OCTOBER 1991

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AQUARIST AND PONDKEEPER

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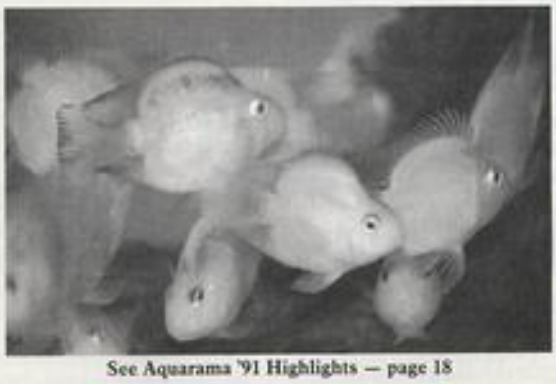

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Regulars

EDITORIAL

MULTI-COLOURED AQUATICS

Benetton, the clothes manufacturers, seem to have got things just about right. For some time, they've refreshingly been employing their now-familiar 'many colours' approach to advertising, using models of every conceivable shade of skin, and clothes of virtually every hue under the sun. Some people may object to the actual content of some of their adverts, but that's a totally different matter altogether.

The fact that the company appears to be doing so well is, no doubt, largely the result of that uniquely human trait that dictates that, when it comes to personal tastes or opinions, there are as many permutations as there are individuals.

Now, if that is, indeed, the case, why have I recently come across so many 'inflexible' people who don't have opinions — they just know for certain that this product or that one is utter rubbish, or that this writer or that "knows absolutely nothing about aquatics"?

You know the sort of thing I mean: "You can't grow plants with undergravel filters" or "Shopkeepers know absolutely nothing about marines" or "Call himself a writer? What does *he* know that's worth knowing?"

Perhaps it's the frustrations of the summer we haven't had that has led to a proliferation of so many 'You-may-think-you're-right-but-I-*know*-you're-wrong' incidents. I really can't tell but, perhaps, as autumn closes in, these 'oracles' will allow themselves the time and space to reflect.

If they do, they'll probably realise that it is perfectly possible for plants and undergravel filters to co-exist . . . using, among other things, air-operated uplifts, a gentle flow of water through the substratum and a thick enough layer of rooting medium.

Perhaps they'll discover that, while there are, undoubtedly, some aquarists who know more about marines than most of us put together, there are also many retailers who know more about marines, and can advise aquarists better, and more objectively, than most hobbyists can.

Maybe they'll also come to the conclusion that, while those of us who dare to put our thoughts into print may not know everything about everything, we may just know a thing or two. . . .probably as much as those who so pretentiously chuck abuse at others.

Perhaps even the unthinkable may happen and they will accept that what they have is an *opinion* and not an exclusive claim on absolute, objective knowledge.

Oh, for that 'multi-coloured' approach to aquarium and pondkeeping! Where has it gone?

John Dawes
Editor

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LAURENCE E. PERKINS

It may seem a long way from an Axolotl to a spleen (!) . . . but there is a common link — a Goldfish bowl!

WHAT A BEAUTIFUL SPLEEN YOU HAVE!

Only **Jason Endfield** could find a connection between spleens, Goldfish, Axolotls and Bichirs. Intrigued? Read on . . .

What is the most unusual thing you've seen in a Goldfish bowl? A Shubunkin? A Moor? Perhaps some tadpoles? Well, surely nothing can compare with the contents of a story that was related to me recently by an enderly lady who let me in on a secret. She made me swear that I wouldn't tell a soul, but it's alright — she didn't spell 'soul', so I can share this tale with you, and honestly say that I haven't told a 'sole' . . . Lemon or Dover!

The lady's sister-/in-law ("you may have seen her, she has very thin blue-rinsed hair and a yellow hat . . .") kept something very unusual in a Goldfish bowl on her sideboard — her spleen.

Seriously, she had part of her spleen removed (the process of which was regretably related to me at great length), and she insisted on having it pickled and jarred.

In due course, the lady's spleen was rehoused (as though it was going to outgrow the jar) in a large Goldfish bowl, with a lid thereon to prevent evaporation (or the spleen escaping . . .?).

As if eager to add more interest to the tale, my storyteller informed me that a short-sighted maiden Aunt had admired the chocolate coloured fish on the sideboard and had taken the liberty of feeding it with her biscuit because it "looked a bit peeky". Totally bizarre, isn't it?

However, as usual with my writings, there is only a limited connection between that tale and the following item, which, though less startling, is, nevertheless, of interest to aquarists and of some concern to me . . . Axolotls.

The first time I said that word to someone, they looked at me in horror, obviously mistakenly insulted, and said something back to me in reply which was, well, less that aquatic! Axollotls are, as you will know, the juvenile form of salamanders, much like a large-gilled tadpole, the difference being that the Axolotls can remain and even breed in the juvenile form when prevented from developing into the, some would say, less interesting adult salamader. Although I've never kept them myself, I know of several that have made excellent pets.

I don't want to discuss Axolotls in detail, as such descriptions can be found in depth elsewhere (where space is less limited!), I am merely citing them as an example: the fact is that they are generally considered to be easy to maintain, as well as being particularly absorbing pets, and this being the case, one begins to wonder why they are, as far as I can see, rather difficult to obtain. I remember seeing them as a child, so they should be well established within the pet trade and yet, I can very easily go into a shop and purchase a delicate marine fish or a demanding freswater species, while it seems that I can no longer buy some of the easy-to-keep, inexpensive and less endangered captive-bred creatures that used to be so popular.

Tastes change and it would appear that we are becoming more sophisticated and less satisfied with the run-of-the-mill. This, I fear, has been the fate of the Axolotl. These thoughts were planted in my mind after I purchased an example of one of the now readily available exotic species that I've briefly referred to above. It's a *Polypterus* or Birchir from West Africa, and depite being a comparative newcomer (I think) to the fish-keeping scene, it is proving to be a very satisfactory pet.

That said, I expect that, as with everything else, as soon as more people discover the virtues of the Bichir and they achieve their deserved popularity, aquarists will consider them as 'beginners' fish' and crave something more exotic. Anyway, despite this, I can thoroughly recommend the Birchir to anyone with a reasonable amount of tank space (they have the potential to grow very large, but only very slowly).

Birchirs are primitive fish, on par with the famous Coelacanth, and it is perhaps due to their tolerance of varied environments gained through the millenia of their existence that they are highly adaptable and hardy; indeed it seems sometimes, virtually indestructible.

Well, watching my Birchir, I quickly became aware of its reptilian features — fins that work like legs and a snake-like head and mouth, and this, in turn, brought back long-ago memories of seeing Axolotl. (The similarity, if it exists at all, is purely superficial, but my mind works in mysterious ways!)

To cut a long story short, I got to wondering just where Axolotls had disappeared to; maybe I've just been unlucky and missed them, but dealers I've been in to don't seem to have had them in stock for years. I wonder why. What could be more interesting than a giant tadpole that will never turn into a frog (or a salamander in this case)? They don't need tropical conditions, neither do they require any specialist attention, so what could be a more suitable alternative to the humble Goldfish?

I should point out that I'm not suggesting keeping an Axolotl in a Goldfish bowl, as I feel that not even a Goldfish should be sentenced to such a cramped environment, but an acceptable Goldfish-type set-up would be very suitable for Axolotls.

To sum up, I think that in our haste to become ever-more-ambitious in our fish-keeping habits, we are forgetting the creatures that got us started in the first place. Don't forget that if newcomers to the hobby have to begin with exotic marines or delicate tropicals through lack of choice, they'll likely be put off very quickly owing to lack of success.

So let's spare a thought for Goldfish, Guppies (and yes indeed, Axolotls, wherever they are). If would-be hobbyists fall by the wayside, then what will become of their tanks? We'd be overrun with terrarium conversions! Or worse still, we could be faced with beautifully arranged displays of spleens . . . !

Seaview

By Gordon Kay

NEGATIVE LIST UPDATE

I am writing this at the end of July and — would you believe it — I've just discovered the result of the meeting of the EEC Wildlife Trade Regulations Scientific Review Group which took place in March! It's amazing, but for some reason, information like this is taking ages to filter through to the UK.

Anyway, the outcome of the meeting was a big anti-climax. The group agreed that no negative list should be adopted until there had been more dialogue with other parties. **Keith Davenport**, the new man at OFI (UK), has requested that he be allowed to go to the next meeting in Brussels. Trouble is, I don't know when that is due to take place.

By the time you read this, it will probably already have happened, so I will keep on ferreting until I know what is going on. As always, when I do, I will tell you.

NAME CHANGE FOR I.M.A.

And now, for something completely different (where have I heard that before?). **International Marinelife Alliance of Canada** — an organisation I've talked about many times in **Seaview** — has celebrated its fourth anniversary by changing its name. It is now officially known as **Ocean Voice**.

Don McAllister, the president of Ocean Voice, says that, "the name is more in tune with nature and the oceans".

The organisation has been very busy — not to say successful — over the last year or so. Their **Philippines Netsman Project** trained 283 aquarium fish collectors to use small handnets in preference to sodium cyanide which was killing the fishermen, the reefs and the collected fishes.

They have just published a *Coral Reef Conservation Manual in Indonesia*. This will, it is hoped, help to educate fisherpersons to care for their coral reefs. It is also hoped this manual will be followed by others in different parts of the world.

Also, Ocean Voice has published a *Green School Checklist* right on its own doorstep in Canada. This Green Checklist is designed to help both pupils and teachers to evaluate how environmentally friendly their school is.

FUNDS NEEDED FOR NETSMAN PROJECT

All this is fabulous work indeed, but it needs the all-important dosh if it is to succeed and continue. Over 18% of cyanide-using Filipino fish collectors had been converted to using nets, but there is still a long way to go.

As I have already said, it is hoped that Ocean Voice will publish its Coral Reef Conservation Manual around the world. Also, its Coral Reef Fish Specialist Group has undertaken the daunting task of a survey of the status of coral fishes and coral reefs all over the world and to determine where major hotspots of species richness and endemism occur. This will help determine conservation priorities.

Very worthwhile, all of it, but it needs money. Please try to help. Donations may be sent to:
Ocean Voice International,
2883 Otterson Drive,
Ottawa,
Ontario K1V 7B2,
Canada.
Alternatively, why not help by joining Ocean Voice? It will cost you £10.

UNDERWHELMING RESPONSE

You will remember that in June's issue I told you about a letter I had received asking whether or not being kept in freshwater was in itself harmful to sea-going Dolphins. You will also remember that I threw the question open to you, the readers, offering a Nitrite Test Kit to the first person to send me the correct answer.

Well, the response was absolutely underwhelming. You obviously don't want a Nitrite Test Kit because I received only one reply. It came from **Mrs Frances Gubbins** of Watford and, I'm sorry to say, was wrong!

Marine dolphins cannot survive in freshwater. Apparently, they become listless and stop feeding after a period of only 24 hours. After another period of about the same duration, their body cavities become full of water and they swell up like balloons. They also turn a funny yellow colour and their mucus comes away by the handful. As you can imagine, death follows fairly quickly.

In fact, this scenario actually took place at a British dolphinarium, except that salt was introduced at the eleventh hour and the dolphins survived. My thanks go to my mate **Colin Grist** for that horrific story. I have letters from other dolphin authorities to back it up.

So you see, Frances, you are, unfortunately wrong — but what the hell, I'll send you your Test Kit anyway, just for taking the time to reply. Hey! I've just had a terrible thought. Could be that you were the only one to reply because you are the only one to read this bilge. No it couldn't be . . . could it?

TURTLE TRIP

Anyway, I'm off to Kefalonia to look at the work of a 'turtle project' out there. I'll be telling you all about it in *AGrP*, so keep your orders in.

Meanwhile, I'll be with you next time . . .

Now there's a novel twist to a garden pond!

Tomorrow's Aquarist

By David Sands

THE DAY IS COMING

The year 1991 is running away. I'll bet more than one of you has thought about Father Christmas . . . and don't tell me you don't believe, because the 'Spirit of Christmas' is there for everyone, regardless of age.

Has any reader asked 'Santa' for something fishy . . . say, a larger tank or a new filter? I would like to know if aquaria count as Christmas presents (and do they fit inside a stocking?).

I won't mention the day again, promise. I can almost hear parents raging at my premature thoughts!

I sometimes write this column a few months ahead, so I have to look forward and think about your year. Now it's the end of the summer holidays and I'm sure you are all *dying* to get back to school . . .?!

I hope none of you are considering the red pen spots on the face — "Hey, mum. I think I've got measles!" — routine.

SILENCE OF THE DEEP

At the Scottish Aquarist Festival at Perth, a young fishkeeper (with Oscar) won a special prize and I was happy to present him with the 1991 'Aquarian' goody bag prize. I'm a bit annoyed that I didn't take note of his name, but perhaps he can write in to me and let us all know how difficult/or easy it was to show his prize cichlids.

Do any **TA** readers show fish? Let's print a list so you can all get in touch with each other!

I'm still waiting for an intelligent **TA** reader to identify the massive long-necked *mysterious* creature from Scotland, a picture of which appeared in the August edition of the *Aquarist & Pondkeeper* (although I hear from our editor that some letters are on the way).

The very first correct answer will receive a large mega tub of flake food and an official roller ball pen. I also set a challenge that if anyone can give me its scientific name, then I'll send them a 'giant' tub of flake, a towel and two pens!

That's the thing about **TA** readers — I just spoil you like crazy.

"Hey dude, or what???"

TA MAILBAG

My **TA** mailbag/intray has been a lot quieter lately, although I do receive a great pile every month from my other activities. Don't tell me you had lots to do in the summer holidays because I won't believe you anyway.

I did receive a letter from **Hayley Baker** from Walthamstow who likes gouramis (Sparkling or otherwise) although, through unfortunate circumstances, Hayley is left with odd pairs after her Pearl Gourami female and her male Honey Gourami died. It's a pity that many gouramis are sold in pairs, although Pearls are usually sold separately.

Zoe, from Somerset, asked why a retailer said she should put salt in the water for her pair of Siamese Fighting Fishes. This is something that has come up several times and I believe it is because salt helps fight bacterial infections and more and more retailers are resorting to salt.

For the record, *Betta splendens* are actually quite shy (a little like me!) and only territorial males have to fight it out. They are sometimes difficult to feed in community aquaria.

FOOTBALL CRAZY

I almost bumped into the manager of Blackburn Rovers football club while in Perth. **Don Mackay** was on a secret spying mission in Scotland to watch Celtic players. I recognised Don but went into a restaurant without speaking to him.

Have you ever seen somebody famous and *not* spoken to him/her? Did you know I was a football supporter?. I hope to keep surprising you all for some time yet.

For a future **TA** I want to know which football team you and your fish support, with a prize from the editor for the most interesting game you and your goldfish/catfish/Kuhlie or Coolie Loach/Tiger Barb watched.

All my fish support Blackburn Rovers — they appear to like the blue and white . . . it reminds them of home. No jokes about Billy the Fish, please!

