus*)  
Angel (*Pterophyllum scalare*) — medium-sized specimens  
Rosy Barb (*Barbus conchonus*)  
Cherry Barb (*Barbus titteya*)  
Harlequin (*Rasbora heteromorpha*)  
Three-lined Pencilfish (*Nannostomus trifasciatus*)  
Platy — all varieties (*Xiphophorus maculatus*)

#### ③ Bottom swimmers

Bronze *Corydoras* (*Corydoras aeneus*)  
Leopard Catfish (*Corydoras julii*)  
Reticulated Catfish (*Corydoras reticulatus*)  
Keyhole Cichlid (*Aequidens maronii*)  
Dwarf Cichlid (*Apistogramma agassizi*)

### TROPICAL SPECIES SELECTION

#### ① Hardwater types

Tank length (approx)

18in (45cm)

24in (60cm)

30in (75cm)

36in (90cm)

48in (120cm)

② Softwater types

18in (45cm)

24in (60cm)

30in (75cm)

36in (90cm)

48in (120cm)

Approx No. of fish

5

15

20

30

50

5

5

as above, plus

5

as above, plus

5

as above, plus

5

5

5

as above, plus

5

5

5

3

Guppy (*Poecilia reticulata*)  
Platy (*Xiphophorus maculatus*)  
Molly (*Poecilia latipinna*)  
Swordtails (*Xiphophorus helleri*)

Zebra Danios (*Brachydanio rerio*)  
Glowlights (*Hemigrammus erythrozonus* [gracilis])

Harlequins (*Rasbora heteromorpha*)  
*Corydoras* Catfish (*Corydoras* spp)

Black Widows (*Gymnocorymbus ternetzi*)

Beacons (*Hemigrammus ocellifer*)  
Rummynose (*Hemigrammus rhodostomus*)  
Neon Tetras (*Paracheirodon innesi*) or Cardinals (*P. axelrodi*) but added at least a month later

Lemon Tetras (*Hyphessobrycon pulchripinnis*)  
More *Corydoras*  
Angels (*Pterophyllum scalare*) — small specimens only



Firemouth Cichlid (*Cichlasoma meeki*)  
 Kribensis (*Peleicichromis pulcher*)  
 Upside-down Catfish (*Synodontis nigriventris*)

Install trios of individual species except where strongly shoaling (ask dealer's advice) fish are concerned, when at least five specimens should be obtained. Most dealers sell fives as a special offer.

## PONDFISH CHOICES

**Q** Are there such wide choices for the garden pond?

**A** No, but there are many varieties of a given species. For example, if a Koi pond is installed, you can get an infinite variety of coloured fish, from simple white with red markings (a Kohaku), white with red and black (a Sanke), black with white and red (a Showa) and so on, with yellow, silver, gold, orange in metallic and non-metallic versions. When a shoal of mixed pedigree Koi are seen, it is a breathtaking spectacle.

Even the Goldfish can be chosen for the pond in varieties other than the common form. The exotic round-bodied varieties are not suitable, but the Comet with its powerful tail is happier in a pond than an aquarium. The many colours of the Shubunkin give contrast with the ordinary Goldfish. Cross-breeding has also given a Common Goldfish shape with colours ranging from a chocolate brown to white, reds to mottled (a popular one is the Sarasa Comet, a white fish with vivid red marks).

Orfe are a popular choice (gold, 'blue' and silver varieties) because they grow as large as (or larger than) Goldfish but are much more active. Even some of our native fishes are suitable for ponds and can be found in the trade, such as Golden Rudd. Do not install 'wild' local fishes however; these will be carrying parasites. New coldwater specimens are now arriving from China and many of the North American so-called bait fishes are ideal for the UK pond because they can survive the winters.

## MARINES

**Q** The most colourful fish I have seen are in the coral seas in TV wildlife programmes... can these be kept in the home?

**A** Yes, it is possible to create a complete coral reef in your living room! But only if you are an experienced fishkeeper; marine fishkeeping of this type is not for the beginner. You need to study and understand things like specific gravity, pH, nitrite and nitrate levels, biological filtration, and so on. The challenge is part of the fascination and the rewards great for marine fishkeepers. If you want an instant coral fish tank, rent one from an expert in the field (see Yellow Pages) otherwise start with a coldwater or tropical freshwater system and graduate to marines when you, too, are experienced.

It is, however, possible to start off with marines, but you do need to do your homework very thoroughly.

## SOME POPULAR MARINE FISH

Common Name	Scientific Name	Comments
Common Clownfish/ Anemone fish	<i>Amphiprion ocellaris</i>	Hardy, inexpensive and peaceful
Domino	<i>Dascyllus trimaculatus</i>	Peaceful when small; become territorial as they grow
Yellow-tail Damselfish	<i>Pomacentrus melanochir</i>	Hardy and inexpensive but can be aggressive
Orange-spotted Boxfish	<i>Ostracion meleagris</i>	Quite hardy; should be kept with slow-swimming species
Cowfish	<i>Lactoria cornuta</i>	Hardy and peaceful; become very tame if kept with other slow-swimming species
Cardinal	<i>Apogon orbicularis</i>	Like to be kept in shoals; should only be housed with peaceful, slow-swimming species
Spotted Sweetlips	<i>Gasterin orientalis</i>	Can be a bit difficult to get to feed; otherwise, relatively hardy and peaceful
Cleaner Wrasse	<i>Labroides dimidiatus</i>	Hardy and easy to keep; should not be housed with slow-swimming species
Clown Wrasse	<i>Coris gaimard</i>	Slow-swimming species; hardy once they have settled down; peaceful
Lionfish, Scorpionfish	<i>Pterois volitans</i>	Highly poisonous species; not particularly aggressive but should not be kept with small fish that can be swallowed; dislikes strong light
Angels	1. <i>Pomacanthus</i> species 2. <i>Centropyge</i> species	Peaceful when small, can become very aggressive as they grow; immature stages look very different to adults Considerably more peaceful than <i>Pomacanthus</i> , but can be aggressive towards members of the same species
Butterflies	<i>Forcipiger</i> , <i>Chelmon</i> and <i>Chaetodon</i> species	Generally peaceful and often good community fish. NOT for the beginner
Surgeons and Tangs	<i>Acanthurus</i> species	Often aggressive towards own species, but peaceful towards others
Triggerfish	<i>Balistes</i> , <i>Balistoides</i> , <i>Melichthys</i> , <i>Rhinocanthus</i> and others	Safe with species that can stand up for themselves; otherwise, can be aggressive and unpredictable
Seahorse	<i>Hippocampus</i> <i>hadda</i>	Should be avoided by beginners; difficult to keep, although peaceful and retiring; a fish for the specialists.

## AQUATIC SHOWS AND SOCIETIES

**Q** I have heard that fishkeepers put on shows and I am sure this would help me understand the hobby more. Where and when are the shows?

**A** There are 400 fishkeeping clubs in the UK and most have an annual Open show. There are also national shows such as the British Aquarist Festival at Bowlers, Manchester at the end of October each year. The Yorkshire Aquarist Festival is held at Doncaster Racecourse (20 and 21 April 1991) and the Association of Aquarists hold their annual show at Sandown Racecourse, 8 and 9 June 1991. The Federation of British Aquatic Societies hold a Supreme Championship each year — rather like Crufts.

The national societies such as British Cichlid Association, British Killifish Association, Catfish Association of Great Britain, Goldfish Society of Great Britain, Viviparous (Livebearer Information Service), Southern Livebearer Aquatic Group (S.L.A.G.) and so on, all have annual shows where their special interest fish are displayed.

Pondkeepers are catered for too, with Koi

Shows by the Koi Traders and the national societies of British Koi Keepers Society, Yorkshire Koi Society and Midland Koi Association. See *A & P* for regularly updated diary of events and the advertising sections, because some of the national shows have full page adverts. For local shows check with your nearest aquarium shop where club secretaries leave details of the club activities.

**Q** Will I have to join a society?

**A** No, an Open show, by definition, means it is open to all. But why not join anyway? Most clubs meet monthly and have discussion groups, lectures and videos, not to mention outings to public aquaria or trading units with behind-the-scenes tours. There are auctions where local breeders sell off their stocks so you can get pedigree quality fish. The experts at the clubs help newcomers and there is usually a library and a junior section.

Fishkeepers are very nice people — you have to have special qualities to love a fish — so these clubs are places with a happy atmosphere, not at all academic or demanding. This is because fishkeeping is fun... try it.

# AQUATIC HARDWARE

## TANKS, LIGHTING, HEATING, FILTRATION, MAINTENANCE, ACCESSORIES, POND MATERIALS

Dick Mills

(Photographs by the author)



A wide-ranging selection of filters to suit any aquarium or pond need — but choose wisely!

### TANKS

**Q** *As the place I intend to put an aquarium into is a 'non-standard' size, could I build my own tank to fit it?*

**A** Given a competent pair of hands, plus an understanding of the main problems involved, there is no reason why you couldn't do just such a thing. Bear in mind that water exerts tremendous pressure and, in a tank of any appreciable dimensions, the thickness of the glass must be adequate to withstand them; extra cross-bracing at the top of the tank will prevent the front glass from bowing out.

All-glass tanks are well within the DIY enthusiast's capabilities, but do use aquarium-suitable materials: not all building site sealants are safe in aquariums as they contain anti-fungus inhibitors. Similarly (if you're thinking of building a glass-fronted, wooden tank), some often-recommended

'marine varnishes' also contain additives (in this case, to repel marine invertebrate life from the hulls of boats), and these, too, would prove fatal to your tank inmates.

Finally, when designing a tank for that special alcove, don't be too ambitious and allocate all the space to the tank (however imposing it may look); you must allow room above and around it for feeding and maintenance purposes!

Alternatively, why not buy the nearest-fitting standard aquarium available? They are much easier!

**Q** *Are plastic aquariums all right to start off with?*

**A** As long as you observe proper stocking levels, don't use harsh abrasives to clean the 'glass', or fit over-powerful tungsten lamps in the plastic hood, there should be no problem. The only real danger is that, should you make a success of fishkeeping on such a

small scale, you could become obsessed with the idea of progressing on to much bigger things — at least that's most people's excuse!

### LIGHTING

**Q** *My aquarium hood has provision for either tungsten or fluorescent lighting. Is one more preferable to the other?*

**A** In general, fluorescent lighting is better suited to aquarium use for the following reasons: tungsten lighting (ordinary light bulbs) is very inefficient, giving out a lot of heat in proportion to light, and the consequent high temperatures generated within even the best-ventilated hoods may shorten the lifespan of the lamps, which are also being operated 'on their sides' as opposed to their normal vertical mode.

While they may be more expensive to buy at the outset (you have to buy starting gear,



too), fluorescent tubes give out more light (for the same electrical consumption, so they're cheaper to run) and spread it evenly right across the aquarium. They also run much cooler than tungsten bulbs and the colour spectrum of light output can be varied according to taste and/or aquarium requirements.

**Q** How much light will I need for my aquarium?

**A** This very much depends upon which type of aquarium you are keeping. A single fluorescent tube (or average brightness bulbs, say 40 watts each, fitted in the holes provided in the hood) will give adequate light to see the fish by, but for good freshwater plant growth and marine algae and invertebrate culture, extra lighting will be necessary. A rough guide is to allow twice as much light for good plant growth and at least half as much again (three times as much) for marine uses. (See **Barry James'** article elsewhere in this Supplement for a freshwater lighting chart.)

**Q** I intend to keep Goldfish in a plastic-planted tank. Will I need a light over the tank?

**A** For coldwater tanks, where Goldfish may be constantly uprooting plants, the use of plastic plants may be considered a reasonable substitute for the 'real things' and, strictly-speaking, in this event, you won't need to provide lighting, which otherwise stimulates real growing plants to absorb carbon dioxide and produce oxygen through photosynthesis.

However, you are sure to want to watch your fish during the winter evenings, so a light of some description will be necessary, but it needn't be too high-powered or else algae may develop on the plastics!

**Q** What advantages are there in using differently-coloured fluorescent tubes?

**A** A lot depends on your own personal tastes: some people prefer their fish to look 'colour-enhanced' (which is how they will look under, say, a Gro-Lux type of lamp); a Northlight tube may look too cold, a Triton too bright, or a Warm White too pink. To others, each of these would look perfect.

By using a combination of different tubes you will be able to get just the visual effect you want, but then there may well be too much algae-encouraging light!

Actinic (blue) tubes are more necessary in marine tanks, especially those containing soft corals and other invertebrate life.

## HEATING

**Q** I would like to keep tropicals but, probably because I don't quite understand how they work, I'm a bit worried if I will be able to cope with the technology of aquarium heating systems.

**A** I don't suppose you're in the least bit worried about how your electric iron, kettle, cooker, electric blanket, or central heating works, are you? They all work on the same principle — you fit a plug, and a combination of a thermostat and heating element does the rest.

The customary aquarium heating unit comes in a sealed, watertight glass tube that you place in the tank under the water. (NEVER switch it on out of water, just to see if it works!). Should you need to adjust the temperature, there is a small knob just for this purpose sticking out of the top.

### APPROXIMATE HEATING REQUIREMENTS FOR TROPICAL AQUARIA KEPT IN HEATED WARM ROOMS

Aquarium Size	Approx metric equivalent (cm)	Approx total wattage
18 x 10 x 10	45 x 25 x 25	30-60
24 x 12 x 12	60 x 30 x 30	75-100
36 x 12 x 15	90 x 30 x 37	100-150
48 x 15 x 15	120 x 30 x 37	120-180
60 x 18 x 18	150 x 45 x 45	150-210

There are a few variations on the thermostat/heater theme: some large external powerfilters (suitable for freshwater use only) have them built-in; micro-chip equipped, electronic thermostats are designed to work with separate heaters, some of which may take the form of external, under-tank heating pads (it's a good idea to use two pads, so that if one fails you have an operating standby until the time you can face stripping the tank down to replace the failed unit!).

When choosing a heater, allow around 10 watts per 4.5 litres (1 gallon): a 60 or 70-litre tank (12 or 15 gallons) will need approximately 150 watts. Using an overlarge heater will very quickly overheat the water if the thermostat sticks 'on'.

**Q** The temperature in my aquarium appears to vary. How near to the thermostat-set temperature should it stay?

**A** Temperature fluctuation depends on several things — what temperature differential (i.e. between 'on' and 'off' operations) is set up at the factory, the size of the tank



The temperature-adjustment control is clearly visible on this combined heater/thermostat. A neon indicator lamp glows through the square 'window' when the heater is 'on'.

(small tanks warm up and cool down fastest), the siting of the aquarium (near a draughty doorway?) and so on.

However, the underlying query in your question is more likely to be whether the fishes will be harmed by such fluctuations or not. A two or three degree shift is nothing to worry about as far as the majority of fishes are concerned. In nature, far wider fluctuations occur over the normal 24-hour tropical period without any fatalities taking place, otherwise we wouldn't be getting many imports!

The reason that the fishes survive these changes is that they take place slowly, not suddenly, so that the fish are never subjected to any form of thermal shock. Stop thermometer-watching and concentrate more on fish-watching!

## FILTRATION

**Q** Is there a filter which would be suitable for any kind of aquarium, just in case I change my fishkeeping-mind in the future?

**A** Filtration utilises three main actions — mechanical, chemical and biological — and, unfortunately, not only do some areas of fishkeeping demand more use of some of the methods than others, but the fishes, too, may have other ideas about letting the filter get on with its job. Therefore, a compromise has to be found.

Biological filtration is mainly incorporated in an 'in-tank' sub-gravel system for convenience and aesthetic reasons. In cold-water aquariums, the filterbed may be dis-

### MARINE LIGHTING GUIDE APPROXIMATE TOTAL WATTAGE

TANK SIZE		For viewing purposes only	For growth of seaweeds
Inches	Centimetres	30W	60W
24 x 12 x 12	60 x 30 x 30	40W	90W
36 x 15 x 12	90 x 37 x 30	60W	120W
48 x 15 x 12	120 x 37 x 30	140W	220W
60 x 18 x 18	150 x 45 x 45	160W	270W
72 x 18 x 18	180 x 45 x 45		

turbed too much by digging fishes to operate adequately (any uncovering of the filter plate will effectively 'short-circuit' its operation) and a secondary filter system may be required to deal with the amount of suspended matter in the water.

With marines, biological filtration is a must, but powerheads needed to move the necessary amounts of water in order to maintain adequate oxygen levels may not give satisfactory effects in, say, a heavily planted freshwater tank (who wants leaning over plants?).

Again, although small decorative fishes may not take too kindly to strong water currents being generated in their living space — could you build a bubble-nest in a Force 10 gale? — some of the larger more heavily-feeding (and, thus, heavier waste-producing) species require very powerful filters to keep their quarters clean. Careful spraybar positioning and return-flow directioning can help to maintain a less turbulent tank.

Regardless of tank size, external powerfilters should be chosen to process the water in the aquarium around 3-4 times each hour. Looking at the 'performance figures' on the box can be misleading, as some refer to the pump's output only, not when it's fixed to a filter medium-filled canister, too. Some filter manufacturers have started either quoting realistic flow rates (when the filter is filled and connected with hoses, etc), or market their filters with specific tank sizes in mind.

Don't assume you can economise by using 'cheaper' air-operated filters — remember, you will have to add on the price of a sufficiently powerful airpump to give you the required flowrate!

Filtration systems need not be considered only for indoor aquariums, of course. Although they receive a certain amount of natural 'water-changes' by the action of wind and rain, outside ponds also benefit by being fitted with filtration systems.

One form works on the same principle as aquarium external powerfilters, except that the water is driven through the filter medium contained in a remote separate box by a pump either in the pond (submersible type) or above water, outside the pond (surface type).

Biological filtration can be fitted into a gravel-filled section of the pond too, using a network of perforated 1in plastic pipes and 'T' pieces connected to the pond pump (all the pond books listed in Dr David Ford's article contains details of the range of filters available and should therefore be consulted by anyone considering going into this aspect of the hobby).

**Q** I have noticed several different filter media about. Are they all necessary?

**A** These media work in different ways and four immediately come to mind:

**Floss** — usually a man-made fibre-mass designed to remove suspended matter in the water by simply trapping it;

**Activated Carbon** — this has an immensely large surface area, onto which dissolved

matter is adsorbed chemically;

**Ceramic pieces** — another material offering a large surface area which bacteria can easily colonise to provide large areas of biological filtration. Using a more highly-porous sintered glass material (such as Siporax) will provide both aerobic and anaerobic biological filtration simultaneously.