ROCKPOOLING IN CORNWALL

Earlier this year I had the pleasure to visit Cornwall to see some Catfish Association friends from the old days, **Derek** and **Pat Lambourne** and **Terry** and **Doris Cruikshank.** They have all semi-retired from South London (can you blame them?) and they now enjoy an idyllic lifestyle, unlimited sun, seashore and leafy lanes.

The South West is renowned for its wonderful rockpools where, after the right tide, you can search for crustaceans, fish and general sea-life.

We only 'look' — turn over rocks and lift up seaweed to see what's there — and leave the life where it belongs. Terry and Derek searched hard for something interesting and exciting and, sure enough, they turned up with a big blue Velvet Crab and an odd looking eel!

On one particular excursion Derek discovered a happy-looking Blenny (underneath a Mega rock) which my older son, Jonathan, held up for me to photograph.

Have you ever been rockpooling?

Rockpooling would seem to be a very relaxing holiday hobby. Derek had a copy of *The Readers Digest Book of Water Life*, so we could identify the creatures we discovered.

DAVID SANDS

Jonathan holding up a very healthy blenny found in a Cornish rockpool.

What's your opinion?

Billy Whiteside, BA, ACP

BREEDING PIRANHA

A mention of the word 'Piranha' usually makes people think of vast shoals of Piranhas stripping bare a human or animal body.

The most disturbing experience I had concerning a Piranha occurred years ago when I asked a young dealer if I might photograph some of the fish in his shop. He agreed.

I worked round the tanks and when I got to the tank housing his pet Piranha, I was focusing my camera when he tossed in a live Goldfish saying "There's its dinner".

Nothing happened for some time; then the Piranha made a dart at the Goldfish and sank its teeth into the poor fish's stomach. Unlike the Goldfish John Dawes mentioned in his July editorial, this one swam on, rather like the headless chicken one reads about. I found it somewhat disgusting. However, I would find a slaughterhouse disgusting: yet, I eat meat. Is feeding the Goldfish to the Piranha worse than using other live foods — such as worms or fresh meat? My photograph shows Piranha at Washington Aquarium.

David Tierney's home is at 21 Consiton Road, Flixton, Manchester M31 3PS, and his Red-Bellied Piranhas spawned recently. The first thing he noticed was that several of his *Serrasalmus nattereri* were blowing into the gravel. This went on for several weeks. David writes: "The fish were noticeably agitated and were fighting with each other most days. Eventually, two of the fish paired. On inspecting the tank one morning I saw one of the fish severely wounded around the mouth, with its bottom teeth fully exposed. The second fish was injured around the head.

"It was then I realised that the fish with the injured mouth was closely guarding a cluster of light brown eggs of approximately 1mm in diameter scattered among the gravel at the front right-hand corner of the tank. The second fish was chasing away possible intruders. As I did not see the eggs being laid, I cannot say which fish was the male or female of the pair. The second fish soon joined the others but the fish with the injured mouth stayed close by the eggs. The eggs hatched two days later and the fry remained in the gravel.

After four days the yolk sacs had gone and the fry were free-swimming. It was not until this time that the fish with the injured mouth stopped guarding the nest site. As many as could be caught in a fine net have been removed from the main tank and left to progress in a smaller 24 x 12 x 15in (60 x 30 x 38cm) tank. Several still remain in the main tank. The fry are being fed on Liquifry and baby Brine Shrimps.

"I originally bought the five Piranha with the intention of rearing them to adult size and maybe getting them to reproduce. I had read that this was quite rare in the home aquarium. It is still a shock to me to see fry and realise my achievements, considering the age of the parent fish. From baby fish, to adult fish, to raising baby fish — all in 12 months!"

BILLY WHITESIDE

A shoal of Red Piranha which I photographed during my visit to Washington Aquarium. Note the 'non-Piranha' fish which appeared to be perfectly at ease and quite safe.

David ends with specific details of the Red-Bellied Piranhas' spawning. "Five fish, bought 12 months ago at approximately 1in (2.5cm). Tank: 48 x 24 x 24in (120 x 60 x 60cm) with built-on filter area. Filter: charcoal, peat, mechanical and biological media. Water: pH 7.0, temperature 84°F (c29°C); water treated with tannic acid. Decorations: 2in (5cm) layer of coarse gravel, bogwood and a few large pebbles, plus small quantity of Java Fern. Light: natural daylight only. Other fish: two small 'Plecostomus'. Fish: five in number; age: approximately 14 months; size: 5 — 6in (12.5 — 15cm); food: frozen sprats, occasional live fish, liver, ox heart, tropical flaked food, earthworms."

It's most helpful that David kept records of his fishes' success and passed them on to readers. I should be pleased to hear from other readers who have bred particular species of fishes — even if no youngsters survived.

MAD ABOUT OSCARS

Julie Neal lives at 2 Edinburgh Drive, Bingham, Notts, NG13 8FX, and she writes: "I have been interested in aquariums for some years now and have at present got a 48in (120cm) tank filled with six Oscars, two Tinfoils and three 'Plecostomus'. I've also got a coldwater tank filled with various Goldfish, Carp and small Koi; also two Weather Loaches and a Mussel. This tank is 36in (90cm) long. I also have a 24in (60cm) tank housing smaller cichlids, i.e. small Oscar, Angel, Kribensis, two Keyholes and two 'Tilapia'. I am studying prices of 48in (120 cm) tanks for the time when I will have to separate my Oscars due to size.

"It is these Oscars I would like some information about. How I got the Oscars was quite funny. My boyfriend and I were at our local aquarium shop where I fell in love with the giant Oscar called Harold. At the time I was selecting some Gouramis when Ralph pointed out some baby Oscars. I fell in love with them. I never dreamt they could be so small and beautiful. I immediately cancelled my Gouramis and bought six tiny Oscars — two Reds, two Tigers and two Red Tigers. When I got them home I cleared out my Gourami tank and gave the fish to Ralph for his community tank.

"My Oscars are doing very well, being about seven months old now. I picked up my first copy of *Aquarist & Pondkeeper* — and what did I find in it? My heart's desire: an Albino Tiger Oscar poster. I am determined to have one or two such fish one day. I shall be ordering your magazine regularly now.

"Some information I would like is about an Oscar club. I notice there are Discus clubs, Koi clubs and Red-Tailed Catfish clubs — but what about Oscars? I know there are Cichlids clubs but they cover a vast array of fishes.

Julie concludes: "I would like to thank you for my beautiful Oscar poster. You wouldn't have any others lurking about by any chance? I feed my Oscars on Doromin and Hikari Cichlid Pellets.

Many years ago I bought one small Oscar — which grew so big he had to be given away. I haven't bought any since. I do have the Oscar poster from my own copy of the magazine and as Julie so obviously wants another one, I'll send her mine as I enjoyed reading her letter — female letter-writers are much less common than male writers.

I suggest Julie looks at the list of foods fed to his Piranhas by David Tierney. Any of those foods could enhance the Oscars' diet — if it needs enhancing.

NEXT MONTH

For next month please send me your opinions on any of the following: (a) feeding live creatures to aquarium fishes; (b) breeding tetras; (c) unusual livebearers; (d) cultivating aquarium plants; (e) your aquarium club; (f) coldwater fish; and (g) text-books on aspects of the hobby that you'd recommend, i.e. what is your favourite aquarium book?

Send your letters to me **c/o What's Your Opinion? Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.** I look forward to reading your letters. Good-bye until next month.

Coldwater jottings

By Stephen J. Smith

COLDWATER NIGHTMARE SCENARIO

Picture the scene: a thick frost covers the ground outside, forming paper-thin sheets of ice on the pond while, in the fish-house, 100 Goldfish fry enter a virtually dormant state.

Hatched only a few months previously, the cold is proving too much for them, and a season's work of careful selection and rearing is going to waste. These treasured fry will be stunted, rendered useless to the specialist Goldfish keeper for showing or breeding.

This is the scenario which forms the nightmares of thousands of Goldfish breeders throughout the UK and further afield. Yet, there is a very simple answer: a heater/thermostat which will provide frost protection, especially designed for the coldwater fishkeeper.

So why not heat the fish-house as an alternative solution? However, few coldwater hobbyists have the luxury of a purpose-built, centrally-heated fish-house. Most 'make do' with a corner of the garden shed or greenhouse, where, after all, two or three tanks can be quite conveniently accommodated.

Such a need for a 'coldwater' heater/stat has been presented before on this page, with no response from manufacturers. It seems that the coldwater scene receives short shrift when fish need to be kept at a lower temperature range than the average tropical fish.

Regular correspondent **Alex Stephenson** has been determined not to let his requirements lie, and contacted one of his favourite aquarium accessory manufacturers, outlining the need within the hobby for a heater/stat with a temperature range of 45–70°F (c7–21°C).

It appears that the company has totally missed Alex's point: "As normal ambient temperature is usually above 45°F (7°C)", they replied, "you are asking such a heater/stat to do the impossible, namely actually to chill the water and maintain it at this temperature"!!! Those are my exclamation marks. And how!

Please look again at the scenario which opened this jotting. Alex Stephenson, myself, and thousands of coldwater enthusiasts are desperate for a heater/stat which will ensure that the temperature in fry tanks will not drop below a pre-determined level to ensure the health and welfare of their infant aquatic charges, and, subsequently, the development of the hobby. Surely, such equipment cannot be beyond the realms of 1991 technology. Perhaps readers and manufacturers would let me know their thoughts on the subject . . . ?

KOI REFERENCE

A sudden resurgence of interest in coldwater fishkeeping over the past five or ten years brought a rash of publications providing the complete answer to all those questions. Of course, no *one* publication exists, or will ever exist. The means and methods employed by fishkeepers to look after their charges are as numerous as fishkeepers themselves.

However, by balancing information in one book with that in another, the hobbyist can, with some patience, find the solution which best suits his/her individual aquatic circumstances.

Fewer coldwater volumes appear to have been launched in the past year or so, so when our editor forwarded to me a copy of Peter Cole's book *The Art of Koi Keeping — A Complete Guide* I could not wait to delve into its pages to see what it contained that others don't.

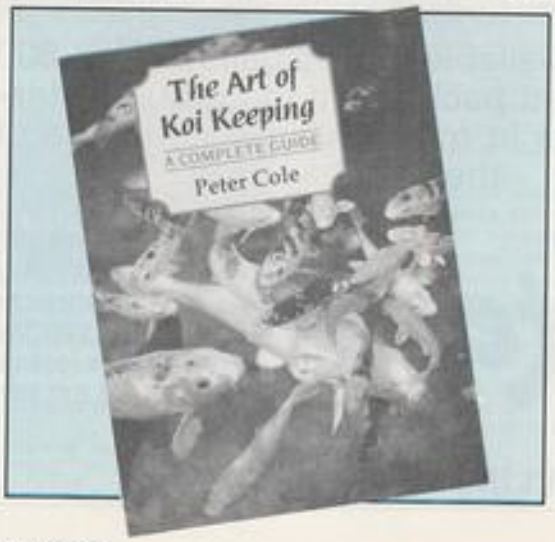
Now, we are warned not to judge a book by its cover, so we really should not judge a book by its title either. *The Art of Koi Keeping* is a long way from being a 'complete guide'. What it is, however, is an honestly presented reference produced by a man who obviously enjoys his Koi keeping.

Illustrated with colour and monochrome photographs, as well as easily understandable diagrams, the book provides useful reference to all aspects of the hobby, naturally enough beginning with pond construction, covering types of Koi, and ending with diseases and treatments.

But, in my opinion, a basic ingredient of 'Art' is depth: feeling alone is not enough. And this book, while obviously produced with a great deal of feeling for the hobby, lacks any real depth and substance.

If you require 'a complete guide' you may feel disappointed with this book; but, if you don't possess a Koi reference and wish to spend your money on a handy volume, then *The Art of Koi Keeping* may well whet your appetite for the hobby.

The Art of Koi Keeping — A Complete Guide, by Peter Cole, (ISBN 0-7137-2141-3) published by **Blandford**. Price £12.95.



REMEMBER SVC?

I was surprised to receive indication from the Ministry of Agriculture Fisheries and Food (MAFF) of a recent outbreak of that devastating virus Spring Viraemia of Carp (SVC) at a fishery in Worcestershire. Now, don't panic: there is no major scare, but this, so far, isolated outbreak is a timely reminder to us all that we must be on our guard to ensure that such viruses and diseases are kept at bay.

Reference to *Aquarist & Pondkeeper* throughout 1988 will provide in-depth information about SVC (see, for example *A&P*, October 1988) but, briefly, SVC can be a devastating viral infection which affects mainly Carp and related species (including, of course, Koi and Goldfish).

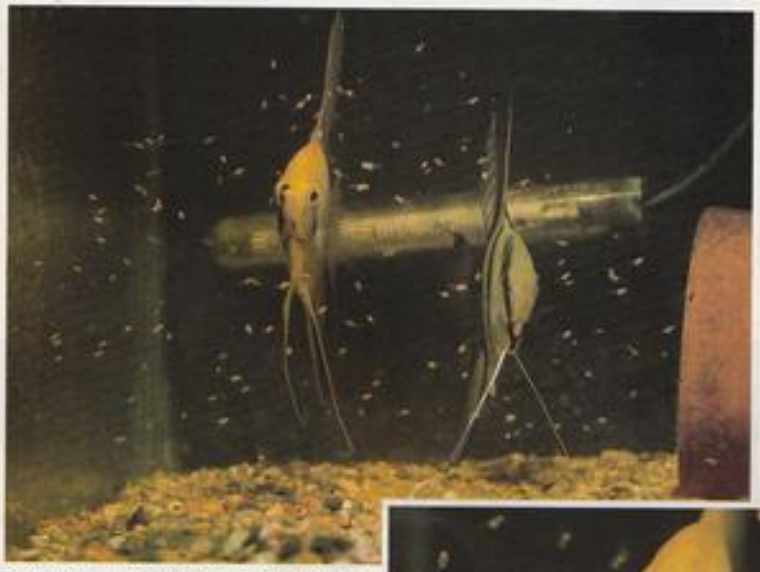
The consequences of SVC are usually fatal, although affected fish can survive infection. However, the virus is passed on to the offspring of surviving broodfish, while the pathogen is also capable of survival in water *without a host*.

SVC is a notifiable disease under the Diseases of Fish Act 1937 as amended, and the only measures which can effectively keep the virus at bay is complete closure of the premises and destruction of stocks.

In the meantime, keep a watchful eye and ensure the best husbandry of your own fish. Further information about SVC is available in a booklet (**Reference UL122**) produced by MAFF and available free of charge from **MAFF Publications, London SE99 7TP.**

MUCUS-FEEDING ANGEL FRY

Derek Elliott reports on a form of fry feeding that is usually regarded as being restricted to Discus, Uarus and (more recently) Plecos.
(Photographs by Alan Hulford)



Proud Angelfish parents with their young swarming around them.

If you have Angelfish in your community tank, you can reckon on fights breaking out fairly often. So it was in my 4 ft (120 cm) community aquarium, where one pair of Angels was guarding an Amazon Sword plant with their lives, chasing anything large or small that came near. A closer look revealed eggs stuck to the leaves.

These eggs were separated from the parent fish and placed in a tank of their own but, alas, none survived past 8 days, even though Methylene Blue was used.

Angels are supposed to make good parents, so the female was put in a quiet tank, along with a new male that I had recently bought. A few weeks later, eggs were being laid on a flower pot and the parents were on guard night and day. Nothing was put into the water, other than food for the parents. When the fry were free-swimming, they were taking Brine Shrimp as fast as I could hatch it.

STRANGE FRY BEHAVIOUR

I spent many hours watching the parents and fry together and noticed some strange behaviour by some of the fry. Just occasionally, some of them would 'peck' at the parents. Could they be feeding? Discus, Uarus and Plecos have been recorded feeding their young from mucus on their bodies and there have been reports that Angels might also exhibit the same behaviour. However, as far as I know, no-one had actually recorded this 'officially', let alone photographed the fry involved in this activity.

I therefore decided to keep a close watch on my fry to see if there was any truth in these reports. As you can imagine, photographing tiny fry feeding off the side of the body of a nervous parent isn't the easiest thing in the world. Nevertheless, one of the accompanying photos shows this actually occurring.

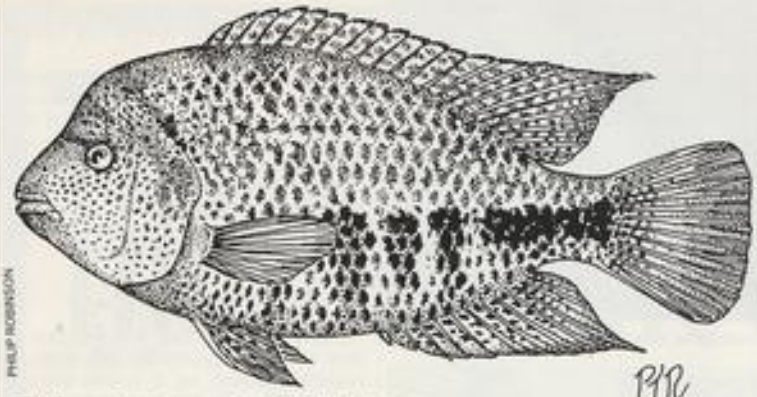
This type of feeding usually occurred when the parents were fairly still. At such times, the fry would approach, to both body and fins, and feed. Sometimes the parents would twitch their fins or swim away; perhaps the pecking annoyed them.

A further pair of Angels subsequently spawned in another tank and, as soon as the fry were free swimming, I noticed that they, too, were feeding from the parents.

I now have several batches, amounting to hundreds of young Angel fish, from different pairs (and all of which have exhibited some mucus-feeding behaviour) and am fast running out of tanks!

Could it be, that if left alone, our fish would be better better parents, able to exhibit more natural behaviour, and that all our well-meaning interference with chemicals and additives only distracts from the natural process?

Caught in the act! A tiny fry can be seen feeding off the body mucus just below the pectoral fin of this Golden Angel.



"Cichlasoma" zonatum — victim of multiple identifications.

THE JUDGING DILEMMA

Mary Bailey offers some personal thoughts on the problems involved in judging fish, along with some constructive suggestions on how some of these may be overcome.

Some time ago I received a letter from a disgruntled cichlid-keeper, the owner of a large *"Cichlasoma" zonatum*, whose pedigree had been traced back to the original imports of wild specimens. This fish had been shown half a dozen times during 1989, as *"C." zonatum*, but, on every occasion, the judges had renamed it as something else and judged it on the basis of their own identification. As if this weren't irritation enough, on each occasion the 'expert identification' was different!

My correspondent was not alone, having compared notes with other owners of large Central American cichlids who were found to have had the same problem. I was requested to write an article (perhaps exposé is a better term!) on the situation.

This touches on a problem of which I have been aware since the very first time I visited a show (about 1973) and was reduced to hysterics by the winners of the Rift Valley Pairs Class — two magnificent males of totally different genera, let alone species! Since then, I have, on several occasions, been called upon to act as referee regarding disputed identifications, often when the disputants were near to coming to blows. Those of you who have met me will realise that it is not desperately funny for someone my size to find herself playing Kissinger to two large men about to declare open warfare.

Now, before anyone grabs their pen to complain that I am being unfair to judges, I must add that, on many occasions, the judge has been right; on others, neither has been right; and on yet others, we have all eventually admitted that we don't really know. I also know several judges very well and know them to be hard-working individuals devoted to the hobby, and I have spent a lot of time helping the 'Governing Bodies' update their data on cichlids, not only those already available, but those which might crop up in the future.

SUGGESTIONS

There is, clearly, a problem, and I have no doubt that it affects groups other than cichlids. As I am, I hope, impartial (I don't show my fish), perhaps I can suggest a few ideas for both sides to think about.

Registration

Accurate identification of fishes can be a very difficult business, and, often, the only way to be sure is to do a morphometric analysis, which, regrettably, means a dead fish . . . end of story as far as showing is concerned. So no-one, judge or exhibitor, should dig their heels in too hard unless the species is well known to everyone, well known to the person concerned, or has a pedigree traceable back to properly diagnosed individuals (as with the *"C." zonatum* mentioned above). It would, perhaps, be useful to establish some sort of registration system for show specimens. It is, after all, done with cats and dogs and horses, so why not fish?

If the owner can produce evidence to show what his/her fish is, and this is acceptable to the Governing Body (eg FBAS, A of A, etc) then why not issue some sort of certificate to that effect, which could then be produced at shows in the event of a dispute? An increased interest in correct identification would be advantageous to the non-showing hobbyist as well, and if the identification were increasingly regarded as important, I'm sure the trade would be pleased to co-operate. Strains of Discus have pedigrees, so there is already a precedent. I am sure that the serious exhibitor (and/or breeder) would be happy to pay a small adminstration fee (because admin would be necessary and would have to be financed) in order to avoid disputes.

Data are available for most species, if not all, so if the identification is assured, there is no problem with standards. Registration would also, perhaps, show up the type of person who buys a fish and then claims to have bred it — and this does happen.

I don't know if this is too ambitious; I don't know if the authorities would co-operate, but I think that if I were the *"C." zonatum* owner mentioned earlier, I would get written evidence of the pedigree, and of the variety of assorted IDs over the showing year, and then send the details to the powers-that-be, with a letter of protest. If enough people did this, instead of grumbling privately, then perhaps action would be taken.

I would not be surprised to learn that the authorities are unaware of the extent of the problem. People have a horrid tendency to mutter revolution to their friends, who can do nothing, instead of complaining to the people who can take the necessary action.

Supporting evidence

However, it is important that the fishkeeper be reasonable in his/her attitude. It is not sufficient that you were sold the fish as such-and-such. *Pseudotropheus socolofi* is still, 17 years since it was described and officially named, sold almost universally as *"pindanni"*. *Apistogramma borellii* is still sold as *reitzigi*, though mercifully, few people now label *cacatuoides* as *borellii*.

If your only ID is what the fish was sold as, and a helpful judge attempts to put you right, don't argue, but consider what (s)he has told you, look for further evidence to support one ID or the other. Of course, if you, once again, get a different ID from every judge, then you do have a problem.

Unjudgeable fish

Equally, it is very important to accept that some fish are not identifiable without sacrificing the fish, and that some species available to us, the hobbyists, are unknown to science, and thus there are no data by which they may be judged when they first appear. After a while, we learn how big they get, what constitutes good colour, etc — but when a new, unidentified fish first arrives it is really unjudgeable, and a waste of time to show it at all. The quality of anything can be gauged only in relation to some sort of norm, and

MAX GIBBS, GOLDFISH BOWL, OXFORD

Apistogramma borelli — sometimes sold as *A. reitzigi* or, less frequently, as *A. cacatuoides*.

MARY BAILEY

A fine specimen of *Cichlasoma* (possibly) *amazonarum*. This fish was a 'contaminant' in a shipment of *Aequidens dorsiger*, and was sold as such. It is certainly a good specimen but cannot be judged fairly for size without being correctly identified.

MARY BAILEY

A hybrid between *Pseudotropheus socolofi* and *Melanochromis auratus*. Unless the true nature of its identity is known, serious problems can arise when such a fish appears on the show bench.

MARY BAILEY

Another potentially confusing species is *Nanochromis parilus* (this is a female), which is almost invariably sold as *N. nudiceps*.

without a norm to go by, judging is not feasible. People seem to find this concept difficult to grasp.

Judges, for their part, should be prepared to admit they don't know, embarrassing though this may be. I know! But if you pretend to knowledge you don't have, or use your position of expertise or authority to lay down the law without justification, then you will breed resentment and lose respect. Far better to say you don't know what it is, but help the owner to find out if possible.

New imports

I have said above that it is pointless to show a new unidentifiable fish with no available standard; but it is vital that the judging authorities should make themselves aware of new imports and set standards as soon as feasible, even if the fish lacks any formal identity.

It would be ridiculous if hundreds of people had a particular fish but could not show it because it was undescribed; it remains pointless, however, to expect any judge to cope with the first Orange-spotted Oojamyflip seen in UK!. And, for all you know, it could be an absolute runt with appallingly poor colour.

I am sure the various specialist societies would be delighted to help with the necessary research and data collection.

This type of research into new species would, hopefully, weed out any hybrids purporting to be true species, as by their very nature, these would not become established.

Credibility

It is important that judges should not leave themselves open to ridicule by errors such as the 'pair' of Rifts I mentioned earlier. It is totally wrong that anyone should be judging a class of fishes if (s)he lacks the basic expertise needed to spot such an obvious and gross misrepresentation, deliberate or innocent.

If one wishes to be any sort of expert, then one must have knowledge and establish credibility. I can find no excuse for awarding top marks for deportment to an Angel blind in one eye, which consequently 'sits' immobile in the show tank with its good eye to the front, watching the crowds.

That is another true story, and if a passing aquarist can spot it ("Hey Mary, come and have a look at this Angel, it's blind!") then a judge certainly should.

CLOSING REMARKS

Well, I've said my piece, and I hope it makes some sort of sense. I usually try to steer clear of controversy, so I hope readers will accept this as an impartial attempt to help, and that I won't be deluged with irate letters from exhibitors and judges, and that no-one tries to punch me on the nose at the next show I attend!

I *do* hope, however, that perhaps a few people will be prompted to do something about the very real problems that exist.

Reflections

By David Sands

THREATENED WORLD

By the time this goes to press, I will have attended a scientific congress in Holland. The theme of this week-long get-together is *The Threatened World of Fish*.

The subject is appropriate for debate as aquatic ecosystems diminish, water pollution increases and the human population figures reach billions.

Fish are often forgotten; when water authorities want to rid themselves of excessive aluminium levels tipped into the water supply by mistake, they flush the concentrate into the nearest water and suddenly thousands of fish are floating dead by the banks. I once read a report on water pollution that detailed fish losses and finished by stating that "No wildlife was affected. . ."

You can imagine the seething letter I wrote to the editor! I have said before that fish come second best because we eat them and not dogs, cats and horses (I'm talking about the UK!).

I've always liked fish. I find the texture of scales wonderful. I find the way some species aggregate dazzling. Some fish have characters and tenacity and show incredible bravery rarely surpassed in the animal kingdom. Fishes live in a world alongside ours. They rarely harm us, often feed us and are the most misunderstood of all creatures on our planet.

The truth is, our world would be much poorer without fishes . . . *we* wouldn't exist without them. If their world is threatened, then ours is too!

The North American Indian Chief who warned 'white men' over 150 years ago that ". . . all the world is a web and we are all strands in it . . . break one and the whole can be threatened. . ." (or words to that effect) instinctively must have known what the future held for the greedy and the ignorant.

Fish often get the rough end of the deal, and I wonder how we can redress the balance. Taking special care of the fishes in our keep is a primary example, but not the 'full colour' of the way forward.

I will attend the international conference with an open mind and hope to report good news. I think everyone is a bit wary of the gloom and doom, with writers like me preaching on in print.

Let's hope there's a common agreement to go with a common theme and the *Threatened World of Fishes* can be replaced with understanding *The World of Fishes* — because there is *so* much to learn.

CATFISH IN CORNWALL

I had a very enjoyable stay in Cornwall with **Derek** and **Pat Lambourne** (President of the Catfish Association of Great Britain, and his wife) including a successful interview on BBC radio Cornwall as a guest of the local fishkeeping society.

Visitors for my lecture came from as far away as Plymouth and from deepest Cornwall and a very enjoyable evening was had by all. (I have to admit to nipping into the pub after my talk with friends **Bill Rundle, David Price,** 'The Flying Scotsman' and **Peter Burgess** of Plymouth AS because it had been my round since Weston-Super-Mare!)

I hope that fishkeeping is as buoyant everywhere else — when times get tough, hobbies get going.

What better hobby is there beside fishkeeping? Happy fishkeeping, wherever you live!

WATER WORKS

It seems an age ago that fishkeepers didn't want to know about water chemistry. Only the 'boffin' buried his/her head in chemistry books for information that might have been relative to fishkeeping.

Now, more and more aquarists are prepared to look into water quality. Most test kits available today appear to be superior and more 'user-friendly'. Gone are the days (I hope) when even very experienced fishkeepers would announce with some deliberate casualness, "If it won't live in my tank/tap water — I don't keep it!".

We all know different these days and, certainly, it helps to have as much information as possible. Then, when things do go wrong, as they can, the process of elimination is speeded up considerably.

In a recent special survey of Red Tail Catfish club members, nitrate levels in aquaria in which large RTC's are kept has been investigated. The full results are outstanding and I will save them for a special article. One of the main factors illustrated in this unique water quality survey showed that a great many Red Tail Catfish-related health problems can be linked with excessive nitrate levels.

Without the present test kits we would all be in the dark, not only about the levels of nitrates in tank water, but also in tap-water.

I have discovered through the survey that a great many water authorities have little option but to offer nitrates straight out of the treatment plants. It's no good doing a water change to reduce high nitrate levels if the water change is just going to replace one level for a slightly lower one.

If high nitrate levels are unhealthy for fishes I wonder how unhealthy they are for humans? Luckily, we can take our oxygen straight from the atmosphere! Should you become a fish in your next life (à la Buddha) you might well discover to your horror just how difficult it is extracting oxygen from polluted water.

Never mind the high carbon dioxide in acidic water. . . what about brain-dulling nitrates on top . . ? It doesn't really bear thinking about.

Having easy-to-use test kits helps keen fishkeepers considerably, and I must state that a slightly more 'user-friendly' nitrate kit would go down a bundle at the moment. Does anyone out there know about an easy-to-use nitrate test kit?

AMANDA JANE SANDS

While in Cornwall for a recent lecture, I took the opportunity to check out a Cornish brook for aquatic plants. Other brooks elsewhere in the country are not quite so healthy, thanks to 'fertilised' run-off from surrounding fields.

AUTHOR LOTTERY

I have often wondered how publishers choose authors for books. I'm sure that, for specialised books, it's a kind of a lottery, because some authors seem to know less about fish than most fishkeepers.

In one author's case, I would say that he appears to copy everything from everyone else's books . . . Please, publishers . . . half the readers of this magazine can do that . . . so why not just have a raffle?