**Zeolite** — an ammonia-absorbing material, which helps to de-toxify fish waste products. Zeolite is only suitable for freshwater aquaria, though.

Several makes of filters have 'dedicated' filter-pads or cartridges (exclusive to their design) which may incorporate several of the above filter media in one 'sandwich' for easy use and replacement.

**Q** How will I know if my filter is working correctly?

**A** There are two things to check: flowrate and condition of the water. If the flowrate slows down (and there are filters on the market which have built-in flowrate indicators) the filter needs cleaning out because it's clogged up with all the dirt it has successfully collected for you.

The water should be clear, although this, alone, isn't a really accurate guide to filter efficiency. Periodic nitrite and nitrate measurement will confirm that all is well... or not. To make really sure that water conditions are at their best, it is recommended that regular partial water changes are made too (about 15-20% once a fortnight or month), however much faith you may have in your filter.

**Q** What's the advantage of using an external powerfilter to provide reverse-flow filtration?

**A** The one advantage to the hobbyist is that only pre-cleaned water is pumped through the biological gravel filterbed (the bacteria couldn't care less which way the water goes, as long as it brings oxygen with it), and you won't have to rake over the filterbed so often in order to prevent it clogging up.

Remember, however, that reverse-flow won't provide as much surface turbulence (to assist oxygen replenishment and carbon dioxide dispersal) as will powerheads, or even air-operated conventional 'down-flow' systems, with their surface-located water returns.

#### FILTRATION CHART

Type of filter	Main Types of Filtration	Method of Operation
Internal Box Filter	Mechanical and Chemical	Air
External Box Filter	Mechanical and Chemical	Air or Electricity
Internal Sponge/Foam Filter	Mechanical and Biological	Air
Undergravel Filter (Normal and Reverse-flow)	Mechanical and Biological	Air or Electricity
Internal Power (Canister-type) Filter	Mechanical and Biological	Electricity
External Power (Canister-type) Filter	Mechanical, Chemical and Biological	Electricity
Diatom Filter	Mechanical	Electricity
Trickle-feed (Gravity) Water Purifiers/Filters	Mechanical and Biological	Air



This powerhead has many operational features: a variable flowrate (in the conventional direction only), a reversible flow for use where 'reverse flow' undergravel filtration is preferred, swivelling directional return tube, filtered air intake on the aerating venturi and a choice of tank mountings.



# SETTING UP

## STOCKING LEVELS, BUYING FISH, QUARANTINE, INTRODUCING FISH

(John Dawes — Editor, *Aquarist & Pondkeeper*)



An attractively set up aquarium, whether it contains natural or artificial plants (this one contains both) will bring endless hours of enjoyment — always providing that the basic rules of stocking and maintenance are observed.

Once a decision to become an aquarist or pondkeeper has been taken, there is usually a perfectly understandable urge to rush out and buy every fish and plant in sight. Well, perhaps this is a slight exaggeration, but, if you've ever felt that surge of wild enthusiasm, you'll know exactly what I mean. You will also know that this sort of approach often spells disaster for the fish and plants . . . and (often) a pretty rapid exit from the hobby.

I therefore hope that the following questions and answers will help direct this enthusiasm along proper channels, and that both you and your fish and plants "live to

fight another day", hopefully, in a fit state of body and mind!

### FISH STOCKING LEVELS Tropical Freshwater Aquaria

**Q** How do I work out a reasonable stocking level for a tropical freshwater aquarium?

**A** There are so many different kinds of tropical aquarium fish, and their requirements differ so much, that it is quite impossible to give universally applicable, infallible figures concerning the number of fish that an aquarium will hold.

Even the same aquarium will vary in the number of fish of a single species that it can accommodate if the temperature, diet, filtration, aeration, or any other factor is altered.

It is, therefore, essential not to be too ambitious, particularly at the outset. A safe way of going about stocking an aquarium is to start off at the 50% level and add fish gradually over a period of weeks. This approach has the added advantage that it avoids stretching the biological capacity of a filter beyond its limits, thus giving it time to mature and enhance its efficiency in tune with the slowly increasing fish population.

The figures given in the accompanying

### RECOMMENDED STOCKING LEVELS FOR TROPICAL FRESHWATER AQUARIA

Surface Area of Tank		Number of Fish		
Inches	Centimetres	Up to 5cm (2in)	5-7.5cm (2-3in)	7.5-10cm (3-4in) Not recommended
18 x 10	45 x 25	14	10	14
24 x 12	60 x 30	22	16	21
36 x 12	90 x 30	33	24	29
48 x 12	120 x 30	44	32	54
60 x 18	150 x 45	83	60	

table represent approximate stocking levels (at full capacity) for fish which are neither over-aggressive nor possess other 'undesirable' qualities which dictate that they be kept either individually or in pairs. Note that the sizes of the fish are measured in body length, omitting the length of the tail.

If you go for an African Rift Lake Cichlid tank, you could raise these figures by about 50%, PROVIDED that you use good power filtration and build numerous rock shelters for the fish.

### Coldwater Aquaria

**Q** Is it possible to stock coldwater fish at the same rate as freshwater tropical ones?

**A** No. The vast majority of coldwater aquarium fish kept are either Goldfish or young Koi. Both produce large quantities of waste and therefore tend to pollute the water much more quickly than their tropical counterparts. This therefore dictates that a coldwater aquarium must be more lightly stocked than tropical ones — even if the species being considered are not Goldfish or Koi.

### RECOMMENDED STOCKING LEVELS FOR COLDWATER AQUARIA

Surface Area of Tank		Number of Fish	
Inches	Centimetres	5-7.5cm (2-3in)	7.5-10cm (3-4in)
18 x 10	45 x 25	3	2
24 x 12	60 x 30	5	3
36 x 12	90 x 30	7	5
48 x 12	120 x 30	10	7
60 x 18	150 x 45	18	13

### Ponds

**Q** What is a safe stocking level for a pond?

**A** The crucial thing when stocking is working out how many fish a pond can comfortably accommodate. It is important to accept from the word 'GO' that we can't fool nature. It, and not we, will eventually determine the size of our pond population. We can help things along by adequate aeration and filtration, but we can never force nature beyond its limits. So it is pointless fighting against its laws. We might as well obey the rules. We owe it to our fish.

To be on the safe side, we can apply the following basic stocking rule:

**Allow 24 sq in (155 cm<sup>2</sup>) of pond surface for every 1in (2.5cm) of fish, excluding the tail (at 70°F = 21°C).**

Using this rule-of-thumb, a pond measuring 10ft x 5ft (3m x 1.5m) would have a surface area of 50 sq ft (4.5 sq cm). This

works out at 7,200 sq in and 45,000 sq cm respectively. Given the 24 sq in stocking rule, it follows that a pond of this size can take:

$\frac{7,200 \text{ in}}{24} = 300$  (4,500 x 2.5cm) of fish, i.e. 300in or around 725cm.

When 45,000 is divided by 155, the resulting figure represents the number of 155 'units' available for stocking. Since each of these can accommodate about 2.5cm of fish, the figure obtained from dividing 45,000 by 155, i.e. 290, needs to be multiplied by 2.5 to produce the final stocking figure of around 725cm of fish. It must be remembered, though, that these results always allow for some flexibility. The warmer the water, the fewer the fish (at 80°F — 27°C), the capacity is half).

One very important factor to bear in mind, is that, if you go too close to your stocking limit at the outset, you will almost certainly end up well over it later. So, in theory, one should base one's calculations on the eventual maximum size of the chosen fish. In practice, this can easily result in quite an empty-looking pond.

Many people compromise in various ways. One option is to buy a mixture of large and small specimens. Another alternative is to

stock close to the limit with largish fish and pass some on to other pondkeeping friends, or sell them to a local retailer, in due course.

### Tropical Marines

**Q** How do I go about stocking a tropical marine aquarium?

**A** Seawater, whether warm or cold, holds less oxygen than freshwater. It therefore

follows that stocking levels must be correspondingly lower. The oft-quoted — and virtually foolproof — 'rule' devised by Graham Cox many years ago, states that you should allow:

*"One inch (c 2.5cm) of fish to every 4 gallons (18 litres) of water during the first six months, and then a maximum of one inch for every 2 gallons (9 litres) thereafter."*

Applying this rule to a range of aquarium sizes, we get the approximate figures shown in the accompanying table. For invertebrates these estimates can be considerably increased, as long as water, lighting and other parameters are adequate.



Heavy stocking such as this can only be maintained with excellent water-quality control equipment... and expertise.

### PLANT STOCKING LEVELS Aquaria

**Q** What would be reasonable stocking levels for plants for freshwater and marine aquaria?

**A** Most aquaria are able to house both fish and living plants. In some, however, the fish will either eat the plants or simply uproot them.

If inexpensive plants are chosen for tanks housing plant-eating species of fish, it is then not difficult to keep a constantly renewable, effective display at modest cost. Indeed, if the tank is fully planted out, one often finds that some species are left virtually untouched and displays can last a long time.

In those tanks where plants are regularly

### APPROXIMATE RECOMMENDED STOCKING LEVELS FOR TROPICAL MARINE AQUARIA

Surface Area of Tank		Number of Fish (Approx 2in (c 5cm) Long)	
Inches	Centimetres	New Tank	Marine Tank
24 x 12*	60 x 30*	3*	6*
36 x 12	90 x 30	4	9
48 x 12	120 x 30	6	12
60 x 18	150 x 45	11	22
72 x 18	180 x 45	14	28

\*Not recommended for beginners



uprooted, e.g. those housing Oscars (*Astronotus ocellatus*), or Goldfish (*Carassius auratus*), one may sometimes need to forgo the aesthetic and biological advantages provided by living plants and opt for some of the more realistic plastic plants currently available. These will provide the fish with some form of shelter and will help to minimise stress levels.

Genuinely small plants, i.e. those which grow only to a maximum length of 10cm (4in) or so, should be stocked at the rate of 50 plants per sq ft of planting area (c 900 sq cm). This would include species such as *Sagittaria subulata* forma *paucifolia*. Medium-sized plants such as *Vallisneria* and *Hygrophila* should be planted at a lower concentration — say, around 20-25 plants per sq ft (c 900 sq cm). For specimen plants, such as the larger Amazon Swords (*Echinodorus* spp), single specimens, or just a few, will be enough.

In so-called 'Dutch Aquaria' where plants hold centre stage, these levels can be increased significantly.

In marine aquaria, their layout is often such that it is a question of installing plants as the design allows. Generally speaking, such aquaria are planted more sparsely than freshwater ones, possibly because of the relatively narrow range of species available or because fewer marine hobbyists give plants as much consideration as their freshwater counterparts.

## Ponds

**Q** Are there any plant stocking rules that can be applied to ponds?

**A** Pond profiles don't tend to conform to rigid rules, and actual bottom areas available for planting are likely to vary from pond to pond, so relating plant stocking levels to surface areas can't be done the way it is with fish.

As a rough guide, the stocking level should be 20 plants per sq ft (900 sq cm) for a pond with a surface area of up to 100 sq ft (9 sq m), 10 plants for a pond between 100 and 500 sq ft (9-45 sq m), and 6 plants for a pond of above 500 sq ft.

Note that recommended pond stocking levels decrease as the size of the pond increases. This is quite logical because larger ponds are generally more stable than smaller ones, have a greater surface area (for oxygen absorption and carbon dioxide elimination), contain more water, and so on. In other words, larger ponds are likely to be less prone to potentially harmful fluctuations than small ones.

The above approximate figures apply to submerged oxygenating plants. Marginals have little effect on water quality, although they do absorb nitrates and can, thus, help to control algae (other parameters being favourable).

Surface plants such as water lilies, and floating plants like Water Soldier (*Stratiotes aloides*), should be used at a level that will provide about 60% surface cover. This will help shade the water and control the occurrence of green water.



Surface plants such as Water Chestnuts (*Trapa natans*) and water lilies, along with floating plants, should be used to provide about 60% surface cover in ponds.

## BUYING FISH

**Q** How do I ensure I buy healthy fish?

**A** It may sound disappointing to newcomers to aquarium and pondkeeping to be told that we can never be 100% certain that the fish we buy are perfectly healthy. However, there are a few signs that we can look for which will help stock the odds in our favour.

If, for example, several fish in a holding trough or tank look decidedly unhealthy, it is best to forget buying any fish, however healthy they look, from the same batch. It is not worth taking the risk.

Some good pointers to watch out for in healthy fish are:

- ① Erect fins (except in some long-finned varieties)
- ② Lively disposition
- ③ Balanced swimming
- ④ Full body
- ⑤ Good appetite
- ⑥ Intact fins, i.e. no tears
- ⑦ No missing scales
- ⑧ No injuries, lumps or sores

In the case of marines, potential buyers are often advised to ask to see the fish feed. Where Koi are concerned a close-up examination of the fish either in a holding basket or trough, followed by close inspection of the sides and underbelly (made possible by placing the fish in a large polythene bag) is also recommended.

If you buy a fish with these characteristics and/or go through the procedures outlined, the chances are you have bought a healthy fish.

Some internal diseases are not detectable in the early phases, so you can never be 100% certain of a fish's state of health, but the above should ensure a good start.

## QUARANTINE

**Q** How and why are fish supposed to be quarantined?

**A** Fish are surrounded by potentially harmful pathogens. This applies both to home and show aquaria and ponds. The mere physical act of netting in the shop, followed by bagging, transport and de-bagging into an alien environment at home can cause sufficient stress in a fish to reduce

its resistance to the point where it becomes highly susceptible to attack.

Therefore, when such a fish is released into an established tank or pond and is required, on top of everything else, to compete with the resident fish for food and space, it is bound to experience some problems. It does not, of course, follow that every new fish will develop some disease or other. In fact, most fish are so resilient that they will survive this traumatic period in their lives quite successfully.

However, the inherent risks cannot be overlooked and it makes sense to take precautions, particularly since apparently healthy fish can be harbouring dangerous parasites or bacteria. A period of quarantine lasting approximately two weeks (but preferably longer) is usually long enough to allow fish to settle down, recover from their shop-to-home ordeal, get used to their new water and, very importantly, exhibit signs of any disease which they may be carrying.

When a new tank or pond is set up, it can automatically provide quarantine accommodation for the first batch of fish. This is not an ideal situation but it, nevertheless, often works quite effectively. Problems arise, though, if any of the fish in this first batch are carrying a serious disease such as TB. In such cases, or in others where complete disinfection is required and plants need to be destroyed, the experience invariably proves both depressing and time-consuming. Fortunately, selecting healthy, acclimatised or quarantined fish which are known to be feeding well in the shop will reduce risks very considerably.

Few aquarists or pondkeepers, if any, obtain all the fish they are ever likely to require in a single batch. New fish are regularly being bought to replace those that die (for whatever reason) or to increase the collection. Since each new purchase is a potential source of trouble, steps have to be taken to minimise the risks. It is on such occasions that the value of a quarantine tank or trough/vat becomes obvious.

Although some may bemoan the extra expense, it only takes one major wipe-out to convince them that it is most unwise to dispense with quarantine. Luck and good general management may result in prolonged success even without quarantine facilities and this may well lull some people into a false sense of security. Sooner or later, though, disaster is likely to strike. If, by that time, one has progressed to rare, difficult or expensive species, there will be yet more reasons to regret not having followed this golden rule of fishkeeping.

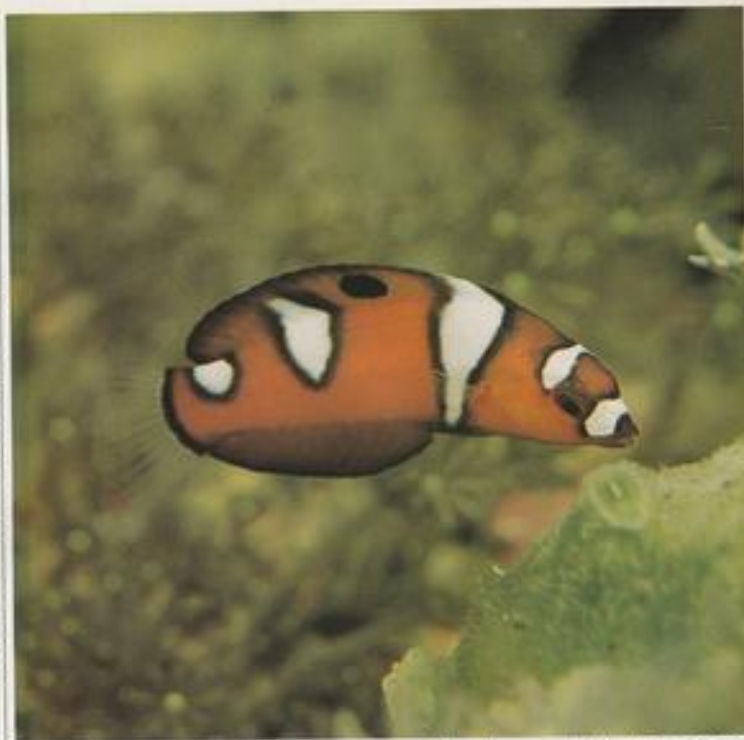
## INTRODUCING FISH Aquaria

**Q** What technique should I use to introduce fish into an aquarium?

**A** Different techniques can be used, the following being one that works for most people... and most aquarium fish.

- ① Work out the stocking level of fish for your tank.

- ② Select compatible species, e.g. avoid aggressive or overlarge specimens.
- ③ Obtain only about 50% (maximum) of your eventual stocks at the outset.
- ④ If buying shoaling species, such as Neons, Cardinal Tetras or Zebra Danios, obtain at least five or six specimens. There are numerous species available for community aquaria. These are usually referred to as 'community species' (see Dr David Ford's article elsewhere in this Supplement).
- ⑤ If possible, arrange to buy your fish in the late afternoon to allow for an evening introduction. This will give the fish time to adjust to their new surroundings.
- ⑥ Minimise heat loss by ensuring that fish are packed in a heat-resistant bag, such as those used to keep take-away food warm. Failing this, the bags containing the fish may be wrapped in newspaper or other insulating material. Avoid carrying exposed bags of fish — they are under enough stress already and can do without being subjected to this added ordeal.
- ⑦ On getting home, switch off the aquarium lights.
- ⑧ Float the bags containing the fish in the aquarium.
- ⑨ Leave for about ten minutes to allow temperatures to equilibrate. Individual bags may require a longer period if they contain a large volume of water.
- ⑩ Untie the bags (do not pop them!).
- ⑪ Replace about a quarter of the water in each bag with aquarium water.
- ⑫ Leave for ten minutes.