AQUARAMA '91 HIGHLIGHTS

Aquarist & Pondkeeper editor **John Dawes** reports on an exceptional biennial event that has rapidly become established as one of *the* high spots of the international aquatic calendar.
(Photographs, unless otherwise indicated, by the author)

Surprise presentation from Dr Tang Cheng Bok, Member of Parliament for Ayer Rayah — an engraved plate in acknowledgement of *A&P*'s support during the lead-up to Aquarama '91.

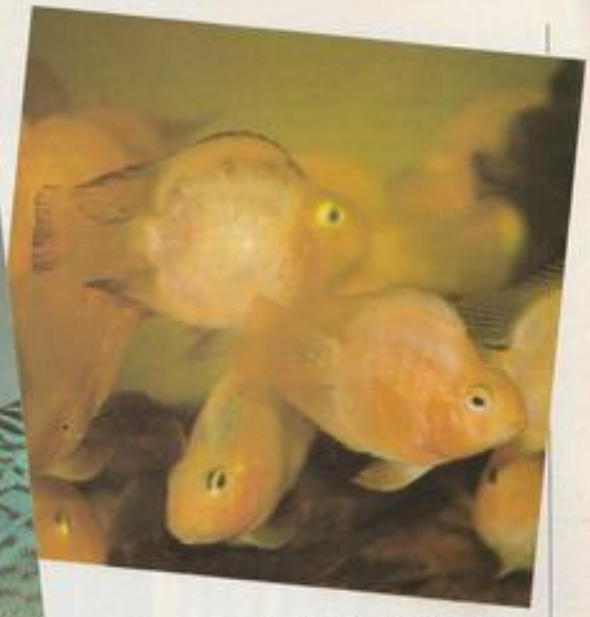
Organising a local fish show is, to say the least, a challenge. Running a regional or national one like, say, the British Aquarist Festival scheduled for 26–27 October at Bowler's Exhibition and Conference Centre in Manchester, could be said to be a challenge with a capital 'C' (or a major headache, if you're that way inclined).

Step up into the international arena, throw in a conference for good measure, and then organise the show over a four-day period — opening up at 11.00 am and closing up shop at 6.00 pm on two days and at 9.00 pm on the other two — and one could be forgiven for thinking that you probably need your head examined for taking on such an apparently impossible task!

I therefore take my hat off to Irene and Helen Goh and their team at Academic Associates Pte Ltd. Not only did they tackle the challenge, but did so magnificently, staging a show between 27 and 30 June at the World Trade Centre in Singapore that will set the standard for years to come.

True, they had some assistance from the Singapore Aquarium Fish Exporters' Association (SAFEA), and were supported in one way or other by Ornamental Fish International (OFI), Singapore's Primary Production Department (PPD), the Singapore Aquarists' Association and PETS

Below, prize-winning Red Oranda. It's impossible to gauge the real size of this giant specimen from the photograph. It was about 12in (30cm) from snout to tip of tail!



Above left, how about this for a Hi-fin Discus?

Above right, making their first official public appearance at Aquarama were these Blood-red Parrots — a cross between a Severum and . . . what?

Below, an unusual combination of coldwater and tropical fish spotted in the Furnished Aquarium Display — Discus and Goldfish. But then, what does 'coldwater' mean in the Tropics?

Europe, with more than a little bit of help, both publicity-wise and 'advisory-wise' from us here at *A&P*. Still, the onus was very much on Academic Associates to 'produce the goods on the day', and this they did in a display that attracted people like a magnet from all over the world.

MASS TURNOUT

As keen-eyed *A&P* readers will have noticed over the past year or so, our occasional news items and updates on **Aquarama** have repeatedly mentioned that all the signs emanating from Singapore indicated that interest in this, the second International Aquarium Fish and Accessories Exhibition and Conference, was running even higher than for the first event held in June 1989. In the end, nearly 90 trade exhibitors booked stands, some going for a larger display area than they had taken in 1989, others for the first time.

During the first show two years ago, the doors were opened both to the trade and public for the whole of the four days. This resulted in a mind-blowing attendance figure of over 50,000 people! When you consider that the total population of Singapore is only around 2.8 million, this is pretty good going (an understatement if ever there was one).

Healthy though the attendance undoubtedly was, it did create a problem in that visiting members of the aquatic trade had to try to do business with exhibitors in the hustle and bustle of a packed exhibition hall — hardly the most conducive atmosphere for sealing deals and establishing new contacts.

This year, the first two days were set aside strictly for the trade. The result — a most encouraging one — was that almost 2,400 delegates attended, and they came from virtually every corner of the globe. Both they and the exhibitors were, quite naturally, delighted.

On the third day, the public flooded in (there's no other word for it). In two hectic days of continuous ebb and flow, nearly 31,000 visitors turned up (30,803, to be exact).

Wherever you went, and whenever you went there, there were people milling around the exhibits, asking questions, discussing problems and (towards the end of the show), buying. Even at 8.00 pm on the last day, it was still difficult to move around.

AQUATIC DISPLAYS/ COMPETITION

A substantial corner of the exhibition hall was dedicated to a dazzling display of individual furnished aquaria, one or two containing what could be termed 'unusual' fish combinations, such as Discus and ... Goldfish ...!? On one side of this assemblage was an equally-impressive composite display of 20 tanks (again, fully furnished), this time set up by members of SAFEA and sponsored by Aquarama's 'official airline' Singapore Airlines (who also hosted a quite superlative dinner/buffet at the incomparably elegant Goodwood Park Hotel.

Flanking the individual furnished aquaria on the other side, were the tanks housing the fish that had been entered in the official traders' competition. While the range of species was, surprisingly, quite restricted, the number and quality of the entries was something else. Those who occasionally knock the quality of Singapore fish should visit Aquarama. They'll be hard pushed to find any fault with any of the fish on show.

I can tell you one thing for sure: the Singapore producers are real masters of their craft, and I have not seen any substandard fish in any of the numerous breeders' premises and fish farms I've visited for a very long time now. Yes, of course, we sometimes see Singapore fish in less-than-good condition in this country, but perhaps we should be looking elsewhere for the weak link, because it certainly doesn't lie at the producers' door.

It was busy ... and how ... through the whole of the four days. Mind you, no one was complaining!

Back to the competition ... I know I speak for my fellow judges — who included representatives from the US, Germany, Thailand, Japan, Netherlands, Taiwan and, of course, Singapore itself — when I say that, if our job proved challenging, it was because we found ourselves having to decide, not between poor, average and good fish, but between very good, excellent and really superlative specimens.

The judges in the (later) Koi competition staged by the Singapore Koi Keepers Society didn't have it any easier either. In fact, I am now convinced that the very best fish owned by top Singaporean Koi Keepers are every bit as good as those you'll find anywhere. If in doubt, just ask this year's judges Chikahisa Kusune or Kato Masao, both of Zen Nippon Arinkai, or Shigezo Kamihata, from Kamihata Fish Industries, manufacturers of Hikari Koi Foods.

CONFERENCE

When I attended the first 'unofficial' Aquarama in 1987, staged to commemorate the re-opening of the Van Kleef Aquarium (now, sadly, closed once more in preparation for privatisation), the lecture programme consisted of just one presentation ... mine.

By 1989, the programme had grown into a fully-fledged conference at which over 40 papers were delivered, including one from our regular 'Coldwater Jotter' Stephen Smith, one from me ... and several from the one and only, and sorely missed, Rodney Jonklaas. Rodney was one of the true gentlemen and long-time ambassadors of our trade and hobby. It therefore gave me great pleasure to dedicate the publication of the *Aquarama '89 Proceedings* which I have had the honour to edit, to him, albeit posthumously. (See last month's *A&P* for a full review from Dr David Pool of the Tetra Information Centre).

This year, the conference was, again, a big affair, with papers presented by a whole host of international speakers, including Heiko Bleher, Dr Chris Andrews (well-known to *A&P* readers), Rick Gibson (who occasionally also writes for us, as he has done this month), Keith Davenport (formerly of Sparsholt College and now of OFI-UK) and Kapila Tissera (Assistant Director of the Sri Lanka Export Development Board (old friend of Rodney Jonklaas and Keynote Speaker at the session which I chaired).

By staging these conferences alongside Aquarama, the organisers offer visitors two unique opportunities: that of seeing all the latest aquatic products, and genning up on all the latest scientific developments that have a direct impact on the industry, all in the space of four days of intense activity.

CLOSING THOUGHTS

Aquarama has gone from strength to strength since the idea was originally 'put to the test' in 1987. The first 'official' Aquarama in 1989 showed that there was a great need for a truly international aquatic gathering of hobby and trade. This year's event has now taken things a significant stage further, to such an extent that Aquarama has now become a firm fixture in everyone's calendar. So make a note, whether hobbyist or member of the aquatic industry ... leave a gap in your diary for the second half of June '93 ... it will be here before you can say **Third International Aquarium Fish and Accessories Exhibition and Conference!**

Paper Round

By Dr Ian Winfield

FISHES OF THE IGAPÓ LEAF LITTER

Many readers will remember the television series on the wildlife of the Amazonian igapó, or flooded forest, even though it did not feature the fish life to any great extent.

P. A. Henderson of the Marine Biology Unit of Fawley Power Station, UK, and I. Walker of the Instituto Nacional de Pesoquisas da Amazonia, Brazil, have recently produced data which challenge the common view that acidic blackwater streams flowing through such habitats are impoverished with respect to their fish life.

In one small stream, over 20 fish species were found at average densities of 100 individuals per square metre, not in the open water, but in association with leaf litter banks. Some species such as *Apistogramma* cf *regani* were usually found to rest on the surface of the litter, entering it only when disturbed, while others, including *Elachocharax pulcher* and a knifefish, *Hypopygus* species, lived just within the litter itself, at least during the day.

Most remarkably, a pygidid catfish, *Phreatobius* species, was found to live in litter actually raised out of the water, where it burrows up to 0.5m (c 19in) below the surface and probably lives at the interface between the ground water and the air. This effectively semi-terrestrial catfish has no visible eyes or scales and is bright red when alive, probably due to high haemoglobin levels which enable it to utilise the very low oxygen levels of its unique habitat.

(**Source:** *Journal of Fish Biology* 37, 401-411.)

MOONLIGHT AND SPAWNING IN TANGANYIKAN CICHLIDS

K. Nakai of Kyoto University, Japan, working with a number of colleagues, has found that eight species of substrate-brooding cichlids in Lake Tanganyika belonging to the genera *Lamprologus*, *Lepidolamprologus*, *Neolamprologus* and *Altolamprologus* synchronise the peak of their spawning activities to the second quarter of the lunar cycle.

One possible reason for this timing was suggested to be that the nocturnal guarding-efficiency of the fish benefits from the 'extra' light of the full moon. Evidence for this suggestion is found within the group of species studied, as open-substrate spawners showed the most marked synchronisation, while species employing concealed sites were more variable.

(**Source:** *Journal of Fish Biology* 37, 589-598.)

JOHN DAWES

Numerous 'corners' like this occur within the Amazonian flooded forest in which the leaf litter (seen here below the surface) hides a wealth of fish species.

DECLINING AMPHIBIA

Numerous authors have reported that amphibian populations are declining in many parts of the world.

Andrew R. Blaustein of Oregon State University and David B. Wake of the University of California, U.S.A., have analysed such reports from North America, Central and South America, Europe, Asia, Africa and Australia. While well-publicised habitat destruction can account for some of these declines, there are also marked reductions in areas apparently free from human interference.

For many species, contractions in distribution ranges and population numbers seems to have begun in the mid 1970s. Surprisingly, the reductions are not seen in all amphibian taxonomic groups at any given locality. In addition, there is little evidence of declines in species living near the equator at low altitude, except where their habitats have obviously been affected by man.

There is little evidence at this time for a single, global causal factor for the observed declines, including predator introductions, pesticide pollution, acid rain and even consumption by humans. It is also possible that climatic change, acting through increases in ultraviolet radiation or higher temperatures, may be involved.

Plans are being drawn up to initiate long-term studies of selected amphibian populations and to carry out more extensive evaluations of historical records.

(**Source:** *Trends in Ecology and Evolution* 5, 203-204.)

RED LAND CRABS IN RAINFORESTS

While land crabs have become increasingly popular with hobbyists over recent years, Dennis J. O'Dowd and P. S. Lake of Monash University, Australia, have been studying one particular species in its natural habitat, the rainforest floor of Christmas Island in the Indian Ocean.

The Red Land Crab (*Gecarcoidea natalis*) is abundant in such places and reaches densities of 2.6 individuals per square metre. By deliberately excluding land crabs from certain parts of the rainforest floor, O'Dowd and Lake showed that these animals are important herbivores in such habitats and consume significant quantities of tree and vine seedlings.

Grazing by the crabs may consequently influence the abundance and composition of establishing plant communities, as do the activities of insects, mammals and fungal pathogens in mainland habitats.

(**Source:** *Oikos* 58, 289-292.)

HOPLOS IN THE EARLY HOURS

In addition to being a very popular aquarium fish, the Hoplo or Atipa (*Hoplosternum littorale*) is becoming of increasing interest in aquaculture in its native South America.

T. Boujard, P. Keith and P. Luquet of the INRA Hydrobiologie, France, have recently been looking at the potential role of the timing of feeding in improving production efficiency. Observations were made of feeding behaviour over periods of 24 hours of groups of Hoplos reared in tanks equipped with demand feeders and controlled lighting conditions (13.5 hours light, 10.5 hours dark). Feeding started at dusk and increased to a peak between 02.00 and 05.00 hours, during which period the fish consumed 40% of their total daily ration.

Subsequent experimental manipulations of the lighting conditions showed that light was the synchroniser of this behaviour, rather than changes in factors such as temperature or dissolved oxygen. Hoplo keepers wanting to achieve maximum growth in their aquaria should perhaps consider buying an automatic feeder, or if they are really keen, just an alarm clock!

(**Source:** *Journal of Fish Biology* 36, 133-140.)

News

Margate trader fined

Although we (quite rightly) pride ourselves in being able to boast numerous excellent aquatic shops throughout the country, **Gary Hixon,** *reporter at the Thanet Gazette, brings us disturbing news of a retailer who recently fell foul of the law.*

Bailiffs who broke into a shop in Margate found tanks containing hundreds of dead tropical fish, and mail dating back two months piled against the door.

In court an RSPCA official described the scene as "catastrophic" and said that more than 550 fish had been killed through lack of heat and light.

The shop, Kent Aquatics Ltd., had been closed months earlier due to the recession, but the owner claimed he had regularly visited the premises to feed the fish. He denied six specimen charges of abandoning and causing unnecessary suffering to more than 100 tropical fish, but was found guilty on all counts after an eight-hour hearing, was fined £450 and ordered to pay £200 towards prosecution costs of more than £1,900.

The owner had earlier claimed that a gas heater and electrical pump system broke down simultaneously a few days before the RSPCA's visit, but this was dismissed by the magistrates.

Mr Louis French, prosecuting for the RSPCA, said the retailer had lied about his more recent visits to the shop, that the fish had been abandoned because they were too expensive to keep and that the likelihood of the gas heater and pumps "mysteriously stopping" was too unlikely to be plausible.

Prosecution witnesses included RSPCA inspector Christopher Towler, who visited the shop after bailiffs broke in and found the dead and dying fish. He said that the building smelled of stagnant water and was littered with debris. Envelopes with post-marks dating back two months were piled against the door.

"When I first went into the tropical fish rooms, the first thing I noticed was how cold it was when it should have been hot. I had to keep my outside overcoat on to work comfortably," Mr. Towler said.

He went on to describe the lack of working pumps, lighting and gravel filtration, and the hours of painstaking work that had gone into cataloguing the dead fish and putting dozens of others to sleep.

He described the scene as "catastrophic" but admitted that when the owner arrived at the shop, he appeared genuinely concerned with the welfare of the fish.

Mr Raymond Butcher — a vet called upon by the RSPCA — added that, in his opinion, photos of the fish showed that they had been dead for several days and were beginning to decompose.

In his defence, the shop owner told the court that Kent Aquatics had once been a thriving business with an import licence for more than 500,000 fish, but that the company had fallen on hard times in late 1990.

He said he was "astonished and shocked" by what he saw when he visited his shop after the RSPCA raid, but claimed he had visited the premises just three days earlier. On his last visit, he had fed the fish and caught others to be sold to several shops, but no hard evidence of the sales could be proved.

Although one of the shop owners appeared as a witness, it could not be proved that the fish came from the Margate shop. In addition, the defendant also contradicted another witness over the date of a visit.

He also said that he had cared for the fish and would never have let them suffer, and added that the mail build-up was junk mail which he never opened. Although he could not prove why the pumps failed, he said the wind had blown out the gas heater as had happened once before during the 1987 hurricane.

"I did the best I could to look after those fish to the best of my ability. Their value didn't matter — they were still fish — and I wanted to keep some of them myself because they were quite rare."

William Sinclair's £1.9m King British Acquisition

One of the leading suppliers to the garden leisure and pet markets, **William Sinclair Holdings plc,** has purchased the entire issued share capital of **Keith Barraclough Aquarist Limited** (KBAL) whose principal operating subsidiary is **King British Aquarium Accessories Company Limited,** for £1.875m.

Based in Bradford, Yorkshire, King British produces an estimated 20 million fish meals per week, plus water treatments for ornamental fish. As readers of this magazine know, King British is one of the leading brands in the U.K. aquarist market. What many *A&P* readers may not know is that King British exports to 32 countries, this accounting for 25% of all sales. The Directors of KBAL will continue in their present roles and will be responsible for the future growth of the company.

Commenting on the acquisition, **Keith Barraclough,** managing director of KBAL said "As the only manufacturer of fish foods who also deal in livestock, we obviously claim to have expert knowledge of our business. The tie-up with Sinclair will enable us to expand through technology and continually improve the healthcare of fish".

Peter Barton, managing director of William Sinclair, said that the acquisition was a logical progression in the development of their expanding Pet products Division. The pet and aquarist markets are supplied by a diverse range of companies and the directors see opportunities to expand and develop their current activities in this market and to acquire further companies in the same area of activity.

William Sinclair supplies a wide range of products to the garden leisure and professional horticultural markets, where its major brand is J. Arthur Bower's. It also operates in the pet market under the name Altons, manufacturing treats and feed supplements for the pet and equestrian markets.

For further information contact: **Peter Barton, Managing Director, William Sinclair Holdings plc, Firth Road, Lincoln LN6 7AH. Tel: 0522 537561.**

Dorset Company sends tanks to the Gulf!

A Dorset company has just shipped a dozen bomb-proof tanks to the Gulf!

But the super-strength tanks built by Weymouth-based Sea Life Centre Technical Ltd are of the fish, rather than the military, variety. They are bound for a new fisheries research centre in Aden in the Peoples Democratic Republic of Yemen.

BIGGIN LYONS AND ASSOCIATES

During one of his first visits to King British, Peter Barton (right) learns a little about the aquatic market from Keith Barraclough and a Giant Gourami, one of the possible 1200 species and varieties stocked by the company.

SEA LIFE CENTRE (HOLDINGS) LTD

'Testing' one of the bomb-proof tanks being shipped out to the Gulf by Sea Life Technical Ltd.

Sea Life Centre Technical, of the Granby Industrial Estate, Weymouth, won the contract to build the 12 tanks because of its expertise in constructing heavy duty aquarium displays which it normally produces for the UK chain of Sea Life Centres. The company has become a European leader in the field of glass and acrylic tunnels.

The Aden consignment is of 12 fairly small glass-fronted tanks, but the Chinese company which is building the new research centre particularly wanted tanks which would withstand nearby bomb-blasts in the event of renewed conflict in the troubled Gulf region.

It was the Weymouth company's first overseas order, but further possible contracts for a variety of aquarium displays are being negotiated for Scandinavia, Italy, France, Belgium and Holland.

The company's expertise is also in demand for projects other than Sea Life Centre developments within the UK. For example, they are also providing underwater viewing windows for a huge new penguin pool at Edinburgh Zoo.

For further information contact: **Mark Oakley on 0202 896289.**

Anglo Aquarium wins coveted Hampton Award

Enfield-based Anglo Aquarium Plant Company, one of Europe's leading growers of aquatic and moisture-loving plants, has won yet another accolade — one of the seven highly rated Tudor Rose Awards at the recent Hampton Court Palace International Flower Show.

With assistance from **Nick Evans** of Capel Manor, the stand was designed by **Mark Hayne** and **Steve Day,** both of whom also played a prominent part in the construction.

The theme was 'The Water Hole' and comprised three ponds of varying sizes. The top pond was a standard fibreglass one, such as can be obtained from water garden specialists. From here, the water ran through a hollow tree trunk into a butyl-lined pond surrounded by raised rockeries.

A simple but effective flight of steps constructed from railway sleepers, led onto a wooden patio complete with arbour and wooden seat. The water then dropped from the second pool into a stream which ran under a curved, wooden bridge into the last and largest pond containing only indigenous plants.

One of the attractions of the stand was the fact that it would be possible to recreate each pool, or a combination of them, in the average family garden.

Anglo Aquarium took advantage of the fact that they were close to the famous Hampton Court Long Water and planted the section opposite their stand heavily with marginals and floating plants. They also sponsored the planting of the Bailey Bridge with other varieties of marginals.

It is estimated that over 200,000 visitors saw the displays this year, and **Rosalind Everett,** Anglo's Marketing Director, was delighted with the enormous interest shown in their exhibit.

ANGLO AQUARIUM PLANT COMPANY

Part of Anglo Aquarium's prize winning display at the Hampton Court International Flower Show.

Weston Up-date

An impressive list of speakers has been booked for this year's 'Supreme Weekend of Fishkeeping' which is taking place at Pontins Holiday Centre, Sand Bay, Weston-super-Mare, on 9/10 November 1991.

Speakers include:

Gordon Kay: (contributor and columnist to *Aquarist & Pondkeeper*).

Dr P Burgess: (Plymouth Polytechnic).

Dave Garratt: (B.M.A.A.).

All will be speaking on various aspects of Marine Fishkeeping, Disease Problems and Conservation.

Tony West: (Chairman British Koi Keepers Association).

Brian Walsh: (Characins).

Dr David Ford: (Aquarian Advisory Service, speaking on Nutrition).

Adrian Excell: (Water Technology and Chemistry). Bring a sample of your aquarium or pond water for FREE TESTING!

There will also be a special guest speaker from Germany: **Manfred Mayer.** Manfred has written many articles for publication in Germany and is the author of many scientific papers. He will be speaking on Cichlids.

Airport Aquaria of West Drayton, Middx, have generously donated a fabulous Furniture Aquarium set-up worth over £800 for a FREE DRAW, open to all visitors.

The **F.B.A.S.,** in conjunction with Pontins, have arranged a fabulous weekend's entertainment, including cabarets. A weekend break from Friday to Sunday is only £57 per person (contact **Colin Richards – 0494 772552** for details), or day visitors will be admitted from 10am – 5 pm for £1.50 per adult, 50 p per child.

It's a great weekend to learn about fishkeeping and for the family to enjoy an extraordinary 'value - for - money' break.

Trade displays, beginners' demonstrations, fish displays, and specialist society advice centres will all be featured . . . and we *(Aquarist & Pondkeeper)* will also be there. So, book now and make a date to see us at Weston . . . tide permitting!

Pet Show Re-scheduled

The Pet Show, organised by Barker Brown, and scheduled to take place at Wembley from 24-26 August this year, has been re-scheduled, to take place over the May Bank Holiday — 2 - 4 May, 1992 at Earl's Court.

The change of dates is the result of requests from within the industry to re-schedule the event, so that there would be no clash with other major shows.

Full details will shortly be re-mailed to the industry. For further information contact: **Barker Brown Limited** on **071 637 3313.**

ADVANCED WATER MANAGEMENT FOR TROPICAL FRESHWATER AQUARIA (Part 2)

Berti Gesting of the Aquatic World completes his two-part review with a detailed look at the various, interconnected aspects of filtration/purification.

BERTI GESTING

An attractive medium-sized set-up in which the plants provide all the oxygen required both for their survival and that of the fish.

Adequate water treatment is crucial if we are to stand any real chance of maintaining a well balanced, well planted tropical freshwater aquarium. Yet, without a good grasp of the processes involved, the likelihood of achieving the desired results is pretty limited.

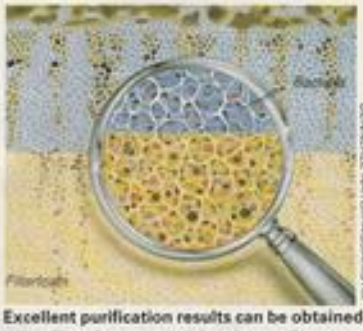
FILTRATION

Which is the 'right' filtration for a freshwater tropical aquarium? The correct size and capacity of the filter is not determined by the size of the aquarium, as it is very often suggested, but by the amount of organic compounds in the water. The deciding factor, therefore, is the fish stocking level or, to be more precise, the amount of food which finds its way into the aquarium. Where it comes from makes no difference, whether the food sinks uneaten to the bottom where it decomposes, or whether it enters the aquarium via the digestive system of the fish.

This means, for instance, that an 80-litre tank (17.6 gal) with 120 Neon Tetras has to be filtered very intensively indeed, while a 500-litre (110 gal) aquarium with lush plant growth and only 30 Neon Tetras doesn't need any filtration at all! As a rule of thumb, the filter in a well planted tropical freshwater aquarium should turn over the volume of the tank a maximum of once every hour.

Filter materials

The filter material itself (exception: carbon or peat) does not take an active part in the filtration process itself; it only collects the dirt (passive, mechanical function) and provides the surface area for bacterial colonisation. It should, therefore, have the largest possible inner surface area and, at the same time, be chemically neutral.



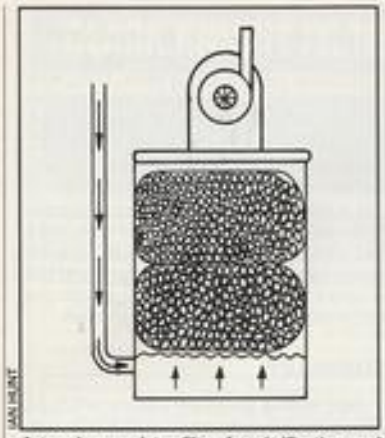
DENNERLE NATURE AQUARIUM

Excellent purification results can be obtained using filter foam containing dense, fine open pores.

Some of the best results have been achieved with the type of filter foam having fine, open pores which retain the water for some time and form oxygen-free 'islands', in which the biological reduction processes are considerably intensified. (Foam with large pores or other material, like sintered glass, lets the water flow through too quickly, in my opinion, hence the suggestion that is often made of using a by-pass filter. This works, of course, but to a lesser degree.)

Filtration processes

To understand the processes that take place inside the filter we have to go back to the organic compounds in the aquarium (see Part 1, Sept '91). As has been established earlier, the main source of these compounds are food remains and fish waste. This means that a large portion of it is albumen (protein); in other words, organic compounds with a 15–18% high proportion of nitrogen. Through the



A two-bag canister filter for nitrification and de-nitrification purposes.

oxidising purification process aided by bacteria which takes place in biologically well established aquaria, and even more intensively inside the aquarium filter itself, the organic nitrogen is set free in the inorganic form of ammonium:

albumin → amino acids → ammonium

Ammonia/ammonium

The ammonium-ion (NH_4^+) is, in the hygienic sense, an indicator of pollution, but it is, in itself, relatively harmless. However, depending on the pH value of the aquarium water, a part of it changes into ammonia (NH_3). Ammonia is a toxic gas which can penetrate the cell walls in the same way as oxygen and carbon dioxide.

The proportion of ammonia in the water increases in line with the pH value. If the pH value decreases, the ammonia changes back into harmless ammonium and vice-versa. This process takes place spontaneously, without any involvement of bacteria, and can be repeated at will over and over again.

As proprietary test kits always give one reading (ammonium and ammonia together), the relevant pH value has to be taken into account. Only after taking a pH test can the true level of the toxic ammonia be assessed, as the accompanying Table shows (original: **Krause, H-J.** (1990) *Handbuch Aquarien-Wasser*, **Bede, Kollnburg**).

Example:

If the test kit shows 0.5 mg/litre ammonium/ammonia at pH 7.0, the level of toxic ammonia is only 0.003 mg/litre. This is far below the critical level of 0.02 mg/litre.

This table is only valid at a temperature of 24°C (75°F). For every 1°C higher or lower, the above values increase or decrease by up to 4%.

This shows that at a pH value of less than 7, under normal circumstances, the toxic ammonia does not even register.

An increase of the pH value through partial water changes, over-filtration, over-aeration or lack of CO_2 can set free the toxic ammonia and fish losses are likely. The loss of fish in these cases is not, as widely assumed, caused by the sudden influx of fresh tapwater or by a jump in pH value, but by ammonia poisoning!

Ammonium, or respectively ammonia, does not only occur through the bacteriological breakdown of proteins. Fish excrete daily around 0.03% of their body weight in ammonia; not only through urine or droppings, but also (most of it) directly through their gills.

Nitrification

For our aquarium plants, ammonium is a very welcome peovider of vital nitrogen. Well growing plants assimilate daily up to 0.1mg of ammonium for every 1 gram of their own weight. (Ammonium forms an important part of most proprietary liquid plant foods.) In most aquaria, however, the production of ammonium is higher than the amount the plants can consume. This excess is, under normal conditions, oxidised further by bacteria via nitrite to nitrate. (The bacteria involved in the process are *Nitrosomonas* and *Nitrobacter*.)

The nitrate-ion is the final stage of nitrification, in other words the bacteriological oxidisation of ammonium:

Ammonium (NH_4^+) → nitrite (NO_2^-) → Nitrate (NO_3^-)

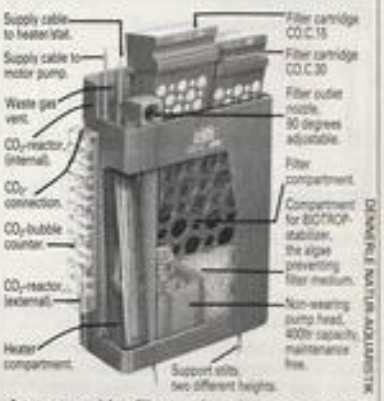
At this point, we have to take a close look at our aquarium filter again — in particular if we want our plants to grow well.