Great fins, bright eye, solid-looking body and superb coloration — unmistakable signs of good health exhibited by a juvenile Red Wrasse (*Coris formosa*).

## SETTING UP A NEW TANK?...



# DON'T GET INTO A STATE

To someone who's never set up an aquarium before, shopping around for the equipment and assembling it at home could be a bit of a puzzle—even some experienced fish-keepers find the whole process bothersome.

Now there's an aquarium that comes in one complete unit and requires no more brain power to install than the wiring of a single plug. So why buy your aquarium in bits and pieces when now you can get it all in a Tropiquarium?



- ⑬ Repeat steps 11 and 12 twice more. (This introduces the fish to their new water chemistry gradually and helps reduce environmental shock.)
- ⑭ Gently release the fish into the aquarium.
- ⑮ Leave aquarium lights switched off.
- ⑯ Do not feed fish for several hours at least (preferably not until the following morning).

**NB:** If steps 7 onwards are carried out during the late afternoon or early evening, this allows the fish time to become accustomed to their new surroundings in naturally fading light. They will, therefore, be able to explore the aquarium and find suitable shelters for the night without the need to do so in the full glare of the aquarium lights. They should also be allowed to see their first day in with naturally increasing daylight.

## Ponds

**Q** Are pond-introduction techniques the same as for aquaria?

**A** They appear a little different — and include a sun-protection angle — but, otherwise, the principles are the same.

The following steps should help ensure relatively stress-free introductions.

- ① Float the bag in the pond for about 15 minutes (up to one hour if the volume of water is large) to allow the temperature of the 'bag' water to rise or fall gradually to that of the pond. Never float a bag in a pond without protecting it from overheating if the day is hot and sunny, e.g. cover it in some way.
- ② Untie the bag — do not burst it — and mix in a small amount of pond water, ending up with a mixture of about 1 part pond water to 3 parts bag water.
- ③ Leave the bag in the pond for a further 10 minutes, resting the open end on the pond surround and weighing it down with a rock.
- ④ Repeat 2 and 3 at least once more, but preferably twice. This allows the fish to get used to their new water chemistry in several small stages — just as for aquarium fish (see previous section).
- ⑤ Gently tip out the fish into the pond. Avoid pouring them in.

Introducing pond fish in the evening provides them with all the advantages outlined above for aquarium fish, plus the added one of minimising (or totally avoiding) the risk of overheating.



Partly pinched fins, poor coloration and a slightly over-large head, all point to a fish that is in poor condition.

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# TACKLING PROBLEMS IN NEW PONDS AND AQUARIA

## NEW TANK SYNDROME, CLOUDY/GREEN WATER, AQUARIUM MAINTENANCE, FEEDING

Dr David Pool (Head — Tetra Information Centre)  
(Illustrations by the author)



Cloudy water in a coldwater aquarium — almost certainly the result of over-feeding.

### NEW TANK SYNDROME

**Q** *I have heard and read a lot about 'New Tank Syndrome', but what is it and how will it affect my fish?*

**A** The first 4-6 weeks after setting up a new aquarium (or filter) are the most troublesome, largely owing to the 'problem' known as 'New Tank Syndrome'. This term refers to the process which occurs as the helpful bacteria in the aquarium, and particularly the filter, increase in numbers and start to decompose fish waste and uneaten food.

When the aquarium or pond is first set up, it is a sterile environment with very few helpful bacteria present. At this stage, any fish waste that is produced, or food that remains uneaten, will not decompose and will gradually accumulate in the aquarium or pond.

As the numbers of bacteria increase (i.e. as maturation develops), this material will be broken down into ammonia, the ammonia into nitrite, and finally the nitrite into nitrate. During this process there is a characteristic rise and fall in the concentrations of ammonia and nitrite (see accompanying diagram), with the levels often becoming toxic and leading to fish becoming unhealthy. In most freshwater aquaria (where the pH is below 8.0) the ammonia is not too toxic to the fish and only nitrite will cause real problems. If, however, the aquarium water is alkaline, then both ammonia and nitrite may be lethal.

The water quality problems that result can affect the fish in a range of different ways, including gasping at the water surface, rapid gill movements, rubbing against underwater objects, clamped fins, shimmying (swimming on the spot) and not feeding. The fish

will also be more susceptible to diseases, particularly Fin Rot, White Spot and Fungus. In severe cases, the fish may be killed.

'New Tank Syndrome' will generally affect all of the fish in an aquarium or pond, or all of those of one species or one size. If only one or two fish are affected, it is likely that the problem is due to an introduced disease.

### Prevention

**Q** *Can 'New Tank Syndrome' be prevented?*

**A** 'New Tank Syndrome' can be easily prevented by taking a little care initially and avoiding the temptation to rush things. When setting up an aquarium or pond you should only add fish in small numbers, gradually building up to the recommended



stocking level over a period of 6-8 weeks.

Initially, add, say 2 or 3 hardy fish (e.g. barbs, danios or platies in a tropical aquarium, common goldfish in a coldwater aquarium or pond and damsels or mollies in a marine aquarium) and take great care not to over feed them.

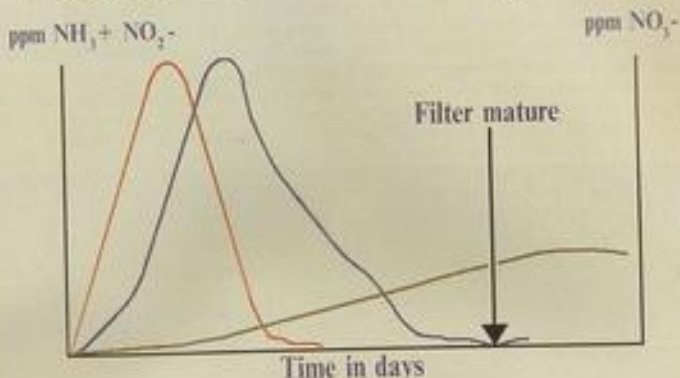
Test the aquarium water at daily intervals using a Nitrite Kit (or Ammonia Kit if the water is alkaline). These kits are very easy to use and will allow you to monitor the gradual rise and fall of the pollutant levels. Whenever the nitrite level rises above 0.3 mg/litre (or 0.1 mg/litre ammonia) change 30-50% of the water. This process should be continued at daily intervals until the nitrite level is very close to 0 mg/litre. It is now safe to add a few more fish. Repeat the above procedure, only adding fish when there is no nitrite present, until the aquarium or pond is fully stocked.

At each partial water change you should remove as much debris as possible from the aquarium and gravel. The gravel can be cleaned without clouding the water using a Gravel Cleaner. The replacement water should be the same temperature as that in the aquarium and be conditioned to remove any toxic chlorine and metals.

A less suitable alternative to the above method of overcoming the 'New Tank Syndrome' involves undertaking a 30-50% partial water change at weekly intervals for the first 6 weeks after setting up an aquarium. Additional water changes should be undertaken whenever the fish show the signs of distress described earlier. With this method, 2 or 3 fish should be added initially, followed by 3 or 4 every 2 weeks until the required stocking level is reached (assuming that there are no problems with the existing stock). This method is less suitable than using a Test Kit because you are correcting the water quality problems after the fish have been affected, rather than monitoring conditions and preventing any trouble.

Bacteria cultures which will seed the filter with the required types of bacteria are available from aquarist shops. These cultures do not prevent 'New Tank Syndrome', but will greatly reduce the levels of ammonia and nitrite that build up, making the aquarium

## Maturing Process of a Biological Filter



Maturation process of a biological filter. The high ammonia ( $\text{NH}_3$ ) and nitrite ( $\text{NO}_2^-$ ) peaks are normally referred to as the Nitrite Crisis in marine aquaria.

or pond water safer for the fish. They will also reduce the length of time required for the filter to mature. The procedures outlined above should still be followed.

### Treatment

**Q** The above answers are fine but my fish are already suffering from 'New Tank Syndrome'. What can I do?

**A** The raised pollutant levels which occur as a result of 'New Tank Syndrome' can have very severe effects on the fish, invertebrates or plants, but may be controlled if the correct actions are taken quickly.

#### ① Water Change

The first task is to conduct an immediate 50-75% water change to dilute the ammonia and/or nitrite and ensure that it does not do any further harm to the fish. Remember to treat the replacement water with a good-quality water conditioner and ensure it is the correct temperature.

#### ② Water Testing

Monitor water conditions using Ammonia and Nitrite Test Kits and conduct a partial water change whenever dangerous conditions occur.

#### ③ Chemical Filtration

The use of chemical compounds to remove ammonia and nitrite is useful in extreme cases. Activated charcoal or products containing zeolite (for freshwater aquaria) are ideal and should be added to the filter.

#### ④ Salt

Aquarium, sea or cooking salt can be added to aquaria containing coldwater fish such as goldfish and Koi (not tropical fish) at a dosage of 1oz = 28gm (= 1 teaspoonful) per gallon (4.5 litres) of water. The salt minimises the toxicity of nitrites and reduces the incidence of disease.

#### ⑤ Treating Diseases

When fish are exposed to high ammonia and nitrite levels they can become stressed and susceptible to certain diseases. These should be treated promptly using good-quality proprietary remedies in order to prevent any losses.



Virtually every new pond 'suffers' from green water. Various techniques may be used to tackle this problem — see text for details.

## CLOUDY WATER

**Q** My aquarium has only been set up for a few days and already the water is cloudy. What causes this and how can I overcome it?

**A** Cloudy water in a newly set up aquarium may be caused by two different factors:

① In some cases, the high levels of pollutants and debris resulting from 'New Tank Syndrome' provide ideal conditions for bacteria to grow. The resultant population explosion of bacteria can result in the water turning a milky colour.

Bacterial water cloudiness will clear naturally as soon as the food supplies are exhausted. This process can be speeded

up by undertaking regular partial water changes to remove any excess debris and also by greatly reducing the amount of food given to the fish.

- ② Unclean gravel, or gravel containing clay, will also cloud the water. Carefully washing the gravel before adding it to the aquarium will usually overcome this problem. However, some gravel sold for aquarium use contains hard pieces of clay. These do not dissolve when the

If the problems persist, add fast-growing plants to the pond to out-compete the algae for nutrients and light. Alternatively, an Ultra Violet Steriliser can be used which, in conjunction with a filter, will maintain crystal-clear water at all times. A partial water change is often undertaken by inexperienced pondkeepers in order to clear the water. This should not be done, as the new tapwater contains nutrients which will feed the algae and prolong the problem.



Test kits must be considered essential accessories to successful aquarium- and pondkeeping.

substrate is washed, but will do so gradually when submerged in the aquarium. Regular use of a gravel cleaner and avoiding such substrates will overcome these problems.

- Q What causes cloudy water in a pond?

A Soon after setting up a pond, the water may turn green due to a heavy growth of suspended algae. These algae thrive on the bright light and large numbers of nutrients which occur in a new pond, before the plants mature. In many cases the 'green water' will disappear naturally as soon as the algae have exhausted their food supply. Using a good-quality pond algicide will provide immediate relief, but it is important that you remove the dead algae, which would otherwise decompose and pollute the water.

A muddy appearance to a newly set up pond, may be due to over-vigorous water movement or the fish disturbing any sediment in the pond. Ensuring all of the plants are in containers which are lined with hessian and have gravel on top of the substrate will help to overcome this problem.

## AQUARIUM MAINTENANCE

- Q Is keeping an aquarium time-consuming? What is involved?

A Once set up, your aquarium will require a minimum of care and attention to keep it looking attractive, and the fish and plants within it in the best of health. The routine tasks involved are simple and are not time-consuming, but they could be described as

### ROUTINE MAINTENANCE TASKS

#### Daily

Check water temperature  
Check filter/air pump

Check fish numbers/  
behaviour  
Turn lights on/off  
Feed fish

#### 2-3 Weekly

Measure water quality  
Partial water change  
(approx 4 weeks in  
marine aquaria)  
Clean filter

Clean tank  
Remove algae from glass  
Clean condensation tray  
Prune plants  
Remove dead leaves

#### Occasionally

Thin plants out  
Replace fluorescent tubes

Check electrical apparatus

Clean air pump valves

the secret to successful fishkeeping.

The routine maintenance of an aquarium involves tasks that need to be undertaken daily, every 2-3 weeks or only occasionally. The accompanying table summarises this information.

## Major clean-out

- Q How often will I need to empty and clean my aquarium?

A Once established, it is rarely necessary to empty and clean out an aquarium completely. However, regular partial water changes and cleaning are more important to ensure that fish and plants remain healthy. The fish in particular, can often be seen to be more active, and show better coloration, following the introduction of clean water.

Adding fresh water to the aquarium dilutes any pollutants (such as nitrates) which may be present. While the nitrate concentration within an aquarium will rarely reach lethal levels, it can retard the growth and fin development of the fish and make them more lethargic even at relatively low levels (50mg nitrate per litre of water).

Removing water from the aquarium should be combined with a general clean-up, and particularly with the removal of any debris or uneaten food. Using a gravel cleaner any debris can be removed from the gravel without clouding the water. Regular use of a gravel cleaner prevents the gravel from becoming clogged with debris and allows the undergravel filter, if used, to function more efficiently. If you use an undergravel filter it is advisable occasionally to place the siphon tube down the filter uplift tube and remove water from under the filter plates.

Removing about 20-30% of the tank volume every 2-3 weeks is sufficient (4 weeks is usually recommended for marine aquaria). With the water level reduced, this is an ideal opportunity to undertake any other routine maintenance tasks that might be necessary. Remove any algae from the front glass of the aquarium using commercially available algae scrapers. Only clean the front glass of the aquarium. Small quantities of algal growth on the back and sides not only look natural, but they also provide valuable food for herbivorous fish and remove large quantities of nitrates from the water. Recurrent or excessive algal growth in the aquarium suggests incorrect maintenance, so check for overfeeding, too much light and too few plants.

The filter will also need cleaning to remove any debris that it may have trapped. I have already mentioned how undergravel filters should be cleaned. The filter media in box or foam filters should be removed and rinsed in old aquarium water. Do not use tapwater if possible, as the chlorine present will kill many of the beneficial bacteria, thus reducing the effectiveness of the filter. Your aim when cleaning filter media is to remove excess debris without removing the helpful bacteria, therefore a quick clean is adequate.

When replacing the water it is important to ensure that it is the same temperature and



quality as the water in the aquarium. Any large changes could stress the fish, making them more susceptible to infection by disease. The replacement water should always be treated with a good-quality water conditioner, such as Tetra Aqua-Safe, in order to remove any potentially dangerous chlorine and metal ions.

### Tapwater

**Q** *Is it safe to use tapwater to fill my aquarium or pond?*

**A** Tapwater is specially treated to ensure that it is safe for human consumption. Among other things, this involves the addition of a sterilising agent, usually chlorine, to kill any bacteria and other human health hazards. Unfortunately, the chlorine is also toxic to helpful filter bacteria and fish.

To make the tapwater safe for use in the aquarium, it is important that it should be treated with a good quality tapwater conditioner before it is added to the tank. The tapwater may contain raised levels of metals such as copper, aluminium and lead. The tapwater conditioner should remove these metals, but in addition, it is wise to allow the cold tap to run for several minutes before using the water. Also avoid using water from the hot tap as it may well have high copper levels due to it being heated in a copper hot water tank. Instead, use water from the cold tap, heated in a kettle.

Tapwater quality (i.e. pH and hardness), may vary from area to area, so it is advisable to check that the water is suitable for the fish species you wish to keep, using a test kit. If unsuitable, there are ways to alter the pH and hardness.

High nitrate levels are a problem in some areas of the country. If used untreated, such water would make aquarium conditions worse rather than better. Encouraging healthy plant or algal growth and only undertaking small (10%) water changes will help. However, to overcome the problem totally, it is necessary to pass the tapwater through a water purifying unit, or filter the water through a nitrate-removing filter medium such as Nitrex or a Polyfilter or, used correctly, Siporax.

### Water testing

**Q** *Is it necessary to test the water quality in my pond or aquarium, and if so, how often?*

**A** Regular measurement of water quality with a reliable test kit will enable you to monitor conditions within the aquarium or pond and detect and correct any problems before they adversely affect the fish or plants. Hardness and pH values of both the aquarium (or pond) and tapwater should be measured regularly at first in order to determine which species of fish can be kept. Thereafter you should test the tapwater prior to adding to ensure that it is suitable.

As explained earlier, ammonia, nitrite and nitrate are potentially toxic pollutants which are produced during the decomposition of

organic waste material. All should therefore be tested at 2-3 weekly intervals and preventive measures taken if the values exceed the dangerous limits.

### FEEDING THE FISH Choice of foods

**Q** *What should I feed to my fish?*

**A** The answer to this question depends largely on the species and size of fish that you keep. It is advisable to use a good-quality commercially available food as the basic diet for the fish. In this way you ensure that they receive a nutritionally balanced diet.

The choice of food depends on the natural diet of the fish. Most tropical fish will thrive on a 'staple' food, but herbivorous species should also be given a vegetable-based diet, and carnivores a diet rich in protein.

The size of the food given is also important. Fry, for example, will have difficulty eating large particles of food and should therefore be given a powdered diet. Conversely, large fish (over 4 inches in length) will tend to ignore small particles of food which will subsequently decompose and pollute the water. This problem can be avoided by feeding a stick food, which is in a size which can be best utilised by the fish.

Finally, there is a need to place the food where the fish usually feed. This can be achieved using flake or stick foods for surface feeding fish, flake or granular foods for midwater feeders and tablets for bottom dwellers.

### Quantity and frequency

**Q** *How much and how often should I feed my fish?*

**A** As a general rule, you should feed your fish once or twice a day on as much food as they will consume within 2-3 minutes. It is very important to avoid overfeeding as any uneaten food could pollute the water. It is possible to feed the fish more frequently

(particularly fish fry), but providing you follow the 2-3 minute rule, you will not overfeed. The more regularly you feed the fish the smaller quantities they will eat at each feed.

This rule is complicated a little for pond fish, which should not be fed once the water temperature falls below 8°C (c. 46.5°F). It is not that these fish do not feed below this temperature — but they can obtain what little food is required from within the pond (i.e. algae, insect larvae, etc.). In fact, feeding below this temperature can pose problems, owing to uneaten food polluting the water, and the acidic digestive enzymes in the intestine causing ulceration.

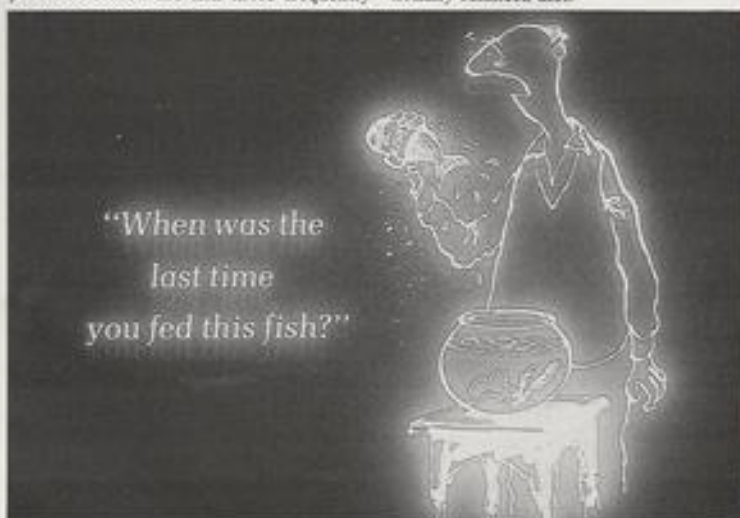
### Livefoods

**Q** *What about livefoods?*

**A** Whenever aquatic livefoods are used in the aquarium there is a risk of introducing disease. This risk has been greatly reduced by the commercial culturing of some types of livefoods, such as *Daphnia* and Brine Shrimp. Others, such as bloodworms, may be made relatively safe by washing in clean water and treating with a remedy to control bacterial parasites before use.

In the wild, fish feed on a very large number of different livefoods (insects, fish and algae) in order to obtain the necessary nutrition. This balanced diet will not be provided by just feeding your fish with 1 or 2 livefoods. Instead, I would suggest that you use a basic diet of good-quality flaked, stick, granular or tablet foods (depending on fish species) and supplement this with freeze-dried or cultured livefoods.

Livefoods do have some specific uses. For example, newly hatched Brine Shrimp or liquid are useful (or essential) in getting some fry to start feeding, before they will take dry foods. Similarly, some species of fish are very selective with regard to their diet and should be tempted to feed using livefoods before being weaned onto a nutritionally balanced diet.



# PLANTS FOR ALL PURPOSES

## TROPICAL, COLDWATER, BRACKISH, MARINE AQUARIA

Barry James (Everglades Aquatic Nurseries)

In the course of their evolution, plants have adapted themselves to survive and prosper in almost all the possible environments on the planet. Life in and around bodies of water has its own advantages and limitations and there are few watery biotopes where plants are not found. Lakes, ponds, streams and rivers in every climatic zone have their complement of aquatic plants.

Although tidal areas and the oceans themselves support only a few genera of 'Higher Plants', algae, with their simpler structure and uncomplicated modes of reproduction, have continued to dominate these regions from earliest times. However, numerous species of 'Higher Plants' have also managed to solve the problem of heavy salt concentrations in those intermediate areas where the waters are brackish.

### TROPICAL AQUARIA (Freshwater)

**Q** I have 3in (c 7.5cm) of fine silver sand in my aquarium, but my plants do not do well. After a few days they seem to rot at the base, snap off and float up to the surface. Am I buying the wrong plants?

**A** Regardless of which species of plants you are buying, they would not do well in this set-up. Silver sand packs down very tightly and, as the particle size is so small, no oxygen can reach the rootstocks. This causes them to rot and break off at the top of the sand. The plants remaining in the sand will cause the sand to become polluted.

Change to washed Chessel Beach gravel. It



An unusual foreground plant for tropical freshwater aquaria — the Dwarf Four-leaf Clover.

comes in a variety of sizes but 3/16in up to 1/2in will be the most satisfactory.

**Q** My tank measures 60 x 24 x 24in (150 x 60 x 60cm). I have an outside power filter, ultratherm heating mat and am using one Triton tube (40 watt) which I keep on for 10 hours per day. I do quite well with Cryptocoryne species and Anubias and my bulbs grow well. However, all my 'Bunch Plants' drop their lower leaves, become very thin and finally go brittle and die. I have tried all sorts with no success. Can you help?

**A** Yours is a familiar moan from those with deep tanks. Up to 18in (45cm) it is just possible to get away with one Triton tube. However, two tubes will give better results.

Unfortunately, once you reach two feet (around 60cm) the absorption of light by the water is very significant. You will need three tubes to be sure, and I always use a very reflective gravel in deep tanks. Quartz gravels are good for this purpose.

Cryptocorynes and Anubias are survivors and will keep going in dimly lit surroundings indefinitely. However, more generous illumination will result in much healthier, faster-growing plants.

**Q** I know that many highly coloured plants offered for aquaria are marsh or house plants. Can you recommend colourful plants that are truly aquatic?

**A** First of all, I must stress that plants with red and yellow pigments need a lot of light. In fact, these pigments act as a protection from the tropical sun, as these species tend to



Red Milfoil is readily available and grows well under bright light.





Whether 'dwarf' or 'normal', Amazon Swords are good subjects for medium to well-lit tropical conditions.

grow in open water. However, if you are prepared to install a high-intensity Mercury Vapour or Halogen Quartz lighting system, there is no reason why you shouldn't be successful with these species. The genus *Rotala* has three species with pink, through red, to dark brown leaves. *R. macrandra* has the largest leaves. *R. rotundifolia* has smaller oval leaves, while in *R. mullisii*, the leaves are fine and needle-like like *Myriophyllum*.

From Africa come the *Ammanias* which grow in substrates poor in nutrients, and in water that is soft to medium hard. Strangely, those species having green leaves are harder to grow in aquaria than those having red ones like *Ammania senegalensis*.



With a bit of flair . . . and knowledge, plants can be used to create stunning displays, particularly in tropical freshwater aquaria.

Two *Ludwigias* *L. malletii* and *L. arcuata*, Red Milfoil (*Myriophyllum matogrossense*) are in good supply and are easy to obtain, as is Red Cabomba (*Cabomba piauhyensis*). The glorious Red Amazon Sword (*Echinodorus ornis*) is a splendid centrepiece, as is the African Water Lily known as the Tiger Lotus (*Nymphaea maculata*).

Plants showing yellow pigments are much rarer. There are variegated varieties of Water Wisteria (*Hygrophila difformis*) and Dwarf Hygrophila (*Hygrophila polysperma*) which are in good supply, while the Variegated Rush (*Acorus gramineus*), although slow-growing, will persist for a long time permanently submerged.



The Giant Twisted Vallis — a good background subject.



*Rotala rotundifolia* has attractive oval-shaped leaves.

## BRACKISH AQUARIA

**Q** I have a tank containing a number of brackish water species including Scats, Puffer Fish and Gobies. Are there any plants which will grow in this salty water?

**A** Certainly, there are several species which will tolerate, and even thrive, in brackish water.

*Cryptocoryne ciliata* from Sri Lanka and adjacent areas of SE Asia is found on clay soils on the coastal plains to about 50 kms (30 miles) inland where the water conditions can vary from highly brackish to soft and neutral. The leaves are lance-shaped, light green and reach a length of 1.2 metres (3 1/2 ft) under ideal conditions — much smaller in aquaria.



The Java Fern does well in brackish water.

Java Fern (*Microsorium pteropus*) is a true fern, also from SE Asia, where it grows attached to rocks and tree trunks. It is found in tidal areas, but also extends well inland.

*Eleocharis* (Hair Grass) has several species which thrive in brackish areas, so a little experimentation might well be rewarding.



Hair Grass can be grown in coldwater and brackish aquaria.

Size of aquarium		No of fluorescent tubes		
(inches)	(centimetres)	(minimum)	(average)	(high)
24 x 12 x 12	60 x 30 x 30	1 x 15	2 x 15	3 x 15
36 x 15 x 12	90 x 37 x 30	2 x 20	2 x 30	3 x 30
48 x 15 x 12	120 x 37 x 30	2 x 30	2 x 40	3 x 40
60 x 18 x 18	150 x 45 x 45	2 x 40	2 x 60	2 x 65

\* These figures should only be regarded as guidelines and may require adjusting according to individual circumstances. (For further discussion on lighting, see Dick Mills' article elsewhere in this Supplement).

In West Africa, *Nymphaea maculata* is found in coastal lagoons in company with various *Crinum* (Onion Plant) species.

*Sagittaria natans* has been grown in brackish tanks for many years and is a firm favourite.



*Egeria densa* — the most popular of all coldwater plants.

## COLDWATER AQUARIA

**Q** My local dealer has quite a good selection of plants for tropical aquaria but only *Egeria densa* for coldwater tanks. Are there any tropical species which might succeed without heat, or is this a contradiction in terms?

**A** Many so-called tropical plants come, in fact, from sub-tropical areas of the world where the water temperature approximates that which is found in the average living room, whose ambient temperature probably hovers around 65°F (18°C). In fact, you are spoilt for choice. *Vallisneria spiralis*, *Vallisneria spirifolia*, *Cubomba aquatica*, *Hygrophila polysperma* and *Ludwigia malincolini* are just a few of the species you could try.

For a fine specimen plant, *Nagah japonicum*, the Japanese Spatterdock, would be a good choice.

## MARINE AQUARIA

**Q** While I have seen many documentary films on marine life in which plants are to be seen growing on the reef, I have never seen any in my local shops. Is it possible to grow these in aquaria, and where can I obtain them?

**A** Certainly, it is not difficult to cultivate marine algae in aquaria. Such species as *Caulerpa* and *Ulva* are regularly available, but only from larger outlets.

## SELECTED TROPICAL AQUARIUM PLANTS

Scientific Name	Common Name	Temperature	Substrate	Lighting
<b>Foreground Plants (Dwarf)</b>				
<i>Echinodorus tenellus</i>	Pygmy Chain-Sword	68-82°F (20-28°C)	Laterite + 1/2in gravel	Medium
<i>Lilaeopsis species</i>	Carpet Sword	65-75°F (19-23°C)	1/2in gravel	High
<i>Eleocharis acicularis</i>	Dwarf Hairgrass	65-75°F (19-23°C)	1/2in gravel	Medium
<i>Marsilea crenata</i>	Dwarf 4-Leaf Clover	72-80°F (22-27°C)	1/2in gravel	Medium
<i>Hydrocotyle vulgaris</i>	Pennywort	55-72°F (13-22°C)	Laterite + 3/16in gravel	High
<b>Middleground Plants</b>				
<i>Vallisneria 'orta'</i>	Twisted Vallis	50-86°F (10-30°C)	Laterite + 3/16-1/2in gravel	Medium
<i>Cryptocoryne affinis</i>		72-84°F (22-29°C)	Laterite + gravel	Medium
<i>Cryptocoryne wendtii</i>		72-84°F (22-29°C)	Laterite + gravel	High
<i>Blyxa japonica</i>		75-84°F (24-29°C)	Laterite + 1/2in gravel	Low-Medium
<i>Anubias barteri</i>		72-82°F (22-28°C)	Gravel	Medium
<i>Echinodorus parviflorus</i>	Black Amazon Sword	72-80°F (22-27°C)	Laterite + gravel	Medium-High
<i>Echinodorus osiris</i>	Red Amazon Sword	72-80°F (22-27°C)	Laterite + gravel	Low-Medium
<i>Microsorium pteropus</i>	Java Fern	72-84°F (22-29°C)	Attach to bogwood or rock	
<b>Background Plants</b>				
<i>Vallisneria asiatica</i>	Giant Twisted Vallis	75-82°F (23-28°C)	Laterite + gravel	Medium
<i>Myriophyllum elatinoides</i>	American Milfoil	72-80°F (22-27°C)	Gravel	Medium
<i>Hygrophila salicifolia</i>	Willow-Leaf Hygrophila	72-82°F (22-28°C)	Laterite + gravel	High
<i>Telanthera violaceum</i>	Red Telanthera	72-80°F (22-27°C)	Laterite + gravel	Medium
<i>Trichorizis rivularis</i>	Mexican Oak-Leaf	70-80°F (21-27°C)	Laterite + gravel	Medium
<i>Aponogeton longiplumulosus</i>		72-80°F (22-27°C)	Gravel	Medium



# SUCCESSFUL OVER-WINTERING

Winter and spring are crucial times of the year for our ponds and their inhabitants. During the winter months, in particular, both will be subjected to the elements which could mean stressful, rapid fluctuations in water temperatures, pollution and, in some cases, dangers caused by the surface of the pond becoming frozen. Peter Cole offers some timely advice on how to tackle this critical period successfully.



A concrete pond undergoing an autumn clean out — in preparation for winter.

**M**any fish are lost each year by passing the winter in unfavourable conditions. The pondkeeper is quite often unaware of the reason why and is therefore unable to control the situation. The result is often bitter disappointment, when pet fish that brought so much pleasure during the previous summer months, float to the surface, dead, the following spring.

Unfortunately, this is only too common, and perhaps some pond owners even take these events for granted and re-stock their ponds systematically each spring, not realising that most pond fish will live for 10, 15 or (in the case of the Japanese Koi) 25 years or more if kept under appropriate conditions.

## FIRST STEPS

The first precautions to take would be around October/November time when water

temperatures have declined. During this period we should remember that our fish have become less active as the temperature drops, and this will include their rate of digestion. If you have not done so already, it is necessary to reduce their feeding times as well as the amount of food that is distributed. It would be further advisable to change their diet to one that is easily digested, such as wheatgerm-based, perhaps, with some occasional livefoods.

Temperatures will obviously be different from region to region. Taking an average around this time of the year, we will find that temperatures are around 8-10°C (c 46.5-50°F) and declining slowly through the month of December. As in springtime, it is very useful to monitor the pond water temperatures during this period and to modify the amount of feeding accordingly.

The distribution should be reduced to once a day, say, morning or early afternoon, leaving out any feeding that might have taken place at other times, as during the long

summer evenings. The amount of food distributed should be gradually reduced as the temperatures decline and, once they have reached 10°C (50°F), it should be reduced to a minimum (and only once a day) say, early morning.

At 8°C (c 46.5°F) and below, it would be advisable to stop feeding altogether; any foods eaten at this temperature will only be poorly digested and, once excreted, will lie on the bottom of the pond and decompose.

At these temperatures, fish will be surviving on stored energy that they have obtained during the summer months; they will also become less active as they approach a state of lethargy. Feeding at low temperatures will also disturb the fish into using up their stored energy in order to rise and swim about the surface. Sinking foods are sometimes used at low temperatures but this could perhaps be considered superfluous in most cases. The rule of thumb is, perhaps, a great deal of patience on behalf of the pond owner while not seeing their fish, taking into consideration that, during low temperatures, fish do not need to eat.

## PREPARING THE POND

Any dead leaves and waste should be removed from the bottom of the pond. If left to decompose during the winter, they will inevitably pollute the water and reduce oxygen levels. This could also provoke the multiplication of harmful pathogenic bacteria and fungi.

Any plants that are in or around the pond should be cut back to remove their leaves and stems in order to prevent the decomposition of these that could also cause further pollution. For Koi pool owners, perhaps a final treatment against parasites would not go amiss in order to reduce the numbers of those that will also survive the winter.

## TEMPERATURE CONTROL

It is very important to keep the pond temperature as stable as possible. As mentioned before, a rapid fluctuation can have adverse effects on the fish by causing a certain degree of disturbance that could lead to stress. This will reduce their resistance during winter hibernation and thus leave them weak at the beginning of the spring when they will need to be fit in order to ward off any pathogenic organisms that are generally present in any aquatic environment. As with the fish, these will also become active during the springtime temperature





By late autumn/early winter, the fish will have become lethargic. As long as the pond doesn't freeze over, the leaves will not usually present a major problem — but they most certainly will if ice seals the surface of the pond.

rise and will affect any fish that have been weakened by the winter period.

Generally, a pond cover is used to help stabilise water temperatures and to keep out dead leaves. A cover can be made from fine-mesh greenhouse shading that is available from your local "Garden Centre". This has an advantage over, for example, a polythene sheet, in that it will prevent a heavy accumulation of rainwater on its surface. The mesh can be stretched over a wooden frame for easy handling; in the case of a large pond, several frames can be placed side by side.

Although a fine plastic netting that is generally used for keeping birds off fruit trees and vegetable patches etc is available, this type of protection will not help in any way to stabilise water temperatures and, with this very fine netting, the dead leaves always manage to find their way through in sufficient quantities.

If the pond has a depth of, at the least, 80 to 100cm (c 30-39in) or more, the water at the bottom will stay in the region of 4°C (39°F), even if the surface becomes covered with ice. This is partly due to the heat supplied by the surrounding earth. The fish will settle in this "warmer" water near the bottom to pass the winter.

If the pond is too shallow, the water temperatures will not only fluctuate rapidly throughout the day and night, but also become too low. At 2 to 3°C (c 35.5-37.5°F) the fish will suffer; below 2°C (c 35.5°F) they will possibly die.

As the warmer water is more dense than really cold water (near-freezing) it will remain at the bottom of the pond. What is important here is to prevent any currents or turbulence in order not to disturb this phenomenon. If a biological filter is being used to purify the pondwater, it will function to a certain extent even at low temperatures, but so as not to disturb the bottom water, the pump or filter intake should be raised near the surface (approx 30cm — 12in) and the water flow reduced so as to produce a gentle current at the return that should also be just below the surface.

This slight water current will provide sufficient oxygenation and also keep a section of the surface free of ice. If the pond is fitted with a bottom drain its operation

should be minimal in order not to flush away the warmer water.