Most aquarium filters work 'oxidatively' (mechanically = aerobic nitrification), but what is needed from this point onwards is a second filter which works 'reductively' (bacteriologically = anaerobic de-nitrification); better still would be one filter which can do both.

De-nitrification

Nitrate in itself is relatively harmless to freshwater fish, and in a fish-only holding tank, with very few or no plants at all, nitrate could, up to a certain level, be regarded as a harmless rubbish dump.

Limiting values: In aquaria, we aim for values under 20 mg/litre; up to 80 mg/litre can still be tolerated by most fish; values of more than 150 mg/litre should be avoided under any circumstances. One of the reasons is that if the oxygen level drops at the same time to an extremely low concentration, the nitrate could be reduced back to toxic nitrite.



A two-cartridge filter makes the management of nitrification and de-nitrification relatively easy to handle.

As far as aquarium plants are concerned it is a different story. Tropical waters with exuberant plant growth contain usually less than 1 mg/litre of nitrate. This amount is so small that it doesn't even register with the usual test kits.

In most home aquaria, however, the nitrate level is considerably higher — in particular where plants don't grow too well and algae have become a problem. The connection between poor plant growth and a high nitrate level has been well known for some time, but recent research has highlighted the complicated relation even more (**Krause, H-J.** (1988) *Wasserpflanzen-Wachstüma und Sauerstoff.* **Teil II: Redoxspannung**).

Redox values

High Redox values promote the production of nitrates and, at the same time, impede plant growth.

(The Redox value is derived from oxidation-reduction reactions, which are commonly known as 'Redox' reactions. Oxidation is the 'addition' of oyygen to a substance, increasing the oxidation number of an element, e.g., $Fe_2 \rightarrow Fe_3$. Reduction is the 'removal' of oxygen — or equivalent — from a substance, decreasing the oxidation number of an element.)

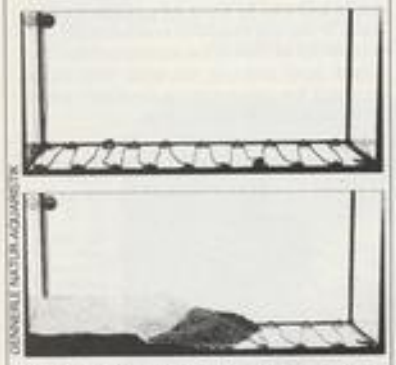
In natural waters, as well as in aquaria, the Redox value is determined by a number of simultaneous Redox reactions, and is closely linked to the O_2 level in the water. The Redox value allows a close assessment of, for instance,

Total Level NH_4^+/NH_3 (mg/litre)	Level of Toxic Ammonia (mg/litre) at pH value of					Rating
	6.0	6.5	7.0	7.5	8.0	
0.1	< 0.001	< 0.001	0.001	0.002	0.006	harmless
0.3	< 0.001	0.001	0.002	0.006	0.017	
0.5	< 0.001	0.001	0.003	0.010	0.029	
0.8	< 0.001	0.002	0.005	0.015	0.046	
1.0	< 0.001	0.002	0.006	0.019	0.057	
1.2	< 0.001	0.002	0.007	0.023	0.069	critical
1.5	< 0.001	0.003	0.009	0.029	0.086	
2.0	0.001	0.004	0.012	0.038	0.114	
4.0	0.002	0.008	0.024	0.076	0.229	highly toxic
6.0	0.003	0.011	0.036	0.114	0.342	
8.0	0.004	0.015	0.048	0.152	0.458	

< = less than

the oxidisation of ammonium via nitrite to nitrate, or the transformation of bi-valent iron (Fe_2) into tri-valent iron (Fe_3).

Waters with high Redox values usually have very high oxygen levels and are, in the hygienic sense, 'clean', with hardly any organic compounds or nutrients. Plants, therefore, cannot grow under these circumstances. In aquaria with moderate Redox values, i.e. containing more organic compounds and



DENNERLE NATUR AQUARISTIK

Suitable undergravel cable arrangement to aid de-nitrification.

nutrients, as well as low oxygen levels, plants thrive and the nitrate level is noticeably low. (Detailed Redox processes are explained by: **Stum** and **Morgan** (1981) — *Aquatic Chemistry*, **Wiley and Sons, Chichester, New York.**)

It follows that poor plant growth cannot be improved by merely removing the nitrate. It is imperative to lower the Redox value first, and this will subsequently reduce the nitrate.

Plants can, of course, use nitrate as a source of nitrogen by chemically reducing the nitrate back to ammonium, but this is only possible if iron and molybdenum are present to act as catalysts. This process, however, drains the energy reserves of the plants and slows down assimilation, to the extent that the algae get the upper hand and the plants eventually die. Therefore, the only satisfactory way to remove nitrate *and* keep the Redox value low is through de-nitrification, as a result of which nitrate (No_3^-), under anaerobic (oxygen-starved) conditions is gradually reduced by bacteria:

NO_3^- (nitrate) → NO_2^- (nitrite) → NO (nitrogen oxide) → N_2O (laughing gas) → N_2 (nitrogen gas).

The last three molecules are gases. Nitrogen oxide (NO) can only exist in anaerobic conditions and will naturally be reduced further via N_2O (laughing gas) to N_2 (nitrogen gas). This escapes over the water surface into the atmosphere, which, in any case, consists of around 80% N_2. The nitrate-ion is, therefore, completely removed (rather than merely exchanged, as would be the case with, for instance, an ion-exchanger), thus creating a 'plant-friendly' environment.

De-nitrification requires the following conditions: temperature 18–35°C (c64.5 – 95°F); pH value, preferably under 7; oxygen contents (maximum) 1.5 mg/litre.

The temperature should be no problem, while the pH value can be kept at the right level by CO_2 fertilisation. The oxygen-starved, anaerobic conditions inside the filter can be achieved as follows: the filter bacteria are fed with sufficient quantities of organic substances, i.e. the filter foam has to be dirty and sufficiently 'covered' with waste. At the same time the flow of the oxygen-containing water through the filter foam has to be greatly reduced. This way the bacteria are given large amounts of 'food' but starved of the necessary water-soluble and free-flowing oxygen. The bacteria are now forced to take the oxygen they need out of the nitrogen compounds, thus reducing these compounds biologically.

It stands to reason that, if a filter has only one foam cartridge, it can only work either 'oxidatively' or, once the filter is dirty enough, 'reductively'; but the biologically well filtered aquarium needs both at the same time to avoid any imbalance to either side. There are a number of filters on the market with two cartridges. Ideally, they should be parallel next to each other, so that they can work independently, as opposed to being stacked on top of each other. (One suitable model is shown in the accompanying illustration.)

By rotating these cartridges in a 15/30 rhythm (cleaning one cartridge on the 15th day of every month and the other on the 30th), nitrification and de-nitrification take place at the same time alongside each other. In an external canister-type filter, the same can be achieved by using two net bags filled with foam dice as filter medium and rotating these in the same fashion.

The advantage of using two net bags is that only the bag at the bottom, which always collects most of the dirt, needs to be replaced or washed out. The bag on top (already colonised with bacteria) is now placed at the bottom. The fresh one goes on top. (If coarser filter material is used, such as open-pored sintered glass, a filter by-pass, as mentioned earlier, should be considered.)

It has to be borne in mind that the oxygen contents in the de-nitrifying filter should be no higher than 1.0–1.5 mg/litre. This is only possible if the water flow is extremely slow indeed — not always easy in many of the small filters on the market, as the internal surface area is often too small.

In the substrate of every aquarium (unless it is filtered with a U/G-filter) there is a de-nitrification process taking place. If the substrate is sufficiently deep (10–15cm — 4–6in) and a small grade of gravel (1–2mm) is used, there will be a sufficiently large area with oxygen-starved, anaerobic conditions to reduce nitrate down to the final nitrogen gas. If this is enhanced with a low wattage substrate-heater-cable, creating a *very slow* circulation (the substrate-water being exchanged approximately once in 24 hours), the entire gravel bed is turned into a very large and most effective micro-filter for de-nitrification processes.

SUMMARY

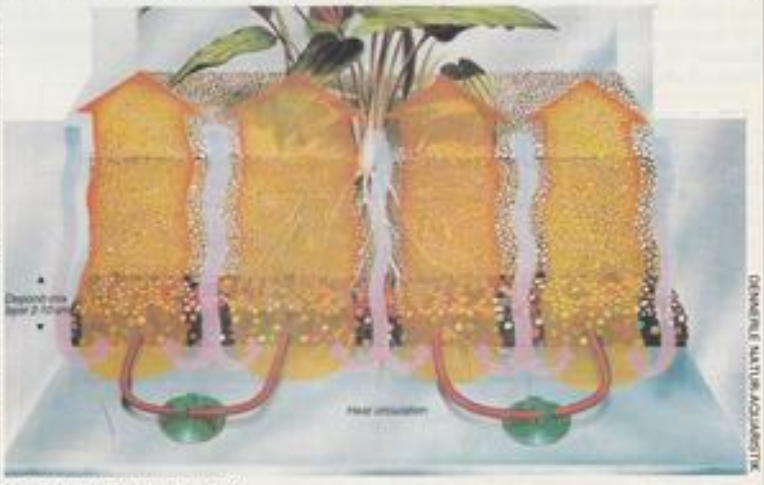
Most tropical freshwater aquaria in Britain contain far too much oxygen and never enough CO_2. In well planted systems, the oxygen for the fish must be produced by the plants only; any form of mechanical aeration should be confined to the unplanted, or poorly planted, fish holding tank. Problems in aquaria are generally not solved by fitting extra-powerful filters; on the contrary, the smaller filter (one which keeps the biological and bio-chemical balance in the water intact and combines nitrification and de-nitrification), is far more effective in planted set-ups.

Practical tests over many years have proved that the combination of nitrifying *and* de-nitrifying filtration reduces nitrate levels from, for instance, 80 mg/litre down to less than 3 mg/litre. At the same time, the Redox value is vastly reduced, thus creating an optimum environment both for luxurious plant growth and healthy fish.

ADDITIONAL REFERENCES

Krause, H-J. (1985): *NITREX — die biologische Nitratentfernung*. **Aquarien-Magazin**, p. 366-369. **Franck-Verlag, Stuttgart.**

Wachtel, H. (1988): *Zur Aquarienökologie: Filtertechnik*. **DATZ 41**, issue 4, p. 42-44.



DENNERLE NATUR AQUARISTIK

Undergravel heating at work.

Naturalist's notebook By Eric Hardy

OVER-THE-TOP PROPAGANDA

We are all conservationists these days, but so many publicity-conscious conservation bodies have arisen, that there is not a little competition, and exaggeration, in fund-raising propaganda. Not much attention was given to the Great Crested or Warty Newt until, a few years ago, it was discovered as good 'copy' for 'press secretaries'.

Generalising upon local losses and the reduction in field ponds, they soon cultivated the idea that it was nationally on the edge of extinction. Locally scarce, yes, but not nationally endangered, was my experience. Then investigators began to discover its sudden widespread increase in areas it had never left. It occupies, for example, Whixall Moss the new Shropshire reserve. Much of Cheshire and the Welsh border had always held it in my youth. So did some 13,000 ponds in old Lancashire, even the industrial Wigan and Manchester areas with nearly half the pools.

Similar national generalisation was made when frogs became scarce in the over-collected waters around London, when Giant Hogweed increased there and when kestrels declined from pesticides in the south.

Some 30 years ago, Golodushko, in Russia, worked on the role of predatory birds as regulators of the populations of amphibians and reptiles, but as it had no fund-raising use it has received scant attention in the west.

Distribution maps began to appear for Great Crested Newts which were maps of the distribution of recorders. In several areas, maps were produced without any liaison with those of us who were mapping newts before their new recorders were born. Lancashire is claimed to be losing four ponds a week, but several larger new waters have been created as fisheries by farmers dispersing their use of land under official encouragement. These are usually stocked with Rainbow Trout.

PEAT BOG TRIP

From the B5110 beyond the California pub at Brynteg, in Anglesey, I recently visited Cors Erddriniog, the largest limestone fen in North Wales, a wet wildland of rare flowers and butterflies. With its friendly warden in this soggy refuge of adders, we crossed a fen where 16,000 Marsh Gentians flower in autumn. In a great spongey mattress of Sundews, Bog Asphodel, Marigolds, Bog Bean, Butterworts and Black Bog Rush, a wealth of Devil's Bit Scabious feeds rare Marsh Fritillary Butterflies and Narrrow-bordered Bee-hawk-moths.

Scaly fingers of primitive Clubmoss thrust through the boggy beauty. We reached its colony of purple, 3-lobed, asymmetrical flowers of Pugsley's Narrow-leaved Marsh Orchids, which flowers in southern England and in Wales — only in Anglesey and Lleyn. They are darker-leaved than the symmetrical, single-lobed early Marsh Orchid with which it might be confused. Fly-orchids grew in an unusual site near the marl-lake of nesting Little Grebes, Ruddy Duck and Teal, with Palmate Newts so typical of Wales and 10-spined Sticklebacks, plus a curlew's nest. Ponies are used to graze the bog to the required vegetation openness, or it would soon revert to scrub.

Duckboards made safe our crossing of the great fen of saw-edged Great Fen Sedge, Mariscus, and Tufted and Slender Sedges. Sawwort flowers added to the variety. Here also grow Marsh Lousewort, Water Violet (*Hottonia*) which isn't a true violet, along with Blunt-flowered Rush and Fen Pondweed whose leaves, held to the light, are semi-transparent and show their veins. Large Red Damsel and Hairy Dragonfly led their season's wealth of 17 Odonata.

LAURENCE E. PERKINS

Great Crested Newt — probably the 'victim' of over-enthusiastic conservation propaganda.

HOLY LAND/ IVORY COAST CROCS

Professor Yehudah Werner, Professor of Zoology and Curator of Amphibians and Reptiles at the University of Jerusalem, writes to me that he is trying to establish which of the 7 subspecies of African Crocodile formerly inhabited the Holy Land, its only haunt outside Africa. He has checked some four available skins, but seeks further records.

Crusaders and travellers found it in the Nahr es Zerka near Caesarea. Others were reported in the Kishon and the Yarkon, while the great swamp they inhabited south of the Carmel was drained some time ago. A skin is housed in Senkenburd museum, Germany, and it is known that the last specimen was caught at the end of the first world war.

Meanwhile, West Africa has established its first major crocodile-breeding centre at the Ivory Coast national zoo, with the crocodiles, *Crocodylus niloticus* and *C. cataphractus*, and the Short-nosed Croc *Osteolaemus tamaspis* being the three species propagated there.

MERSEY AQUARIUM

By the Mersey at Seacome Ferry, Wallasey, tanks of crabs, mussels, lobsters and starfish, plus three hexagonal tanks making a centre-piece of bass, mullet, whiting, pollock, cod, Conger Eels and Spotted Dogfish will not only entertain tourists on the Mersey ferry, but also encourage prospects for a cleaner river, with more marine life.

The aquarium was opened for this summer when, across the river at the famous Albert Dock exhibition centre, Common Purple Jellyfish filled Albert and Canning Docks.

MIXED BAG

Other interests have ranged from natural seed-dispersal by lizards and tree-frogs in Brazilian forests and of Bur Marigold by salamanders migrating in Canada, a new species of beaked whale, *Mesoplodon peruvianus*, from Peru, and antibodies, to the recent canine virus distemper of North Sea seals found in antarctic seals.

Toyama University biologists have been studying Japan's Crab-eating Frog; Natal museum has found Worm Snakes, *Leptotyphlops scutifrons*, in cow-dung; a melanic Grass Snake was found in North Spain and a hybrid between Hawksbill and Loggerhead Turtles from Brazil.

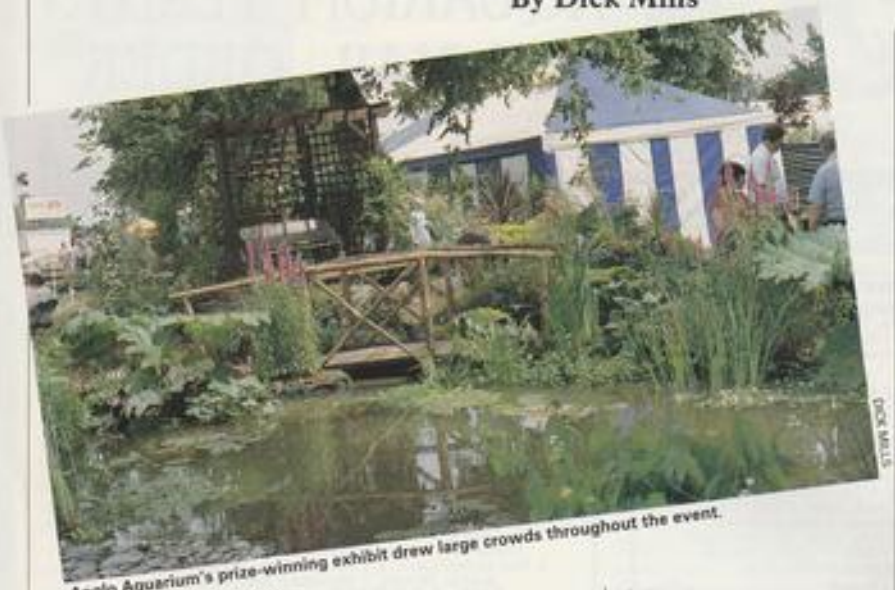
The Cetacean Behaviour Laboratory of San Diego University has developed a technique for photographing Bottle-nosed Dolphins so that individuals may be recognised by their dorsal fin variations, while Canadians used infra-red thermography to measure surface heat loss in Killer Whales, and infra-red rays to sense under-snow lairs of Ringed Seals.

★ ★ ★ ★ ★ ★ ★ ★

OUT AND ABOUT

HAMPTON COURT 2nd INTERNATIONAL FLOWER SHOW

By Dick Mills



DICK MILLS

Anglo Aquarium's prize-winning exhibit drew large crowds throughout the event.

Faced with the prospect of around 300,000 visitors over the period of the show, the exhibiting 'Aquatic Villagers' knew that they were in for a busy time. Covering much more ground than last year, the show organisers had enlarged the aquatic section to reflect the ever-increasing interest in the water-gardening aspect of the hobby.

With the accent of popular opinion appearing to be focussed on 'wildlife ponds,' it came as no surprise to find that two of the aquatic exhibitors, **Walton Koi** and **Anglo Aquarium Plant Co.**, duly obliged by setting up such ponds. The former (in association with **Tony J Howells**), even managed to incorporate several of Hampton Court's resident trees into their display and the carp felt so at home in the pond that they spawned regularly — with one or two quick-witted hobbyists rescuing egg-laden plants!

Anglo Aquarium's two-level ponds managed to combine gardening skills with natural requirement; the top pool originated with water flowing through a hollow trunk before flowing under a wooden bridge into a wild pond complete with shallow beach area.

Visitors to last year's show had rightly anticipated something special from **Kent Koi** whose large pool had an adjoining filter system of dimensions that would have made a more-than-substantial pond on its own. The water was crystal clear, right up to the introduction of the fish on build-up evening, only to be spoiled by a mishap by a photographer who disturbed the liner and caused no little clouding!

Dorking Aquatics featured a huge, free-standing aquarium in the centre of their marquee exhibiting lots of pond life — everything from fishes to water-fleas it seemed. This was surrounded by a host of cabinet-housed aquariums, all showing the various types of fishes generally available. Their speciality, water plants, were much in evidence, but it was a shame that their fountain statuary (of a couple sheltering under an umbrella) proved a little too prophetic on the Saturday!

Dorking Aquatics also provided the pond display (designed by **Mike Adams** of Waterlooville in Devon) outside the *Aquarist & Pondkeeper's* marquee which drew much attention, as admirers of the pond were soon enticed into the tent to peruse the large stock of aquatic literature and to question the daily visiting experts on duty. These included Interpet's **Adrian Exell** and Tetra's **David Pool**, as well as *A&P* editor **John Dawes**.

The **Federation of British Aquatic Societies** came up with a three-pronged approach to satisfying visitors' queries. Anticipating the "Why does my pond go green?" and "How can I get rid of blanketweed?" type of questions, the FBAS had **Alan Benson** on hand to explain modern water filtration systems; while **Peter Caira** and I (from Hounslow A.S.), presented a 'how-to-instal-a-pond' practical demonstration . . . but

DICK MILLS

Tony Howells and Walton Koi joined forces to set up this wildlife pond — so successfully, in fact, that the fish spawned!

JOHN DAWES

Kent Koi received a Gold Award for their large, spectacular exhibit.

JOHN DAVIS

Joint effort at the *A&P* stand, with the pond being designed and built by Mike Adams with materials provided by Dorking Aquatics.

not by taking pick-axes and shovels to Hampton Court's turf. The whole thing was done on a table-top in miniature, using a sand-filled box (for easy excavation), greengrocer's green cloth 'turf' and a dustbin liner. Another show attraction, the Federation's new magazine, *Fishworld*, was launched to the public. On hand, too, were General Secretary **Adrian Dempsey** and President, **Bob Esson**, to give advice on society matters and Goldfish keeping, respectively.

The **Aquatic Design Centre** had multiple tropical aquariums with two common features — they were of modern, all-glass design (often cascading into each other) and all (whether freshwater or marine) had coral decorations. If you have never thought about combining Neons or Mollies with corals, then this display certainly gave you something to think about! Once again, their display was not without initial setbacks — setting up heavy aquariums on artificial floors on uneven ground is not without its thrills, if not spills!

On a slightly-less-than-aquatic side, there was a superb display of reptiles, amphibians and airplants set up by **The Vivarium**. Many hobbyists would have been only too delighted to include some of the decorative wood in their aquariums too.

Architectural Ceramics Ltd enjoyed 'a great Hampton' with their (predominantly) wall mounted ceramic water features set off, most attractively, by a 'Leylands' hedge erected specifically for the occasion.

Next to them, **Renaissance Castings** exhibited a wide range of garden ornaments, including some very impressive ponds with accompanying statuary . . . all in 100% smelted lead!

As if all these main exhibits along the Palace's Long Water were not enough, a row of magnificently set up water gardens of all design tastes, from 'quiet reflective' to 'startingly innovative', provided a backing-up double attraction to the whole scene. Water, water everywhere and not a drop to drink — just to keep fish in.

The Top Award for Excellence went to Anglo Aquarium, with Kent Koi and (wait for it!) *A&P* — with all due credit to Dorking Aquatics and Mike Adams — sharing second place (Gold Award).

JACK NEALS

John Young, *A&P's* Advertisement Manager, receiving our award from show organiser Adrian Greenoak of Le Teurnier Boyd.

Master-minded by **C. J. Skilton, Aquarist,** the Aquatic Village was a whole aquatic microcosm and, probably like Topsy, will just grow and grow in years to come. We look forward to 1991 with eager anticipation.

Herpetology matters

By Julian Sims

TORTOISE FINGERPRINTING

What will they think of next? According to the British Chelonia Group (BCG), individual chelonians, and tortoises in particular, have a unique coloration and patterning of their plastron — the lower half of the shell. The suture lines between the individual shields are also an important and 'personal' feature. The BCG claim that even hatchlings from the same clutch of eggs are always slightly different.

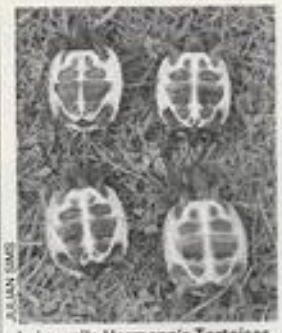
It is quite difficult to 'mark' tortoises on a longterm basis so that individuals can be identified in future months (or years) during population studies in the wild. For example, spots of paint or varnish usually get rubbed off after only a short time. Unfortunately, such spots can actually have a harmful effect and endanger the life of the marked reptile. The paint might have a toxic effect on the tortoise, but more likely, the coloured spots will attract the attention of predators, including small children.

JULIAN SIMS

Two adult Hermann's Tortoises with noticeably different plastron patterns.

Research scientists sometimes mark tortoises by a code of notches along the edge of the carapace — the upper part of the shell. This is an unsatisfactory method for a number of reasons. For example, the notches damage the shell and can provide sites for infection by fungi and bacteria. Tortoises can also become naturally 'notched' through accidents and during courtship. Tortoise courtship is a violent affair which involves much shell butting of the female by the male.

To overcome the problems of longterm identification, the BCG and the Conservation Research Group (based in Cambridge) set up the **Tortoise Fingerprint Identification Register** in the spring of 1990. The register is a store of computer images made from a good quality photograph of the plastron of every tortoise listed. The entire plastral pattern is scanned and stored as digital information on a computer disc. Each entry is given a specific reference number for later identification. The Cambridge Research Group pioneered this work on computer imaging for the identification of marine mammals.



JULIAN SIMS

In juvenile Hermann's Tortoises, the plastron patterns can be quite similar.

It is proposed that the Tortoise Fingerprint Identification Register will have a number of practical uses. For example, registered tortoises which wander off can be identified and returned to their rightful owner when they are found at a later date.

In the case of a tortoise offered for sale, it would be possible to check the plastron pattern against the computer records to see if it had been captive-bred, imported illegally or even stolen.

Further details about 'Tortoise Fingerprinting' and registration forms can be obtained by sending a stamped addressed envelope to:

Dr Bob Lockhart,
The BCG,
PO Box 2163,
London NW10 5HW.

LIVE FOODS FOR CAPTIVE SNAKES

Under the **Protection of Animals Act 1911 to 1988**, it is illegal to cause cruelty, **including unnecessary suffering**, to domestic animals and captive wild animals. There have therefore been court cases where herpetologists have been prosecuted because they have fed live vertebrates to their captive reptiles. However, each case depends on the precise details of the alleged cruelty.

In defence, it could be argued that failure to feed a snake is also an act of cruelty by the 'omission' of care. Whether or not **live** mice and rats should be fed to snakes (and large monitor lizards) is undoubtedly a controversial topic. Herpetologists who keep and study these reptiles must act carefully according to their particular circumstance. Fortunately, the majority of boas, pythons and monitors will take pre-killed items of prey, but some reptiles will not, and this is where potential problems arise.

Ironically, feeding live prey can actually cause cruelty and distress to a snake. This is because live mammals can bite and injure the reptile. In a recent incident which occurred in a school in Paris, a Common Boa (*Boa constrictor*) was gnawed by a live rat which was intended to be its prey. This disaster occurred because the heating in the snake's vivarium was accidentally turned off and the reptile became lethargic.

On the evidence available, it is clearly preferable to feed pre-killed vertebrates so as to prevent any possible injury to the reptile and to minimise stress in the prey animal.

VIVARIUM LIGHTING

Natural sunlight is very beneficial to reptiles, especially for freshwater turtles and lizards. Unfortunately, the useful ultra-violet (UV) rays in sunlight, which help to make vitamin D in the skin, are filtered out by the glass in windows and the glass of a vivarium. It is therefore advisable to provide an alternative source of ultra-violet for captive reptiles during the day. One such source is from a "TRUE-LITE" fluorescent tube. These tubes are manufactured in the USA by the Duro-Test Corporation and imported into the United Kingdom by General Acoustics Limited. Further details about these tubes can be obtained from: **General Acoustics Ltd., Salter Road, Cayton Low Road Industrial Estate, Scarborough, North Yorkshire YO11 3UZ.**

In the same way that glass filters the UV wavelengths out of natural sunlight, so it will do the same with UV rays emitted from fluorescent tubes. Thus, fluorescent tubes used to provide ultra-violet must be fitted inside the vivarium to be of practical benefit to the inmates.

Although specific types of fluorescent tube provide UV rays similar to those available from sunlight, such tubes provide very little heat. Sunlight has a warming effect, and many types of reptile bask in it to increase their body temperature. For example, posturing heliotherms such as baby European Tortoises (*Testudo* sp.) and shuttling heliotherms such as Wall Lizards (*Podarcis* sp.) would normally rely on sunlight to raise and control their body temperature. Silvered spot-lamps, which have a tungsten filament, produce much more heat than fluorescent tubes and can be used to create basking hot spots in a vivarium. However, they must be arranged with care so that agile reptiles cannot climb onto the hot bulbs and burn themselves.