If you are unfortunate enough to have total ice coverage during the winter period, certain precautions should be taken to enable an exchange of gases at the pond's surface. In order to achieve this you will need to make a hole in the ice. Over the years many methods have been adopted. Some say that a floating ball or balls will do this but, unfortunately, the ice will sometimes form below the ball. Floating a polystyrene block or a log of wood is also a recommended method, but these will inevitably be caught in the ice. Depending on their origin, logs can also produce a certain amount of pollution.

It is recommended that a hole be made by cutting, drilling or melting by standing a can of hot water on the surface. This last method will be less disturbing for the pond inhabitants. Be sure to attach the can with a piece of wire or string in order not to lose it as it melts through the ice. Once a hole has been made, about 15cm (6in) of water can be siphoned

heater, or equivalent, which will maintain an ice-free hole open at all times, irrespective of the ambient temperature.

Whichever method you use, again, be certain to attach all your accessories with string or wire in order not to lose them when the ice melts...! (Pond heaters have in-built floats.)

**Note.** Holes in the ice should only be made by cutting, drilling or melting. Never use a hammer or pick, since their vibration transmitted through the water will have adverse effects on the fish or, possibly, the structure of the pond itself.

## THE END OF WINTER

At the end of winter, when the outside temperatures start to rise, it would be advisable not to rush out to uncover the pond, but to be patient and wait until the atmospheric temperatures become more or less stable.

At this point the pond cover should be removed in stages, say, over a period of 2 or 3



A well-made pond cover such as this one will not only protect a pond from falling leaves, but will also help to stabilise water temperatures.

off to create a pocket of air that will prevent further freezing and allow sufficient gas exchange.

Two more holes can be made for ventilation, but these will need to be covered to stop cold air entering. For example, a flower pot filled with a small amount of hessian cloth, or even a length of PVC tubing fitted to stand upright will serve as a vent through which gases can circulate and avoid cold air entering.

The easiest method of all, of course, is through the installation of a good pond

weeks in order not to make a dramatic change in the fishes' environment, remembering that even a rapid change of lighting can be stressful.

Finally, it is preferable to wait until you see your fish swimming around at the surface of the pond in search of food, before starting to feed them, thus not disturbing them into rising at your command. Once you do see them become active, you can start to feed them sparingly and, again, with an easily digested food such as a wheatgerm-based preparation once a day.



A number of methods may be used to maintain a hole open on the surface of a pond at all times during the winter months. This is vitally important for the long-term well-being of the fish.



# INDIA

## (Part 1 — BANGALORE AND MADRAS)

Stephen Clark embarks on the first leg of his exciting journey to the homeland of the Dwarf Gourami  
(Photographs by the author)

**M**y travels earlier this year took me to the intriguing country of India. Previously, I had set a target of three goals to achieve within my personal studies of air-breathing freshwater fish; questions demanding answers:

- ① Were the Dwarf Gouramis (*Colisa lalia*) swimming within our aquariums, poor mutations of the great aspirations I held for the 'wild' form?
- ② Did the Climbing Perch (*Anabas testudineus*) really have a similar valid cousin named *Anabas oligolepis*?
- ③ Is the romance connected with the large Snakehead, *Channa leucopomatus*, justified?

The answers to these questions lay in the completion of a circular journey within the central portion of the country, to diverse rivers and ponds, fish exporters and aquarist shops.

### BANGALORE AQUARIUM

The first 'fishy' experience was at the Government Aquarium set within a suburb of Bangalore, a progressive city within the heart of the State of Karnataka.

Bangalore City Aquarium is in keeping with this fast-growing city's modern environment. Set in a pleasing park, it dispels the dreary 'Victorian' style public aquariums seen so often in Europe and, with its simplistic crisp architectural style, gave me the feeling that the local community were very proud of it.

The nicely arranged aquariums were housed in a modern, two-storey decahedron building. The larger native freshwater food fish resided in the lower section in twelve large 8 x 3 x 3ft glass-fronted, concrete-lined tanks, reached by a sloping concourse and by paying an entrance fee of one rupee (four pence!).

Fish, to the Indian people, is an important part of their diet and this is reflected in the huge freshwater fish industry which abounds in the vast natural river systems and culture ponds. Species included *Labeo rohita*, a large cyprinid *Carla catla*, a 'carp type' fish and the snakeheads *Channa punctata*, *C. striata* and *C. marmorata*. The upper level consisted mainly of exotic aquarium freshwater fishes from Singapore and South America in approximately forty standard 24 x 15 x 12in aquariums, complete with a decor

of plastic air-driven accessories of divers, watermills and sunken boats!

I searched in vain for native Indian species but only found a nice pair of endemic *Colisa fasciata*, commonly known as the Giant Gourami — a strange name to give to a fish whose length rarely exceeds four inches! In the next tank was a pathetic marigold form of *Colisa labiosa* (the Thick-lipped Gourami); the tank labelled the country of origin, Burma? This genetic deformity was more than likely to hail from Singapore.

The outer side of the aquarium fronted onto a beautiful park called Ulsoor Lake. Here, tamed squirrels displaying a double white-lined back, played in lime-green lined avenues of trees. However, the river and pond at the centre of the park were both dry.

### FIRST GOAL ACHIEVED

After an overnight train journey, I arrived in Madras the following day and at 9 am, with an air temperature of 86°F — 30°C — (in the afternoon it would reach 98°F — 36.6°C — and these were within winter climes!). At midday, I visited the premises of 'Southern Indian Aquarists' the fish exporter that a local businessman — in conjunction with the Indian Investment Centre in London — had found for me. Their holding quarters, although small, were efficiently run, and I was amazed to see the Dwarf Gourami (*Colisa lalia*) so early in my journey. Before I had left for England my goals had been set for three species; this was one of them (more about the other two in later articles). The Dwarf Gourami is particularly special for me, since it was the first fish I had ever bred in an aquarium. I can still vividly remember the beautiful colours of the male guarding the hundreds of minute fry at the water surface. However, today most inbred aquarium specimens have only a fraction of their natural colour, and my vow was to bring wild specimens back into the hobby one day.

A netful was scooped from a holding tank of these gorgeous crimson red and metallic blue males. The visual result was a really emotional sight, one only understood by a fellow fishkeeper. The proprietor's wife, Mrs Kumar, bagged me several males and later in the day, I met with Mr Kumar who arranged a visit to his fish farm. That evening an exciting conversation followed regarding the possibility of exporting fish to an English importer, namely Carib UK.



Top left, Bangalore Aquarium — good on food fish, poor in ornamentals.

Top right, the attractively marked 'Lady Blue' Goby.

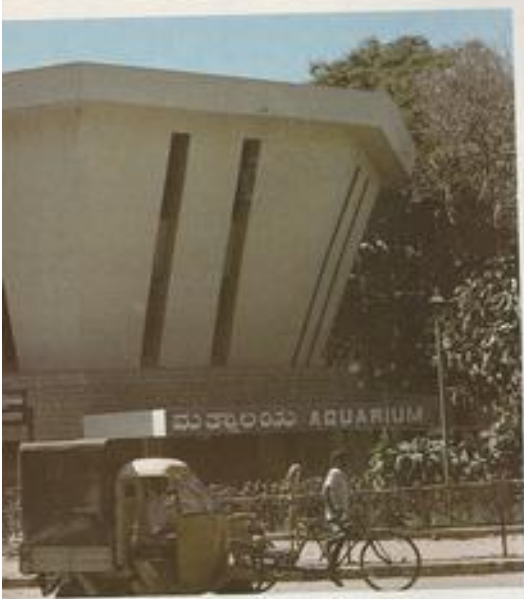
Top right lower, a couple of Spiny Eels photographed at the Kumars' fish farm.

Above, *Chandrama chandrama* is a charming small catfish which is not often seen in the UK.

Above right, one of the many food fish I saw in my travels. This is *Labeo rohita*.

Right, photographed under difficult conditions, this shot still shows the beautiful body markings of the true Dwarf Gourami.

Far right, Mr and Mrs Kumar — my generous hosts during my Madras stay.





Mr Kumar sells fish via his own retail outlet housed in Madras Central Railway Station and to several other shops throughout Southern India. Fish sold are mainly Indian-bred 'Singapore' community fish and, although there is only one Aquarist Society in India (based in Bombay) there is sufficient interest to warrant at least one shop per large city.

### THE KUMAR FARM

The nicely arranged aquatic farm is conveniently situated beside a water pumping station. Fresh water is constantly running through all the tanks and ponds, eliminating the need for filters, aside from the cooler covered area where Angelfish are bred. The plot is roughly cut into two containing rectangular concrete vats and several rearing ponds (30 x 15ft) covered in netting for preventing predatory birds from having a feast on the mixture of rapidly-growing fish fry.

Excellent-quality home-bred fish were on show everywhere. Mr B Elamparthy Kumar proudly showed me his superb strain of blood-red golden Rosy Barbs developed by cross-breeding with wild *Barbus conchomias*, and some imported giant speckled Mollies which attain a huge size in the tropical heat. There were also some Tiger Barbs, with their glossed dark stripes cutting vertically into their lime-green bodies. Other cultured aquarium fish included the vivid Blue and Snow White Three-spot Gouramis (*Trichogaster trichopterus*) gloriously frolicking in a water temperature approaching 86°F (30°C).

The best was yet to come for the inquisitive foreigner who had ventured afar to view native Indian fishes. I was informed that the Kumars' fish catchers operate generally in the large tributaries of the Ganges in the Indian States of West Bengal and Assam. The fish are then flown from Calcutta to Madras, a distance of 800 miles. The rich

fisheries of this area contribute enormously to the massive catch of freshwater fish for food consumption. Progress, with the inevitable contamination of wildlife, has not affected the fish population (unlike other Third World countries) because of India's reliance on edible freshwater fish and their extensive culture programme. Therefore, it is pleasing to note that wild-caught fish from India for the aquarium trade are caught in moderation and will not deplete the vast existing stocks.

A small sample of wild-caught species, aside from the Dwarf Gouramis, included another air-breather, the chocolate-brown Spike-Tailed Paradisefish (*Pseudopomacentrus cupanus cupanus*) and its electric-blue, fin-lined cousin (*P. c. deysi*).

Loaches were well represented by a fish commonly sold in Indian aquarists shops, *Bonia sinata*, known as the Striped or Tiger Loach. This 3in (7.6cm) fish displays oblique gold and brown parallel stripes and the wild forms have a crisp orange-coloured snout. Nocturnal and a bottom dweller, this species makes an excellent scavenger in the aquarium. Its geographical range is Central India, embracing the States of Karnataka and Maharashtra.

To the North of India another *Bonia*, the Y-loach (*B. lohachata*), is best described by its attractive Y-shaped pattern on a creamy white background, while the exquisite Necktie Loach (*B. dario*) has a pleasing crisp vertical barring of bright yellow and jet black.

A close relative of the anabantoids (specialist air-breathers) is *Badu badu*. This chain-linked fish can have an extremely variable coloration. A most pleasant form hails from Assam, where this form has dark blue-spotted fins and similarly-coloured, metallic-edged body scales printed onto a pastel-shaded body.

An interesting goby was also found at the farm: the 'Lady Blue'. A small representative

of a large family, its light yellow body has a sprinkling of reflective turquoise dots. The fused pelvic (ventral) fins located on the belly gave a clue to the fast river habitat it enjoys.

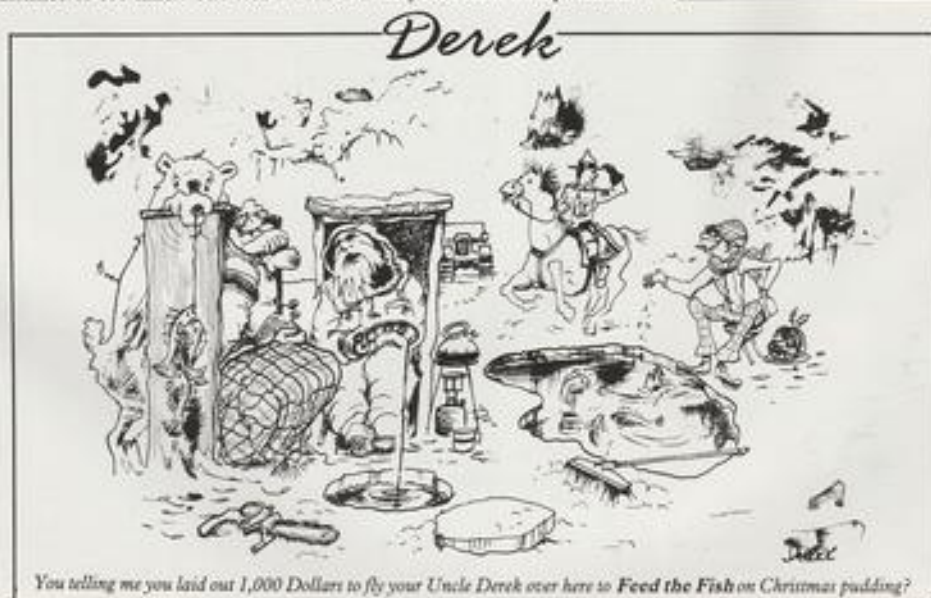
*Chandarama chandarama* attains a length of 2in (c 5cm). This compact little catfish has a dark brown lateral line, diffused and dusted by mottled brownish patches; perfect camouflage among the leafy surroundings where it dwells. *Mamamebebe pancahu*, is a spiny eel often sold for human consumption in fish markets. The fish is said to be mature at 8in (20cm), and, owing to its scavenging behaviour, it can often be found inhabiting decomposing animal corpses in the river beds.

Everything on the fish farm was neatly arranged and I was most impressed by the professional back-up of Dr P Sitar Rami Reddy and several research students working on the premises. One such study concerned the culture of Brine Shrimps bred in earthenware pots; the largest I had ever seen.

India, in my opinion, is one of the leading nations in freshwater fish study, with a rich diversity of species; a paradise for research. It was really thrilling to meet people who are so knowledgeable about their subject. The lasting memory of these warm, honest and friendly people will be uppermost in my mind forever.

### COMING UP IN PART 2

My next article will take me 200 miles north of Madras to the Central Eastern coast area in search of the comparatively newly-described *Anabas oligolepis*. Then, I'll be travelling 500 miles east in search of the dubious *Channa leucopunctata*, first described by a British Army Colonel over 150 years ago. I will be retracing his steps with the use of information gathered in England and in India, and by visiting Government Fishery Departments.



# Books

## THREE NEW LIZARD BOOKS FROM T.F.H.

### 1 LIZARDS

By: David R. Moenich  
ISBN: 0-86622-823-3  
Price: £4.75

### 2 A STEP-BY-STEP BOOK ABOUT PET LIZARDS

By: Ray Stasko  
ISBN: 0-86622-969-8  
Price: £1.95

### 3 A STEP-BY-STEP BOOK ABOUT CHAMELEONS

By: Robert Anderson  
ISBN: 0-86622-488-2  
Price: £1.95

As one would expect from the world's largest publisher of pet books, T.F.H. does things in a big way. Therefore, while others would normally produce one book on a particular subject, T.F.H.'s latest response to the growing herpetological market includes no fewer than three books on lizards alone (there are other new herpetological titles as well).

These three books all have something to offer either the budding or — in the case of *Lizards* — the more established herpetoculturist. Of the three titles, the one that I enjoyed most, by a long way, was the most expensive (but still incredibly cheap!) *Lizards* by David Moenich.

At 128 pages in length, it is double the size of the other two. Yes, I didn't prefer it because of its size alone. It was more a question of the author's approach and very caring attitude towards the animals themselves, including his advice to inexperienced hobbyists not to keep certain species such as the very delicate *Phrynosoma* Horned Lizards. His sensible approach to health, nutrition and care, and the provision of a suggested reading list, all contribute towards making this book a real gem in certain respects.

The other two books cannot, of course, be expected to cover the same amount of ground in half the number of pages.

*Pet Lizards* goes through the basics of starting up and has what I think is a very good section on diseases and their treatments, particularly for such a modestly priced book. Where this one falls down, I feel, is that, despite the author's undoubted concern about the welfare of the lizards, he



seems to show scant concern about some of the live food items, such as rats and mice. Don't they, too, deserve our attention and humane considerations?

I found *Chameleons* both great and disappointing. It was great because, in its limited space, it manages to give the Anoles (*Anolis*) a very fair crack of the whip, and certainly points any potential keeper of these delightful lizards in the right direction.

It was a bit disappointing in the lack of its coverage of diseases, but more so — for European readers, at least — in that, on this side of the Atlantic, a chameleon is precisely that, i.e. a member of genus *Chamaeleo*. In the States, however, a chameleon is a lizard belonging to the genus *Anolis* — a totally different, albeit equally fascinating, animal.

Therefore, if you are European and order this book expecting it to deal with *Chamaeleo* and its care, you are going to be disappointed. If, however, you want to know about *Anolis* lizards, you'll get a fair bit out of this colourful, well-written book. Come to think of it, you'll enjoy this book anyway, even if you thought you were buying a book on *raw* chameleons.

Published in full colour throughout, and at such reasonable prices, all three books are more than worth their cover price and would make great Christmas presents.

John Dawes

## A GUIDE TO THE FRESHWATER FISHES OF SINGAPORE

By: Kelvin K P Lim and Peter K L Ng  
Published by: Singapore Science Centre  
ISBN: 9971-88-225-6  
Price: £6.75

Ask most people what they know about Singapore and they will tell you it's a small island hanging off the bottom of Malaya, and its guns pointed out to sea during the war which didn't help much as the Japanese invaded via the mainland. Ask aquarists, and it's suddenly the birthplace of millions of fish, but, nowadays, with the local fish farms breeding fishes round the clock, it would be hard to know just how many of these are actually indigenous to the island. This small

volume will fill in many more gaps in your fish (and folklore) knowledge of Singapore.

As long ago as the 1880s, destruction of forests led to rapid run-off of water and rising water temperatures and, by 1930, much deterioration of fish stocks had been noticed which, along with the introduction (accidental or otherwise!) of aquarium fishes, led to further depletion of native fishes; one 'innocent party' in all this was the Guppy which, despite 'taking over' water-courses, only did so in streams that were otherwise toxic to native fishes.

Despite its small size, Singapore boasts many different waterways, ranging from tiny crystal-clear, forest streams to large polluted estuaries. In both of these locations (and in all the variations between) fishes can be found, and this book details them all.

Each family is described in similar fashion: the fish may be totally freshwater or estuarine; size; oviparous or ovo-viviparous; solitary or gregarious; omnivorous or carnivorous; surface, midwater or bottom-dwelling; indigenous or introduced; common or endangered. Interwoven with the fish facts are many interesting side comments. Read the real reason for the naming of the Coolie Loach; find out which fish is used to make the Chinese dish 'Clay-pot Fish-head'; which fish's eggs are said to taste better than real caviar... and so on. Later in the work is a real treasure-house of facts for any quiz-setter, together with how fish in general affect the lives of Singaporeans in particular, from decorative additions to keeping off evil spirits — with some medical benefits in between.

Although of modest proportions (some 160 pages), the book is illustrated in full colour throughout and covers 80-90 species in varying amounts of detail. Despite being featured in the lists offered by Steven Simpson (a bookseller specialising in antiquarian books on reptiles and aquaria), the book is a brand new 1990 publication. For those too idle to find his advertisement in the October issue of the *Aquarist & Pondkeeper* (page 95 — Ed!), Steven Simpson's address is: P.O. Box 853, Brighton, Sussex, BN1 5DY (0273 727328). He will be delighted to send you details of his latest acquisitions, but please send an SAE to cover postage.

Dick Mills



## REEF AQUARIUM BOOKS FROM ALBERT J THIEL

### 1 SMALL REEF AQUARIUM BASICS

ISBN: 0-09091-70300-5  
Price: £9.95

### 2 THE MARINE FISH AND INVERT REEF AQUARIUM

ISBN: 0-09091-70100-1  
Price: £10.95

### 3 ADVANCED REEF KEEPING

ISBN: 0-945777-01-9  
Price: £14.95

Publisher: Advark Press  
UK Distribution: Coral Reef Technology Ltd, 62 High Road, Byfleet, Weybridge, Surrey, KT14 7QL.  
Tel: 0932 355121. Fax: 0932 349718

Thinking of setting up a reef aquarium this Christmas? Or, do you know anyone who is... or might be? If so, then you will find that virtually any 'reef' topic you care to

mention (and some others besides) will be covered in some way in one or other of these three books.

To numerous tropical marine hobbyists worldwide, the name Albert J Thiel is almost synonymous with reef aquaria. Indeed, there can be few, if any, people better informed on this subject than the author of these three books (there's a fourth in the pipeline). So, if there's anything you want to know about this fast-expanding side of the tropical marine hobby, you're bound to find one or other (or all) of these texts useful.

Having said that, you may have to struggle a bit (or a lot) for your information. The reason is not that the details are not there — although the actual principles of Reverse Osmosis are missing, despite several references to R.O. filters themselves. It's a more a question of presentation.

Every author has (or should have) his/her own personal philosophy and way of communicating and presenting information. Albert Thiel, not surprisingly, has his own distinctive, unique way of going about things. For instance, two out of the three books don't have an alphabetical index at all. Instead, they have very comprehensive Tables of Contents... right at the back where one would expect to find an index. The exception is *Advanced Reef Keeping*, which has both an index and a Table of Contents... again, both at the back.

The result of this unusual arrangement is that some of the topics are hard to find in both *Small Reef Aquarium Basics* and *The*

*Marine Fish and Invert Reef Aquarium*. When you do find them, though, the information is pretty comprehensive and authoritative, just as you would expect.

For the first-time or potential 'reef' aquarist, *Small Reef Aquarium Basics* is undoubtedly the most useful of the three books. Despite its 'Basics' label, though, this book deals with numerous topics in considerable depth, providing the newcomer with a very sound grounding in the art of artificial reef-keeping.

The other two books take matters further, dealing with a wider range of topics than I have seen covered in any other 'reef' books. *Advanced Reef Keeping*, in particular, seems to "go where no other book has gone before" in the breadth and depth of its treatment.

What all three texts possess in terms of content, they lack in terms of colour, something that is of great significance to some hobbyists, but considerably less so to those others who seek information and advice, rather than sleek presentation. Even so, more extensive use of explanatory diagrams and graphs would have helped, without significantly putting up the cover prices which, when you consider what you get for your money, are very reasonable indeed.

In my view, all three books are well worth having in their own right. However, for really comprehensive coverage, the serious 'reef' aquarist should consider getting all three... plus the fourth one, of course, when it comes out.

John Dawes

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# PRODUCT ROUND-UP

BY DICK MILLS

## PETINDEX NEWS

### INTERPET

Fighting a rearguard action is not what we would normally associate with a company such as INTERPET who are usually to be found leading aquarium technology from the front. However, REARGUARD is the name of their latest product which has (by virtue of its inclusion in these columns) some aquatic connections.

In garden matters, any remedy usually carries some form of pet warning during its use. Rearguard is different: while, basically, a liquid deterrent used to keep dogs and cats from fouling flowerbeds, any spillage (or wind-driven excess spray) finding its way into the pond will not harm the fishes. Now, just suppose, that spraying the pond surround also kept moogies away from the pond too... what an additional selling point!

If you are also as Wild About Animals (as you obviously are about fishes) then you will be interested to learn that, as from October, Interpet are the sole pet trade distributors for the magazine of the same name.

Details from: INTERPET LTD, Vincent Lane, Dorking, Surrey, RH4 3YX. Tel: 0306 881033. Fax: 0306 885009.

### AB-AQUATECHNIK NEW TECHNOLOGY

Just like the Motor Show, there's always one product that takes one's breath away, and the aquarium displayed by AB-AQUATECHNIK didn't even have anything in it - not even water! It was really the equivalent to a Rolls-Royce and, to be churlish, you could say it would take all the fun out of fishkeeping, such as the comprehensiveness of its self-monitoring technology.

Along the top edge of the aquarium cabinet, running the whole length, were LED displays referring to pH, Water Conductivity, Redox Potential

and Temperature (hang on, there's more); the upper and lower limits of these parameters can be programmed in and, according to information fed in to the computer (yes, there's one of those, too!) the relevant automatic action is taken to correct any deviation from the norm. Water levels are similarly maintained via computer-controlled pumps and reservoir, and we haven't got round to the lighting yet.

In the 'hood' are two metal halide lamps (on sliding adjusters to allow exact positioning over the tank, according to the tank's dimensions) and two fluorescent actinics; a spectrum correction filter maintains natural light colour distribution throughout the lights' working life of 4,000 hours. (There's also a 'moon-light' facility for the benefit of dim-light feeding invertebrates.)

The filter systems are no less sophisticated, with an internal semi-dry trickle filter and a multi-filter, having a two-position pump which allows any chosen filter medium to be used either in conjunction with a foam filter, or separately.

By now, you will have got the picture, but there are still CO<sub>2</sub> and Ozone-injection systems, UV tubes and warning lights about voltages in the water, to say nothing of water treatments, remedies and foods!

Coming back to earth again (it wouldn't all go in the back of the car anyway), their UK distributors, NEW TECHNOLOGY

LABORATORIES, were displaying several other more, mere-mortal achievable products: a range of smart, black-topped system-built NT AQUARIUMS (excluding electrics), each available with its matching black-laminate stand if required. The six sizes encompass the 45-litre, 18in 'Cube', to the 300-litre, 48in long by 26in deep and 19in wide oblong aquarium.

Their new disposable MDM FILTRATION UNIT works either with an existing external power filter system or just with a water pump; several can be used in series with each other (each containing differing filter media) and any can be independently switched in or out by a bypass to facilitate cleaning or replacement.

ULTRA-ZORB is an ultra-active, combined filter medium to remove ammonia, nitrate and phosphates, and can be incorporated in any filter system. ACTIZYME is a biological filter 'starter' which also destroys silt and sludge. DISEASOLVE, the well-known aquarium anti-septic, is now being marketed by NT Laboratories.

Full details from: NEW TECHNOLOGY LABORATORIES LTD, Unit 13, Branbridges Industrial Estate, East Peckham, Tonbridge, Kent, TN12 5HF. Tel: 0622 871387.

### DALE-CRAFT

Gone are the days when a trip to the Yorkshire Dales meant risking the car's suspension

(and possible confrontation with conservation-minded local law!) as you drove home with 'aquarium-suitable' rocks.

DALE-CRAFT (well, it'd ruin the opening paragraph if they'd called it anything else!) now provide the very thing in the shape of resin-moulded replicas of dry-stone wall materials. A whole range of craggy walls, slate caves, tunnels, bridges etc, all made from aquarium-safe, hand-crafted materials, will give the aquarium both a natural look and more useful sanctuaries for the fish. Most have a flat top, so fabrication of larger assemblies is easily achieved to suit the hobbyist's every need.

If you're not entirely 'rock-orientated', then there is a range of branches, stumps, logs and even 'corkbark' to lend extra materials to your artistic creativity.

All 'stone' models are available in black, grey or brown; all 'wood' models in standard wood colours or black; for an extra payment all models can be coloured as required.

Details of DALE-CRAFT from: B T FODEN Aquarist, 16 Thornhill Road, Longwood, Huddersfield, West Yorkshire, HD3 4UL. Tel: 0484 645324.

### BLUE WATER ENTERPRISE

The geographical lengths that we go to to obtain fishes for the aquarium may seem extreme, but no less are the distances involved for aquarium decorations.

The latest source is Indonesia and BLUE WATER ENTERPRISE are the suppliers of INDO-WOOD, very attractive aquarium bogwood roots. Unlike some pieces of wood which resemble offcuts from the ark, these roots have the advantage that they are 'scale-correct', even for the smaller aquarium. They are to be shipped to wholesalers in 15kg bags



New Technology's brand-new range.



in three specific sizes: Medium (10-12in), Large (13-16in) and Extra Large (16in plus); with common bag-weights, the pieces of wood are packed 15, 10 and 6 to the bag respectively.

Details from: **BLUE WATER ENTERPRISE**, 102 Shrewsbury Avenue, Kenton, Middlesex, HA3 9NF. Tel: 081 204 1278. Fax: 081 206 0467.

Indo-wood is also handled by: **J & K AQUATICS LTD**, The Old Stable, rear of 28 High Street, Wellington, Somerset, TA21 8RA. Tel: 0823 664431. Fax: 0823 666180.

## PENN-PLAX

Want a filter with all the performance of a remote Power Filter but with all the convenience of a hang-on type? **PENN-PLAX** took APPMA's First Prize for the Best Aquarium Product of the Year (1989) with their **CANISTAR**.

Doing away with all those kinkable (and potentially-leakable) hoses, the hang-on Canistar forces all the aquarium water under pressure through the centrally-positioned, non-bypassable filter-medium. It also offers a multiple choice of media disposable cartridges and floss, diatomaceous earth, carbon, zeolite etc. Low consumption, yet with variable flow, 155 gallons/hour performance (slightly less for UK gallons), it also performs well in the price market, too.

Penn-Plax's UK Distributors, **RENA**, were showing off some new equipment, too.

The **ROMANO INDOOR FOUNTAIN** features a double-sided display topped by a rectangular container: one vertical side has two semi-circular troughs, the other has one trough with a Lion Head above it, through which water emerges. Made in slightly pink-tinted, antique terracotta, and powered by a C20 pump, it can be filled with pebbles or small water-loving plants to provide a small 'alcove-interest'.

The large C60 PUMP forms

the basis of several filter arrangements including a **PONDFILTER**; the size of the prototype foam filter attachment has to be seen to be believed! Most **RENA** filter sponges have rigid, perforated supporting cylinders which may be filled with resin or carbon to provide high-quality water conditions.

The C40 pump is also pressed into good service as the S40 **PONDFILTER/FOUNTAIN** with clip-on, extendable filter cartridges.

Brighten up the dark evenings with a **RENASPOOT** compact, waterproof lamp. Supplied with a step-down transformer and red, green and clear lenses, this 12v light can be clamped to any underwater fountain stem (to transform the otherwise dark pond), but can also be used out of water for pondside illumination purposes.

Details of Penn-Plax and Rena Products from: **RENA UK LTD**, The Bury Farm, Pednor Road, Chesham, Bucks, HP5 2JU. Tel: 0494 786759. Fax: 0494 791617.

## NEW WORLD AQUATIC DISTRIBUTORS

Look out! The Indians are coming! But before you take to the hills, there's nothing to worry about; the Indians in question are ladies of the



New World's spectacular new Rainbow Rocks

Navajo tribe who are diligently carving away preparing **NEW WORLD AQUATIC DISTRIBUTORS'** new range of **RAINBOW ROCKS**.

The purple, red and orange colours of the rocks (from Utah) are ideally suited to creative carving which accentuates their natural strata which, in turn, make for excellent aquarium decoration, especially when colour co-ordinated with matching gravel, stones and pebbles. This latter factor is very high on the company's marketing policy, as is its reliance on using purely natural materials, whether they be **TROPICAL ROOTS, STONES or WOODS**.

The newly-formed company made an instant impression on visitors to **PETINDEX**. They did excellent business (in the six-figure region) and hope to realise more than a ten-fold improvement on this within the very near future.

Of course, they didn't do it all on their own, for in addition to some very eye-catching Red Caps in a smart black aquarium (furnished with contrasting Italian marble pebbles over a German black granular base), they had perhaps a little supernatural help in the shape of a pair of Chinese Foo Dogs flanking the entrance to their display. According to custom, anything that passes between the dogs brings good luck or, in this case, good business!

Details of Rainbow Rocks and all other products from: **NEW WORLD AQUATIC DISTRIBUTORS LTD**, Cardiff Road, Glan-y-Llyn, Taffs Well, Cardiff, CF4 7QQ. Tel: 0222 810663. Fax: 0222 813519.

## JERRARD BROS

No doubt you've always admired those high-powered lamps hanging low over superbly set up aquariums, but always wondered about their awkward position during tank maintenance.

**JERRARD BROS** have come up with the answer, incorporated in their **ARCADIA HQI PENDANT LAMP** - it's fitted with a 'rise and fall' unit, but that's only one of the attractions in this new lamp. Utilising the

latest single-ended metal halide lamp from Phillips (MHN-T), the lamp reflector itself is surprisingly cool to the touch owing to the starter being housed in the 'ceiling rose', leaving only the igniter remaining in with the lamp. The outer glass of the bulb absorbs UV (having no UV filter also reduces the price!), while the reflector cleverly mixes together the separate colours formed within the lamp by the different gases, and a pre-focus lampbase maintains a high beam intensity of an extremely stable colour, to render colours even more accurately.

Despite the lamp's high light output, fish will not be stressed by sudden 'switch-ons', as the lamp takes about 8 minutes to attain full brilliance.

For aquarists who prefer the format of fluorescent lamps, Arcadia's **AQUASTAR** is designated the 'Ultimate Aquarium Lamp' by the manufacturers, being suitable for both freshwater and marine use. The Aquastar range is comprised of 8 lamps - 18, 24, 30, 36, 42, 48 and 60in (the 24in length comes additionally in a 1.5in diameter tube, all the rest are 1in diameter), or expressed alternatively as 15, 18\*, 20\*, 25, 30, 38, 36 and 58 watts (\*refers to the two different diameter 24in tubes and, unusually, the 42in consumes more energy than the bigger 48in).

These new tubes are energy-saving, are claimed to be of unequalled quality, provide superb colour rendition and, at the top end, represent a money-saving of approximately £4 over the lamps' long lifetime, used 10 hours per day. If you already have Arcadia starter equipment for your existing 1.5in fluorescents, don't despair - there are Arcadia **LAMPHOLDER ADAPTORS** available to convert down to the new 1in sizes.

Full details from: **JERRARD BROS plc**, Cairo New Road, Croydon, CR0 1XP. Tel: 081 688 8222. Fax: 081 681 3119.

## PRODUCT NEWS

### TECHNICAL AQUATIC PRODUCTS

If you're finding it difficult to spot that special treatment on

dealers' shelves, then very soon the **TECHNICAL AQUATIC PRODUCTS** range of products should be sticking out like the proverbial sore thumb.

Now operating from two sites in the Bristol area, a new 14,000

sq foot site helps to produce 120,000 bottles a day with its new automatic bottling, sealing, capping and labelling production line.

Ever conscious of increasing efficiency with reduced costs,

the company is achieving this laudable situation by using the Mercury phone system and using recycled paper for several boxed lines.

TAP's new catalogue is available from: **TECHNICAL**



**AQUATIC PRODUCTS**, 542 Filton Avenue, Filton, Bristol, BS7 0QG. Tel: 0272 692345/799 852. Fax: 0272 236478.

## ROLF C HAGEN

Hardly had the ink dried on the *Marines 'Question and Answer' Supplement (A & P,*

October 1990), than the answer came to my query about plastic plants for marine tanks.

**HAGEN** have just the thing: a range of **MARINE SCAPERS**, no fewer than twelve replicas of coral reef flora each in four different sizes (5, 8, 12 and 15in). The green Baby Bows and Sea Ruffle are supplemented by reds and gold colours of

such models as Pacific Pod, Devil's Horns Sea Trees, Dragon's Tongue, Neptune's Comb and Rock Fingers, to name but a few. Now your marine fish can feel right at home without any freshwater substitutes. So, raise any query about product availability in **Product Round-Up** and see where it gets you! Congratulations for Mermaid's

sharp-eyed reader, and to Rolf C Hagen for already having thought of it! Now, for my next idea . . .

Details of all Hagen products from: **ROLF C HAGEN (UK) LTD.**, California Drive, Whitwood Industrial Estate, Castleford, West Yorkshire, WF10 5QH. Tel: 0977 556622.

## NEW PRODUCTS

### ARMITAGES

We seem to be starting several product references with a 'well-known phrase or saying' this month.

'Prevention is better than cure' say **ARMITAGES** and have taken that truism as the motto for their range of six new aquatic remedies. Many of these remedies attack the primary cause of the problem, rather than treat the subsequent symptoms. Thus, by creating the perfect environment in the aquarium, most fish problems can be avoided.

The six remedies under the **NIMROD** brand are:

**Tankguard** — a dual-purpose product for disinfection of tanks and nets, and also as a remedy for certain bacterial conditions such as cotton mouth and other parasitical infections.

**Tapwater Treatment** — a low-cost, multi-function remedy for use when starting up an aquarium, or during water changes. Along with a dechlorinating agent, it contains an enzyme/bacteria mixture to promote growth of useful bacteria in the aquarium.

**Aqualab 2** — two test kits in one carton for testing pH and Nitrite.

**Aquatonic** — essential vitamins and trace element additives; they are especially useful for fish stressed from disease or transportation.

**Plant Food** — almost unnecessary to describe but promotes healthy and vigorous plant growth.

**Multicare** — a general remedy for all stress-induced diseases; eliminates the need of dealer and hobbyist alike to stock a wide range of individual remedies.

Further details from David Griffin, Product Manager at: **ARMITAGES PET PRODUCTS**, Colwick Industrial

Estate, Nottingham, NG4 2BA. Tel: 0602 614984. Fax: 0602 617496.

### B & R ELECTRICAL

'Be Safe, Not Sorry' — Use an **RCD** is RoSPA's advice and, in the hazardous fish-house area combining a wet/damp floor with mains electricity in the immediate vicinity, it is very sound advice indeed.

**RCD's** are Residual Current Devices which switch off the supply should a short circuit (cut cable), an earth leakage fault, a neutral or earth input be lost, or even a reversed live/neutral wire connection occur.

**B & R ELECTRICAL's** Powerbreaker Safety RCD Adaptor trips at 30mA in 30 milliseconds (30 thousandths of a second) and is used simply as an ordinary power socket adaptor. A test button ensures the unit is working correctly; the unit will also detect faulty wiring to the socket. The manufacturers are quick to point out that, despite the excellence of their product, the usual precautionary techniques must still be practised when using electrical appliances: **(ALWAYS DISCONNECT WHEN ADJUSTMENTS ARE TO BE MADE)**. Retail price is just under £20.

Details from: **B & R ELECTRICAL plc**, Templefields, Harlow, Essex, CM20 2BG. Tel: 0279 34561.

### OCEAN FILTRATION SYSTEMS

Readers of the many 'Table-top' books on fishes will often have been disappointed with the colours of genuine 'on the reef' photographs, when all the television nature programmes would lead us to believe that the stunning colours are there all

the time. This is due to the fact that the undersea world is illuminated very differently to ours, with the full colour spectrum of light being curtailed as the water depth increases. Now, surely no-one, not even the most rampant purist, wants their marine aquarium to look exactly natural, ie, in dim blues and greys, do they?

**OCEAN FILTRATION SYSTEMS** have done much research on lighting for the marine aquarium, not just into the rendition of colours, but also into what exactly are the requirements of living invertebrates, such as corals and anemones, not forgetting macro-algae.

Their newest fluorescent lamp is called **ACTINIC-DAY** and combines the qualities of light as received by the marine animals in nature, and that required by the viewing hobbyist to present them in the colours we like best; in short, a 'Slice of the Sun' as seen from under the water.

Available in 24in — 60cm (20 and 40 watt), 36in — c 90cm (30 watt) and 48in — c 120cm (40 watts), the lamps are said to be 70% more actinic than comparable tubes. Prices range from £26.10 to £36.55 from your local stockist or by direct Mail Order post-free.

Details of Actinic-Day fluorescent tubes, together with an excellent explanatory guide to aquarium lighting, from: **OCEAN FILTRATION SYSTEMS (UK)**, 102 Coventry Street, Kidderminster, Worcestershire. (Tel: 0562 515539 Fax: 0562 829667).

### LOTUS

As the sun went down on another great summer, the energy behind the coldwater scene remained high, and **LOTUS** prepared for re-emergence on to the 1991 stage.

Not just content with reshaping the Company and taking on more people, the product line-up for next year includes a totally new range of hi-tech **POWER PUMPS**, new technically advanced **POND LINERS** and a unique line in **WATER FILTERS** design. **UNDER-WATER LIGHTING** and above-pond **WATERCOURSES** have also been transformed.



Lotus' recommendation for winter pond protection

Looking towards winter, Lotus stress the importance of keeping the pond well ventilated, and partially ice-free, to disperse methane and hydrogen sulphide gases; the **LOTUS POOL HEATER** will ensure an area of water is kept clear of any ice formation, and one such heater per 25-30 sq.ft of water surface area is recommended. In addition, the reduction of ice formation in only a small area of the pond helps to reduce the pressure against the vertical walls of any concrete-sided ponds and prevents cracking.

A brochure, **'THE WATER GARDEN MARKET' — Getting Your Share** will ensure the Trade knows what to expect, and you can get details of all the new products from: **LOTUS WATER GARDEN PRODUCTS LTD.**, 260-300 Berkhamstead Road, Chesham, Bucks. (Tel: 0494 774451).



# Herpetology matters

By Julian Sims

## Impulse turtles

A wave of enthusiasm for Donatello, Michaelangelo, Leonardo and Raphael is currently sweeping Britain. No, this is not an upsurge of interest in the work of Renaissance painters — it is for the Teenage Mutant Hero Turtles. These crime-fighting humanoid reptiles originated as 'Mutant Ninja Turtles' in North America in a cartoon series. In Britain, their popularity has been boosted by a wide variety of products including comics, toys (cuddly or otherwise), bedspreads, pencil cases, a series of BBC children's television and a collection of medallions which are on sale in a well-known chain store or have been given away in daily newspapers.

If anything, this demand for items to satisfy 'turtle mania' is likely to increase following the release of a block-busting movie. Such a marketing hype, associated with the characters in a film on general release, is known in the motion picture industry as a phenomenon. These have come, and they have gone, in the past with relatively few problems. For example, the memory of a model of C3PO or R2D2 from Star Wars — purchased in the mid-seventies — would only bring a slightly embarrassed smile to the face today.

However, the purchase of a live 'turtle' for Christmas might cause very real problems in years to come. Unfortunately, 'turtle mania' has caused an increase in demand for hatchling Red Eared Terrapins (*Pseudemys scripta elegans*) from the United States of America.

These tiny reptiles, about the size of a ten pence piece, with light green carapace (the upper half of their shell) and orange-red flashes behind their bright eyes, always look most appealing. Undoubtedly, many herpetologists started their interest in reptiles and amphibians by keeping these aquatic reptiles. But attention must be drawn to the downside in the current 'turtle boom'.

If hatchling terrapins are kept in poor conditions with an inadequate diet, they quickly

develop the symptoms of mineral and vitamin deficiency — 'soft shell' and swollen eyes. These miserable creatures die within a matter of weeks. This is one of the worst examples of the squandering of animal life that can occur. It can only be compared to the sale of cut flowers, which are known to have a very limited life at the time of purchase.

Hatchling terrapins which are maintained in suitable conditions certainly cannot be regarded as 'cheap pets'. They should not be bought on impulse and without due thought and consideration. A large aquarium with warm water (thermostatically controlled) and a basking island illuminated by a suitable fluorescent tube are essential requirements.

around £2.75 each, the purchase of the necessary equipment and the on-going provision of an adequate diet add considerable expense.

One final problem must also be contemplated. Red Eared Terrapins maintained in suitable conditions grow to become quite large reptiles — a female Red Ear can achieve a carapace length of 23cm (9in). Large terrapins obviously need very spacious aquatic conditions in which they can swim. Thus, after about five years, many terrapin owners look for an alternative home for their reptiles.

Every zoo in the country receives many phone calls per week from owners who can no longer cope with their terrapins and who want to give them

dilemma, while proving to be a useful and much appreciated present.

Steven Simpson: *Natural History Books* offers a wide selection of titles by mail order. Not only does he supply a range of books on herpetology — new and secondhand, current and out-of-print — but he can also supply books on other aspects of natural history, including fish and titles from the famous Collins *New Naturalist* series. A copy of Steven Simpson's current catalogue can be obtained by writing to him at the following address:

Steven Simpson,  
PO Box 853,  
Brighton, BN1 5DY.  
Tel: 0273 727328.

One of the books that Steven Simpson can supply is: *Turtles, tortoises and terrapins* by Fritz Jurgen Obst. This book, which is published in East Germany, has been translated into English from the German by Sylvia Furness and is available as the 1986 "Edition Leipzig".

The 231 pages are packed with information presented in a fascinating style. The text is divided into a preface, followed by six chapters, with reference material in an appendix.

Throughout the book, emphasis is given to the environmental biology of this group of reptiles. For example, the adaptations to habitat which have been developed by specific terrestrial and freshwater chelonia, are explained. The text is adequately supported by diagrams, including those showing the diversity of ecological niches chosen by North American terrapins and the courtship behaviour among terrestrial and amphibious chelonia.

The six chapters cover such topics as SOS on tropical coasts, chelonia of the world, their evolutionary history, geographical distribution, anatomical details and details of chelonia in human history — for example, on stamps, on coins and as ornaments.

The appendix contains a list of Latin scientific names, together with the countries and regions of the world where different species occur.

This book is richly illustrated with many black and



Always appealing — but Red Eared Terrapins grow to become large, and often aggressive, reptiles.

An external power filter can be useful in helping to keep the water clear, thus increasing the time before all the water in the tank needs to be drained out and replaced. The diet should be as varied as possible, and include pieces of raw, lean beef, small earthworms and TETRA ReptoMin food sticks. Feeding terrapins with chicken or pork products — either cooked or raw — should be avoided. This precaution will help prevent infecting terrapins with *Salmonella* bacteria — a group of rod-shaped bacteria which can cause food poisoning.

Therefore, although the initial cost of a hatchling terrapin is relatively inexpensive,

away. Large terrapins are already a problem, but the increase in demand for hatchlings in 1990 merely to satisfy 'turtle mania' will undoubtedly aggravate this situation, adding to the surfeit of these large reptiles from 1995 onwards.

## Book presents

With the approach of Christmas, an ever-increasing amount of thought may be focused on trying to solve that annual problem — "What on earth do I buy for the herpetologist in the family?". A book might well be the practical solution to this



white and full colour photographs, including eleven colour photographs 23 x 27cm (9 x 10 1/2 in), the page size of this edition.

All in all, this is a delightful book which is highly recommended. It is certain to appeal to everyone who is enthusiastic about herpetology in general, and chelonians in particular.

## Turtle Code

Although turtles (marine chelonians) are usually thought of as being colonists of the warm seas and oceans of the world, five of the seven species of turtle actually occur in the seas around Britain. The earliest definite record of turtles swimming close to the British coast dates back to 1684 when these reptiles were sometimes caught off the Orkney Islands.

The Leatherly Turtle or Luth (*Dermochelys coriacea*) is the most common species to be sighted around the coast of Britain and is usually seen from June to November. The other species of turtles are more often seen from October onwards through the winter months. Most are Loggerhead Turtles (*Caretta caretta*) which are carried across the Atlantic Ocean from the coasts of North and Central America by the Gulf Stream.

The next most frequent species of turtle to be seen is Kemp's Ridley (*Lepidochelys kempi*). This is a particularly endangered species, only nesting on beaches in the Gulf of Mexico. Hawksbill (*Eretmochelys imbricata*) and Green Turtles (*Chelonia mydas*) have only occasionally been reported off the British coast.

Turtles throughout the world are endangered for a number of reasons. For example, oil pollution at sea is a major threat, while nesting beaches on the Greek islands are disturbed by tourism. Leatherly Turtles eat submerged plastic bags in mistake for their more usual diet of jellyfish. These bags can then choke and kill these reptiles.

While they are in British waters, all marine turtles are given some protection by the Wildlife and Countryside Act, 1981. Under the Act, it is illegal to:

- (i) deliberately kill a turtle;
- (ii) land a live turtle unless to tend a wound. The reptile must be released at a later date;

- (iii) process a dead turtle or its shell, unless the reptile died accidentally. Turtle products should not be displayed for commercial purposes or sold.

In order to ascertain how frequently marine turtles visit our coastal waters, it is most important that details of any turtle sightings are recorded. The shape, colour and pattern of the shell should be recorded, together with the date and region of the coast where seen. The flippers of female turtles are sometimes tagged when they visit their traditional nesting beaches.

If it is possible to read the tag, then it would be helpful to include this number with the previous details, sending all the information to:

**The Natural History Museum,  
Cromwell Road,  
London, SW7 5BD.  
Tel: 071 938 9292.**

Unfortunately, turtles sometimes become caught in the nets of trawlers or entangled with a crab or lobster line. Trapped turtles can drown or die from shock. Even if entangled turtles are found before they have died, it takes time and care to release them from fishing gear because these reptiles have very powerful flippers. During their struggle for freedom, active turtles may suffer respiratory collapse or even cardiac arrest.

Large turtles found stranded on a beach may have been injured by the propeller of a boat. Young turtles get washed ashore because they are vulnerable to shock and inactivity as a result of low water temperatures.

Further advice as to the course of action to be taken should you find a live, stranded turtle can be obtained by telephoning the **Nature Conservancy Council** on 0733 40345.

The NCC also publish *The Turtle Code*. This informative double-sided sheet gives practical instructions about what to do in order to rescue entangled turtles from fishing gear. Five black and white illustrations will prove helpful in the identification of turtles seen around the coast of Britain. A copy of *The Turtle Code* can be obtained from:

**Species Advice Branch,  
Nature Conservancy Council,**

**Northminster House,  
Peterborough, PE1 1UA.**

## Lizard eggshell structure

Detail study of the eggs of the Zebra-tailed Lizard (*Callisaurus draconoides*) from the south-western United States of America, has provided important information about the general structure of squamata (lizard and snake) eggshells. Very high, three-dimensional magnification, made possible by the use of a scanning electron microscope, has revealed that the outer calcareous layer forms only a small proportion of the total thickness of the complete eggshell.

This thin, outer calcified crust 'sits' on top of an underlying fibrous shell membrane. This is very different from the eggs of crocodylians, chelonians and birds. Eggs laid by these vertebrates have a thicker calcareous layer as the outermost part of their shell. Embryos from these groups contain more calcium at the end of their development (just prior to hatching) than was present in the yolk when the egg was laid. Thus, some of the calcium required for embryonic development is drawn from a source other than the yolk, and that source is the shell.

However, with the embryos of the Zebra-tailed Lizard, all of the calcium needed for their development comes from the yolk. No calcium is obtained from the outer layer of the shell. This fact was discovered at the Colorado State University, USA. Biologists at Colorado State observed that, even when they incubated *Callisaurus* eggs which totally lacked an outer calcified crust, normal hatchlings emerged.

Microscopic examination of the membrane underneath the thin calcareous crust has revealed that it is composed of many layers of fibres. Some of the fibres are organised into a series of undulating waves which are important in allowing the egg to swell during incubation. Swelling is possible by the levelling out of the alternating crests and troughs of the waves into a more even shape. Further swelling is permitted by the stretching of the fibres in the membrane.

Swelling of the eggs occurs because water is absorbed dur-

ing incubation. The crystalline structure of the calcareous crust of *Callisaurus* eggshells does not, however, form a barrier to the entry of the water. Absorption of water allows the embryo to use all of the food stored in the yolk and grow larger before hatching, a definite advantage since larger hatchlings have a much better chance of survival.

## Product update

**Standardised BETADINE Antiseptic Solution**, suitable for treating external wounds and fungal infections on reptiles, is manufactured by **Napp Laboratories Limited**. Their head office in England is now at:

**Napp Research Centre,  
Cambridge Science Park,  
Milton Road,  
Cambridge, CB4 4GW.**

This antiseptic solution contains Povidone-Iodine and is available (without prescription) from chemists and pharmacists — although it might have to be specially ordered. Standardised Betadine Antiseptic Solution acts rapidly against a wide variety of disease-causing organisms including Gram-positive and Gram-negative bacteria, fungi, protozoa and viruses. It is also active against bacterial spores. Betadine Antiseptic Solution not only acts against these pathogens if they have infected a reptile, but it also protects against invasion through a new wound or injury.

The multi-mineral and vitamin supplement, **VIONATE POWDER**, which can be used to dust the food of some species of reptile and amphibian, is now manufactured under licence by:

**Ciba-Geigy Agrochemicals,  
Whittlesford,  
Cambridge, CB2 4QT.**

In case of difficulty in obtaining this product, then contact:

**Polcrome Limited,  
11 Mount Road,  
Feltham,  
Middlesex, TW13 3JG.**

It is most important to buy fresh stock of Vionate Powder, or any other food supplement for that matter. A long 'sell by' date will guarantee that the vitamins contained are still viable and that they have not deteriorated.



# News

## THE BIOLOGY AND CONSERVATION OF RARE FISH (Symposium Report by Dr Patricia Almada-Villela)

This symposium, organised by the Fisheries Society of the British Isles, and held at Lancaster University between 16-20 July, 1990, was the first major international gathering of fish conservationists as it included around 150 participants from 30 countries.

The main themes of the symposium were:

- (a) threats to fish;
- (b) review of present status of fish species throughout the world;
- (c) biology of rare species;
- (d) methods of managing fish conservation.

There were a number of invited papers, while the rest of the contributions were in the form of poster presentations.

The general feeling from the meeting was that the present attitude regarding fish conservation must change and that increased attention should be given to this cause.

The conclusions and recommendations will be published in the Proceedings, a special issue of the *Journal of Fish Biology*. However, they can be used now for any purpose, provided that this is to further fish conservation.

During the symposium, there were meetings of the various SSC fish groups, such as the Freshwater Fish (chaired by Dr Chris Andrews, London Zoo),

Coral Reef Fish (chaired by Dr Don McAllister, Canadian Museum of Nature and International MarineLife Alliance, Canada) and Fish Advisory Groups (chaired by Dr Peter Maitland, Fish Conservation Centre, Scotland).

The conference was superbly organised and the presentations were extremely interesting. The amount of information already available for some areas, such as North America, Australia, New Zealand and South Africa, provided a good framework for the meeting. Less-known areas and faunas were, however, also present, with valuable contributions from participants from Mexico, Chile, South-East Asia, China and Eastern Europe.

It is hoped that many more gatherings of this type take place on a national and international basis to continue furthering fish conservation.

### MAJOR CONCLUSIONS

The Conference concluded that:

- ① There is overwhelming evidence from many parts of the world that fish species, particularly in freshwaters, are becoming endangered or extinct at an increasing rate.
- ② A reasonably diverse and stable fish fauna is a major component of an ecologically "healthy" aquatic system.
- ③ Of the many threats to fish, the destruction of habitats and growing demands on water extraction and use are usually the most severe and are bound to increase.
- ④ Nevertheless, with care and foresight, based on a sound

knowledge of fish ecology and genetics, relatively modest adjustments to water resource and other development may often be possible which would greatly reduce the risk to the fish fauna and their habitats.

- ⑤ Attempts to increase the fish productivity of established natural systems are unlikely to have lasting beneficial effects and may often cause adverse and irreversible changes.
- ⑥ Every effort should be made to establish balanced and viable fish populations in man-made or already disturbed water bodies, using sound ecological and genetic principles.

### MAJOR RESOLUTIONS

The 150 participants from 30 countries urged, through whatever means may be appropriate, to:

- ① Draw the attention of national and international bodies to the urgent need to give fish a comparable conservation status to that already given to birds, mammals, and other vertebrates.
- ② Give due weight to the conservation of fish fauna in environmental planning, impact assessment, and execution.
- ③ Support schemes for improving the recording and monitoring of fish faunas.
- ④ To make every effort to inform the public about the urgent need for fish conservation and to give greater emphasis to fish biology, taxonomy, ecology and genetics in all levels of school and higher education.

## AIR CONDITIONING FOR FISH

Many people would think that tropical fish, sea anemones and corals would need keeping nice and warm.

But, as aquarists know only too well, if they get too hot, like most humans, they suffer.

So, as part of a sizeable investment doubling the space

and quadrupling the amount of stock it can hold, Peterborough's Water Zoo has installed a sophisticated air conditioning system designed specifically to keep the water temperature in their tanks to a constant 77°F (25°C).

The system at the Lincoln Road premises has been designed and installed by the Cambridge-based John Adcock refrigeration and air conditioning group, who have seven regional offices, one in Fengate, Peterborough.

"We have to use electricity for lighting the premises and tanks, and for driving the recyclable water circulation system, so a lot of heat is generated in addition to the normal ambient temperature," said Water Zoo's senior partner, Roy Scott.

"In extending the premises we decided to tackle this problem head-on, and the answer was air conditioning. Basically, the system keeps service channels between the rows of tanks cool, and this, in turn, keeps the water in the tanks cooler than it would otherwise be.

The Water Zoo was set up by Roy Scott 4½ years ago, turning a hobby of 40 years into a professional activity. "I got fed up travelling 100 miles to find some groovy shop which had only half the stock it advertised. The aquatic business generally still has a cloth cap image, but we set out from the start to provide the best display of stock in the best conditions. We now get regular customers from as far away as the North and London," he said.

The system installed by Adcocks is based around four Toshiba units and IMI equipment and has the job of keeping well over 7,500 fish and other marine and freshwater animals cool and happy.

For further details of Water Zoo contact Roy Scott, The Water Zoo, 437B Lincoln Road, Millfield, Peterborough. Tel: 0733 312142.

Further information on cooling units and associated equipment from John Adcock Refrigeration and Air Conditioning Ltd, Unit 5, London Road, Sawston, Cambridge, CB2 4EG. Tel: 0223 834189. Fax: 0223 837116.







Common or Smooth Newts, *T. vulgaris* — a group of recently metamorphosed specimens.

## EUROPEAN NEWT REVIEW

Some are rare, some are common — all are here, in Marc Staniszewski's comprehensive guide to the European representatives of the genus *Triturus*.

**T**he genus of typical newts called *Triturus* are widely distributed throughout Europe, North Africa and Western Asia. They belong to the important family Salamandridae which also includes *Salamandra* (typical salamanders) and *Euproctus* (mountain salamanders) to name but a few.

Twelve species of newt occur in Europe (including European Turkey) among which are some of the most beautiful and rarest of all known amphibians. Overall, their range covers a wide area of Europe, even northern Sweden in the Crested Newt (*Triturus cristatus*), although several species have a very

limited distribution. The one thing they all have in common, without exception, is the need for a body of water to breed in, whether this be a pond, stream, garden pool, cistern or puddle. Although some species can be encountered in relatively dry areas, seemingly far away from water, then either underground springs, seasonal pools or streams must be in the vicinity.

### WHERE TO OBTAIN NEWTS

European newts are, unfortunately, either no longer imported, or expensive to buy as wild-caught specimens. This is due mainly



The attractively marked Caucasian Newt, *T. vittatus ophryticus*.



The Italian Alpine Newt, *T. alpestris apuanus*, like all its 'sister' subspecies, is protected.

to export restrictions, bans, or conservation measures which, in turn, are caused by over-collecting or habitat loss. It may also be simply because the species is so difficult to find in the wild anyway. Small quantities of some species are still imported, but these are quickly 'snapped up' by herpetile hobbyists, as most species are extremely attractive and highly collectable amphibians.

The main source of European newts seems to be via the pool of established specialist breeders in Britain and Western Europe, usually people with a keen interest in newts. Newts from these sources are often healthy and fairly priced. Closely study magazines such as *Exchange and Mart* or in the readers' advertisement section of the herpetile club newsletter for such sources.

Once the newts are obtained, the main objective must be to breed them. If the resulting offspring are distributed among other collectors, this can go some way towards relieving pressure on wild populations. Also, the interest and pleasure generated in achieving such breeding is important to the captive care of amphibians as a whole.

It is, thus, fortunate that European newts represent some of the most reliable, easy-to-keep and long-lived of all amphibians. If healthy, fed regularly and hibernated annually, they will breed.



## NEWTS IN CAPTIVITY

There are two main ways of maintaining newts: one is in a glass-constructed aquarium, the other (where greater success is more likely in terms of breeding) is the outdoor reptiliary.

### Aquaria

An aquarium is ideal for those who want to view their newts regularly, or do not want to construct an outdoor vivarium. The furnishings need only be sparse: a 6-10cm (2.4-4in) layer of live Sphagnum Moss, on top of which can be placed several rocks and cork bark pieces and a shallow water bowl filled with 3-5cm (1.2-2in) of clean tapwater and rock for the newts to climb out. The moss will need washing or changing every 6-8 weeks, during which the aquarium, rocks and logs should all be disinfected in a 1% solution of sodium hypochlorite and then thoroughly rinsed. The water in the bowl will need changing every 5-7 days.

No heating or lighting is necessary between spring and autumn; just situate the whole aquarium in a well-lit but sunless area. If this is not possible, then a low-wattage Trulite fluorescent tube, i.e. daylight-compatible, can be fixed inside.

One point to watch out for is escape. Newts are experts at finding the smallest hole or gap by which to squeeze out of, but with a securely fitted aquarium lid (or even net-stocking), this would be impossible.

### Outdoor Reptiliary (Vivarium)

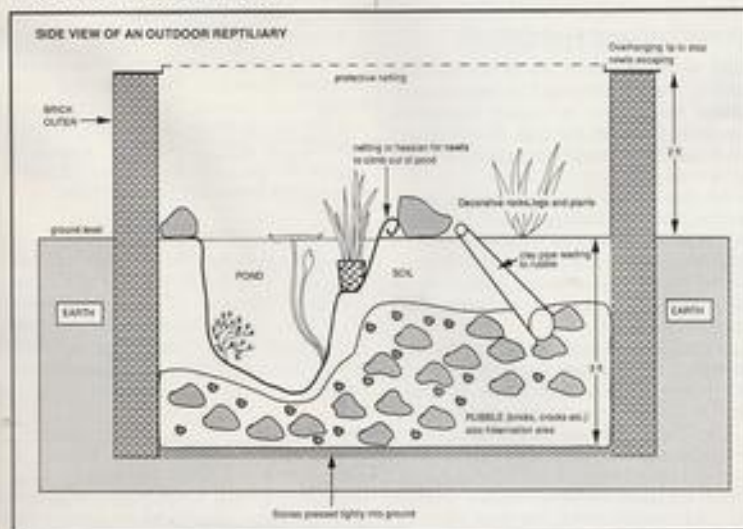
The set-up shown in the accompanying diagram provides the hobbyist with a chance to study the natural behaviour of newts and is highly recommended. As long as a relatively deep layer of rubble is integrated, then the newts can be left here all year round. It requires little in the way of maintenance, apart from weed removal, 'topping up' of the water level in the pond, and the occasional replacement of cracked bricks and overhanging lips and cement fissures.



*T. marmoratus*, the Marbled Newt, is probably the most beautiful of all the European species.



A superb male Great Crested Newt, *T. cristatus*.



Food will enter the reptiliary spontaneously, especially if attractive flowers are present, although it is always wise to throw in the occasional slug or worm.

Just as important as preventing newts from escaping, is stopping potential predators such as rats, cats, birds, or even frogs and toads, entering. This is easily achieved by fixing a removable frame covered with fine mesh or chicken wire to the top of the reptiliary.

### Feeding

European newts are easily fed on live earthworms, slugs, soft-bodied grubs and caterpillars, *Tubifex* and red worm. The last two are ideal for newly-metamorphosed newtlets. The Banded Newt (*T. vittiger*) has a protrusive tongue which it uses to capture small crickets, woodlice or flies.

In their aquatic state, newts will also devour small fish, aquatic snails and crustacea and tadpoles of frog, toads, or even their own larvae.

## Hibernation

A pre-requisite to breeding European newts is the need for a period of torpidity or hibernation. In the outdoor reptiliary, this will take place naturally with the onset of temperatures regularly below 6°C — c 43°F (lower for mountain newts such as the Alpine (*T. alpestris*) and Carpathian (*T. montandoni*)). Here, the newt will go down deep into rubble or underneath tree stumps where the critical temperature remains above freezing, and rest.

Indoors, the newts should be transferred into an aquarium filled with 25-30cm (10-12in) of dampened moss/straw/moss peat which can then be situated in a cold but

ing her, especially near her cloacal region or even giving her a small nip. In Banded Newts the male will swim quickly round the female, causing a whirlpool effect; then he will 'dive bomb' into her.

Once winning a mate, the male will deposit several small sacs of spermatozoa which are covered in hairy barbs. He will then coax the female towards him so that the sacs attach to her cloacal opening, where the spermatozoa are absorbed.

A female may mate with several males before depositing her 150 or more eggs. Egg-laying can be a drawn-out affair, with each egg carefully being wrapped in vegetation, such as a single *Elodea* leaf or a bent



This strictly protected species — the Italian Crested Newt, *T. carnifex* — was once classified as subspecies of the Great Crested Newt.

frost-free garage or attic for 2-3 months. Again, make sure this is escape-proof. All specimens to be hibernated must be healthy, i.e. with ample body fat, but not fed two weeks prior to dormancy.

## Breeding

As ambient air temperatures rise, so the newts will become active. In Alpine Newts this can be as little as 1°C (1.8°F) whereas Marbled require a rise of 8-10°C (14.4-18°F). Sometimes the newt will hunt for food but, usually, the urge to find its breeding waters are too great.

Therefore, indoors, it is best to place the newts immediately into a 30 x 12 x 12in (minimum) — c 75 x 30 x 30cm — water-filled aquarium planted out with *Elodea*, *Myriophyllum* (Milfoil) and *Ceratophyllum* (Hornwort), and heated to around 18°C — 65°F (ideal for all species). As soon as the male newt submerges, so its body chemistry alters to form courtship adornments, i.e. back and tail crests, intense coloration and swollen cloacal region.

Then he will try and attract a female's attention by waving the tail and body in a frenzied dance routine, consistently nudg-

blade or pond reed. Italian Alpine Newts (*T. a. apuanus*) may simply 'dump' their eggs on the pond or aquarium floor.

## Hatching and Hatchlings

Eggs should be taken out of the breeding tank or pond to be placed in separate containers where they are easily monitored. Larvae appear from the eggs after about 2-3 weeks and will cling to water plants or rocks for several days.

As they grow, they will become carnivorous hunters, seeking small crustacea, worms and leeches. Two months or so later, at about 1.5-2in (c 3.8-5cm), they will metamorphose, so make sure the pond is easily climbed out of, or water containers have floating cork pieces.

Larvae which hatch out of eggs deposited later in the year may overwinter to the following spring. In these cases, the metamorphosed newt may be twice the size.

Feed the newts on plenty of chopped worm, red (blood) worm and suchlike. They can either be hibernated or overwintered in a cool place, maturity being reached within a year for Alpine Newts, to four years for Crested and Marbled types.

## NEW SPECIES IN ORDER OF AVAILABILITY

### Common or Smooth Newt (*T. vulgaris*)

Found throughout Europe (including Britain) except southern France and Iberia.

An easily kept and bred species which grows to around 9-12cm (3.5-4.7in). Lays up to 150 eggs between late March and July.

### Italian or Alpine Crested Newt (*T. carnifex*)

All crested newts were formerly classed as subspecies, but have now been recognised as separate species. This type is still exported in huge quantities from south-east Europe.

Grows to 18cm (c 7.1in) and is distinguished from other crested newts by its broader head and by females often having a yellow stripe along the back. Up to 300 eggs are deposited from February to May.

Other species include the Southern Crested (*T. karelini*) from Turkey which attains 21cm (c 8.3in), the rare Danube Crested (*T. dobrogicus*), the smallest species at 12cm (4.7in) and the Northern Crested (*T. cristatus*) which grows to 16cm (6.3in) but is legally protected in Britain and so should not be kept without an endangered species licence.

### Alpine Newt (*T. alpestris*)

An attractive newt that has seven European subspecies. The breeding male, in particular, is beautiful, with cobalt blue flanks contrasting with a vermilion belly and yellow crest. Rarely attains more than 15cm (6in) and breeds between February and August, laying 180 or more eggs. Two nice subspecies include the 10cm (4in) Italian Alpine (*T. a. apuanus*) which can start breeding in the frosts of January, and the Montenegrin Alpine (*T. a. montenigrus*) from a single lake in Yugoslavia. This species can stay and breed in its larval form (neotony) for many years.

### Marbled Newt (*T. marmoratus*)

Possibly the most beautiful of the European tritons, with its green dorsal blotches contrasting sharply with a black background. Coming from western France and Iberia, it grows to 16cm (6.3in) and lays around 250 eggs in April to August. A smaller subspecies (*T. m. pygmaeus*) is found in southern Iberia/northern Morocco.

### Banded Newt (*T. vittatus*)

Only recently has this gem become available, mainly in the form of the mountain-dwelling European Turkish subspecies (*T. v. ophryticus*). Attains 16cm (6.3in) and lays 120-180 eggs. Males are particularly eye-catching, with their green denticulated (jagged) crest.

### Other Species

The other European newts: Italian (*T. italicus*), Bosc's (*T. boscai*), Palmate (*T. helveticus*) and the rare Carpathian (*T. montandoni*) are only occasionally available. The last, in particular, is well worth seeking out.



## EUROPEAN TRITURUS SPECIES

SPECIES (valid scientific name)	COMMON NAME	SYNONYM	GEOGRAPHICAL RANGE	SUBSPECIES	STATUS
<i>Triturus alpestris</i>	Alpine Newt	Mountain Newt	C and S Europe west to France, north to Denmark, east to USSR and south to N Greece. Isolated popn in Spain and Central Greece	(7) Type: <i>T. a. alpestris</i> Italian: <i>T. a. apuanus</i> Spanish: <i>T. a. cyreni</i> Balkan: <i>T. a. lacumigri</i> Montenegrin: <i>T. a. montenegrius</i> Bosnian: <i>T. a. reiseri</i> Greek: <i>T. a. veluchiensis</i>	All protected
<i>Triturus boscai</i>	Bosco's Newt	Spanish Newt	Central Spain west through Portugal	(1) Type: <i>T. b. boscai</i>	Protected
<i>Triturus cristatus</i>	Northern Crested Newt	Great Crested or Warty Newt	Central and North Europe	(1) Type: <i>T. c. cristatus</i>	Strictly Protected
<i>Triturus carnifex</i>	Italian Crested Newt	Italian Alpine Newt	N Italy, Alps, Yugoslavia and Balkans	(1) Type: <i>T. c. carnifex</i> formerly known as <i>T. cristatus carnifex</i>	Strictly Protected
<i>Triturus dobrogicus</i>	Danube Crested Newt	—	Hungary, Rumania and Czechoslovakia	(1) Type: <i>T. d. dobrogicus</i> formerly known as <i>T. cristatus dobrogicus</i>	Strictly Protected
<i>Triturus karelinii</i>	Southern Crested Newt	Russian Crested Newt	SW USSR, Northern Turkey to W Afghanistan	(1) Type: <i>T. k. karelinii</i> formerly known as <i>T. cristatus karelinii</i>	Strictly Protected
<i>Triturus helveticus</i>	Palmate Newt	—	Western Europe incl. GB extends south to Spain	(2) Type: <i>T. h. helveticus</i> Iberian: <i>T. h. sequoiar</i>	Only local protection
<i>Triturus marmoratus</i>	Marbled Newt	—	Central France extending to Gibraltar	(2) Type: <i>T. m. marmoratus</i> Spanish or Pygmy: <i>T. m. pygmaeus</i>	Protected
<i>Triturus montandoni</i>	Carpathian Newt	Montandon's Newt	Tatras and Carpathian mts of Central Europe	(1) Type: <i>T. m. montandoni</i>	Strictly Protected
<i>Triturus cristatus</i>	Banded Newt	Sand Newt	Turkey down to Israel	(3+ — may be 5 subspecies) Type: <i>T. v. cristatus</i> Caucasian: <i>T. v. ophryticus</i> Syrian: <i>T. v. syriacus</i>	Not Protected
<i>Triturus vulgaris</i>	Smooth Newt	Common Newt	North to N Sweden, GB & Ireland, east to China, south to S Greece, absent from Iberia, Southern Italy and SW Asia/minor	(8+ — some Far East subsp.) Type: <i>T. v. vulgaris</i> Rumanian: <i>T. v. ampelenis</i> North Swedish: <i>T. v. borealis</i> Dalmatian: <i>T. v. dalmaticus</i> Greek: <i>T. v. graecus</i> Caucasian: <i>T. v. lantzi</i> N. Italian: <i>T. v. meridionalis</i> Schreiber's: <i>T. v. schreiberi</i>	Not Protected
<i>Triturus italicus</i>	Italian Newt	—	Southern Italy	(1) Type: <i>T. i. italicus</i> formerly known as <i>T. vulgaris italicus</i>	Protected

Note: The status of newts is in some disarray because protection varies from country to country. For instance, Turkey does not recognise the Bern Convention for the wide majority of its native reptile and amphibian species, whereas countries such as Germany and GB apply stricter protection, not only for their own native species, but also in regulating the importation of species from Bern Convention countries.