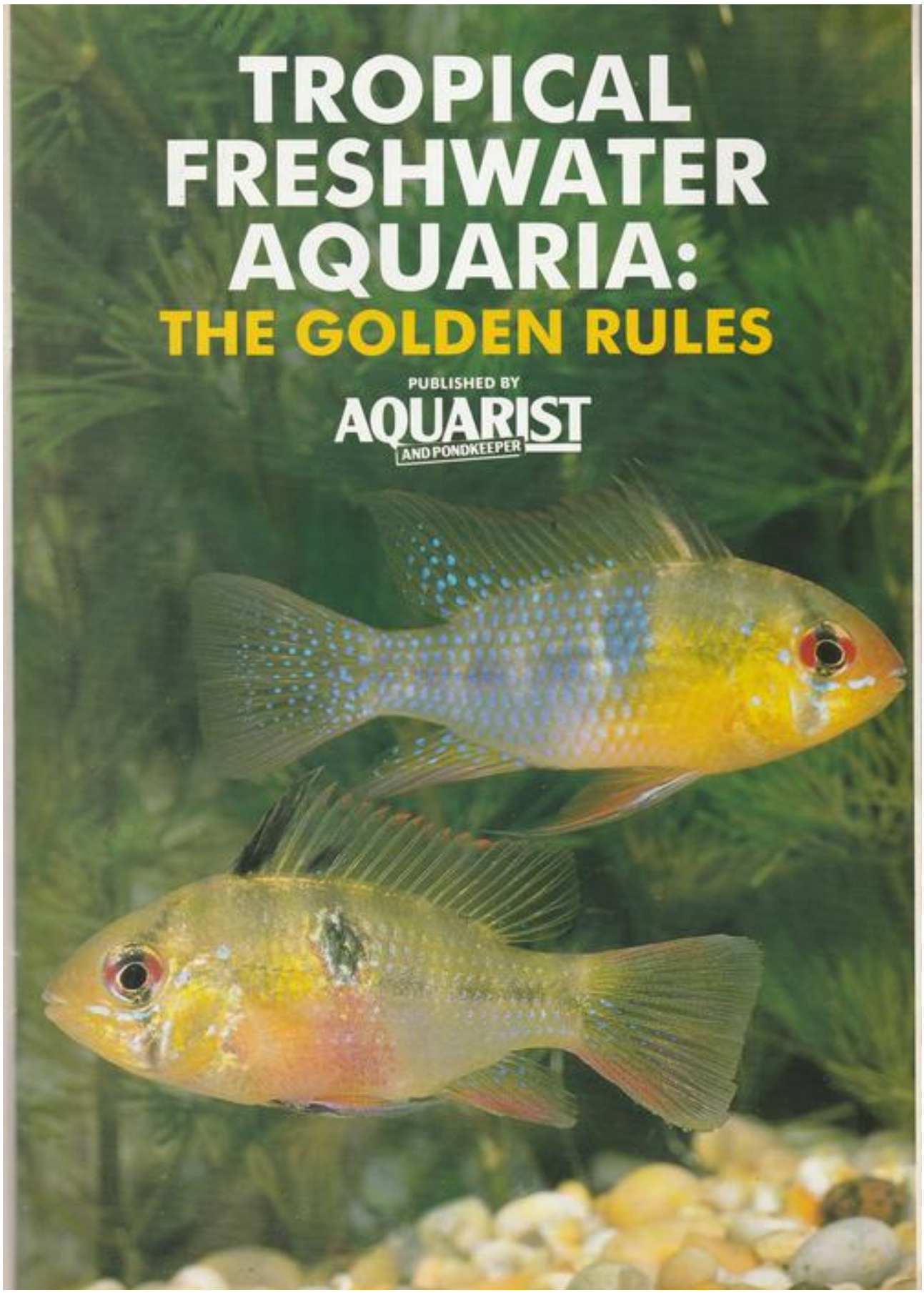
In a terrestrial vivarium or terrarium used for housing lizards and tortoises, from the information previously given, it would seem necessary to provide two types of lighting — a UV emitting fluorescent tube and a spot lamp. Unfortunately, such a combination of lighting is quite intense. Adequate shade areas must therefore be provided if this type of regime is adopted. Alternatively, the spot lamp can be replaced by a suspended ceramic infra-red source to produce the hot spot. Light for basking will still be provided by the fluorescent tube.

In a mainly aquatic vivarium, of the aquarium type used for freshwater turtles, a fluorescent tube above the basking area will be sufficient because the reptiles will obtain their body warmth from the water which can be heated by a submersible heater and its temperature regulated with a thermostat.

TROPICAL FRESHWATER AQUARIA:

THE GOLDEN RULES

PUBLISHED BY
AQUARIST AND POND KEEPER



GOLDEN RULES OF TROPICAL FRESHWATER AQUARIA

Dr David Ford, Consultant to 'Aquarian'

I have been answering questions about fishkeeping for nearly 20 years. In fact, it is now my full-time job with the 'Aquarian' Advisory Service, with some 7,000 letters personally handled each year. This means that I can list the most common queries with assurance that they really are asked . . .

FISHKEEPERS

Q *Keeping fish must be a minority interest, so aren't fishkeepers a bit odd?*

A Actually, fishkeeping is one of the world's most popular hobbies, surpassed only by photography. In the UK it is undergoing a growth in popularity, with a rise over the past few years from 10% to 14% or 15% of households owning petfish.

Far from being odd, it takes a special kind of person to care about a fish, so fishkeepers in general have nice personalities. There are some 400 aquarium clubs in the UK; go along to any of their Open Shows and you will find a crowd of really jolly, friendly people.

Q *How can anyone love a fish?*

A They are 'wet pets'. Ask any Koi keepers and they will talk (for hours) about their delightful obsession. The ugly (to some), giant, whiskered, piggy-eyed, Red-tailed Catfish is so beloved by their owners that there is a national club exclusively devoted to the fish.

The aggressive African Rift Lake Cichlids are widely kept and avidly studied by members of the British Cichlid Association. This is a worldwide devotion too . . . Dansk Cichlide Selskab is the Denmark Cichlid Club, Nordiska Cichlidsaskapet is in Sweden, Deutsche Cichliden Geselischaft in Germany, Victorian Cichlid Society in Australia, and so on. The largest cichlid club is in the USA where they hold an annual convention in Orlando, Florida, with thousands of aquarists attending.

Similarly, there are societies for the livebearing fishes, such as Viviparous — the Livebearer Information Service and SLAG (Southern Livebearers' Aquatic Group) in the UK. Not to mention the Goldfish Society of Great Britain, the Catfish Association of Great Britain, the International Characin Association, the Anabantoid Association of Great Britain, the British Killifish Association, and so on.

(The Absolute Beginner's Questions and Answers)

Q *But you can't pet fish like you pat a cat or dog can you?*

A Every morning when I open the back door to collect the milk, the Koi in my garden pond are always there waiting for me. I can put my hand in the water and give each a scratch, and they respond by finger sucking and leaping. Their reward is a handful of Floating Pond Pellets (of course).

In terms of numbers, the Common Goldfish is the most popular pet in the world; more are kept than all the dogs and cats combined!

Q *OK, it's an obsessive hobby, but what's in it for me since I have no time for hobbies?*

A If you lead a modern, busy life, that is the best reason for keeping fish. Their separate silent world has a calming effect on owners when they gaze into an aquarium or pond.

Medical tests have proved that watching fish can lower blood pressure and slow the heart rate. In the USA, a recent survey of heart attack patients revealed that those owning pets, including fish, had a survival rate significantly higher than those patients without such pets.

Keeping aquaria is an ideal family hobby.

The benefits are not just medical, but also decorative; any home or garden is a better place for the presence of an aquarium or pond. Also educational, children (and adults) can learn a lot about biology, chemistry, and ecology from studying their fish.

BEGINNING

Q *Should I start with a goldfish in a bowl?*

A It takes an expert to keep a goldfish in a bowl, but anyone can look after a 6-foot (c2m) tank. The secret of fishkeeping is water quality, so the greater the volume of water the longer it keeps in good condition.

Goldfish bowls get polluted in just a few hours becasue the fish are swimming in their own 'loo'. So get the biggest tank (or largest pond) you can afford. The most popular aquarium size is 36in (90cm) long, 12in or 15in (30–38cm) wide and 15in or even 18in (38–45cm) high. The once-popular 24 x 12 x 12in (60 x 60 x 30cm) is now a second tank for breeding, treatment or quarantine. As a beginner, do not get anything smaller.

Note that the hobby is only just going metric . . . all the accessories are designed for 24in (60cm), 36in (90cm), 48in (120cm) etc. tanks. Aquaria are silicone-sealed, all-glass boxes, but you can get unusual sizes and shapes, such as corner or round tanks. However, accessories are a problem, especially for beginners.

Choices

Q *What do I put in my 36in (90cm) tank? I like goldfish and seahorses!*

A The aquarium can house fish according to water type. These are:

The coldwater aquarium: Freshwater at room temperature which is used for coldwater fish such as goldfish in common and fancy varieties. Small Koi may be offered, but I believe these fish are happier in ponds. Some semi-tropical varieties will live in the room temperature tanks, such as Blue Acaras, Blind Cavefish, Rosy Barbs, Mosquitofish, Paradisefish, Weatherfish or Weather Loaches, White Cloud Mountain Minnows and most of the USA fish, such as Gars, Flagfish and Rainbows.

The tropical freshwater aquarium: Freshwater kept at a temperature of 24°C (75°F) with a heater-thermostat. Literally thousands of tropical fish are available for this type of aquarium. For the beginner,

choose 'Community Tropicals' because these are compatible. Ask the dealer if your choice is a community fish (some shops do a 'traffic light' system: red dot for difficult fish, amber for special fish and green for compatible fish).

The marine aquarium: Artificial seawater is prepared to house tropical sea fish, usually coral reef species (such as seahorses — but definitely not a beginner's fish). There is now also a growing number of native (coldwater) marine aquarists, thanks — to a large extent — to **Andy Horton's** regular articles in *A&P*.

Others: There are other possibilities such as paludariums, brackish water aquaria and so on, but none are suitable for beginners.

AQUARIAN

Livebearing species are ideal for hardwater areas.

Safety

Q *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 £20, a small price to pay for your own safety as well as that of others. Of course, switch off the mains supply before doing any work within an aquarium.

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, and two or more can be stacked to level a frame on uneven floors.

Buying

Q *Can I buy all the gear and fish at a pet shop?*

A Yes, providing they are aquatic specialists. In addition, there are over 500 exclusive aquatic stores in the UK. If you can, visit these and rely on the local pet shop for routine buys such as food or small accessories.

Never buy the fish at the same time as the new tank. You need to set up the system and get the water mature before adding any fish.

Maturation

Q *How do you 'mature' the aquarium?*

A Time! Any aquarium system will go through changes that bring maturity over days, weeks or even months (because it is a living system, so every tank is different).

What happens is that nitrifying bacteria build up that convert the waste from the fish into harmless nitrates. These excreta are not the solids (faeces), but the invisible solubles (mainly ammonia) that self-poison the fish. When a colony of nitrifying bacteria has become established the ammonia is converted to nitrate (via an equally poisonous stage called nitrite) as soon as it is excreted, and so the fish are not poisoned.

This maturing stage can be speeded up by adding cultures of the bacteria and the process can be monitored by measuring the nitrite content via a kit . . . ask at the aquarium shop and just follow the instructions that come with the kits. If you are not technically minded, just allow *time* to do the job by buying about ¼ of the total fish population every other week.

AQUARIAN

A collection of tropical freshwater community aquarium species. A lighter stocking level than that shown is advisable for beginners.

MAINTENANCE

Q *Is it a problem looking after the fish's needs?*

A It is a responsibility — you are in control of their lives; indeed, their whole universe. It is not a problem, if you install the modern equipment, designed to maintain the water quality. Manufacturers have designed equipment to take away all the problems of fishkeeping, leaving just the pleasure.

The main item is the filtration system. You must filter the water continuously so that the ammonia the fish excrete is removed before it poisons them. Oxygenate the water with an air pump airstone and fit a light so you can see the fish; a fluorescent tube is best for a first tank.

Filtration

Q *What filter should I install?*

A Your choice; it doesn't mater how you do it, so long as the water is continuously filtered. The best, perhaps, is a trickle filter under the aquarium. The easiest is a power filter that siphons the water out and returns it via a pump. The cheapest is an undergravel filter. The smallest is an internal power

filter. The worst is a bubble-up box filter — but they are still popular!

Q *Does the filter polish the water until it is clear?*

A No. Polishing is simply clearing the water of suspended matter and there are special filters for this job, such as a diatom filter. Beginners do not need these.

You need a biofilter where a solid material such as ceramic, glass bead, open-pore sintered glass, carbon, palstic ball, foam or floss within the filter develops the colony of nitrifying bacteria discussed above. The dirty water passes over these colonies and they absorb the ammonia (and other compounds) converting it to nitrate, which is safe (unless it rises excessively) for the fish.

The clean water passes back to the aquarium where the nitrates that build up are diluted by partial water changes (usually ¼ every month is OK for beginners).

Q *Do I have to clean out the tank completely from time to time?*

A No! Never throw away all that valuable mature water. Just do *partial* water changes.

Temperature

Q *If I choose tropicals, is the water temperature really critical?*

A Very! Do make sure it is 24°C (75°F) or within a degree or two at the most.

The modern heater-thermostat will do this job for you; just follow the instructions ... but monitor the temperature by also getting a thermometer. The stick-on (external) digital type is the best and cheapest.

Feeding

Q *What about feeding the fish? An aquarist I know breeds shrimps and goes fishing for water fleas and digs the garden for worms ... I don't want to do this!*

A No need! Breeders and specialist fishkeepers have fun getting special foods, but the average fishkeeper can rely totally on high-quality commercial fish foods, especially the flake foods. These contain all the nutrients fish require and are conveniently packaged for ease of use and storage.

PLANTS

Q *Do I need plants?*

A No. They are not essential to the home aquarium or even the pond. The so-called balanced aquarium where the plants and fish support each other is not for beginners (or even for some experts either!) Plastic plants are very realistic these days and simple to install and clean.

If you want real plants, apply gardening methods i.e. buy well rooted plants, preferably in pots, (see **Golden Rules of Aquarium Planting** by Barry James in this **Supplement**). Use a bright light such as 'Triton' and have a timer so the plants have a tropical cycle of light and dark.

SUGGESTED STOCKING LEVELS

1 If you live in a hardwater area:

Tank length (approx)	No. of fish	Hardwater types
18in (45cm)	5	Guppy (*Poecilia reticulata*)
24in (60cm)	15	Platy (*Xiphophorus maculatus*)
30in (75cm)	20	Molly (*Poecilia latipinna*)
36in (90cm)	30	Swordtails (*Xiphophorus helleri*)
48in (120cm)	50	

2 If you live in a softwater area install Tetras, Barbs and South American fishes such as Dwarf Cichlids, Corydoras Catfish and Angels.

Tank length	No. of fish	Softwater types
24in (60cm)	5	Zebra Danios (*Brachydanio rerio*)
	5	Glowlights (*Hemigrammus erythrozonus gracilis*)
	5	Hatchetfish (*Gasteropelecus sternicla*)
	5	Corydoras Catfish (*Corydoras spp*)
30in (75cm)	as above plus:	
	5	Black Widows (*Gymnocorymbus ternetzi*)
36in (90cm)	as before plus:	
	5	Beacons (*Hemigrammus ocellifer*)
	5	Rummynose (*Hemigrammus rhodostomus*)
	5	Neon Tetras (*Paracheirodon innesi*) (but added at least a month later)
48in (120cm)	as above plus:	
	5	Lemon Tetras (*Hyphessobrycon pulchripinnis*)
	5	more *Corydoras*
	3	Angels (*Pterophyllum scalare*) — small

READ ALL ABOUT IT

Q *Do I need more information before starting, or learn as I go along?*

A Part of the fun of the hobby is learning and planning. Do read books on the subject before you start keeping any fish. You can then decide what type is best for you.

Knowledge of things like New Tank Syndrome, pH, hardness, dechlorination and so on is not difficult to attain. However, they are essential because lack of such knowledge can lead to your fish being made ill, or even dying.

Q *Are books expensive?*

A Some are free! I can send a free **Beginners' Guide** to anyone sending me their name and address at **PO Box 67, Elland, W. Yorks. HX5 0SJ.** Other manufacturers offer free literature too. Most dealers also have cheap booklets.

You can buy good books at around £5, such as the **TFH** and **Interpet** series, but you can also spend £50 on encyclopaedia books ... even leather-bound author-signed ones at £150.

The choice is yours; all are informative and that is all you want ... information. Also, do not forget aquarists themselves. As I said earlier, they are friendly people and all will be happy to help you. Ask at the aquarium shop for the nearest aquatic club and go along to a meeting.

DAVID FORD

There are many easy-to-use test kits available today. Always have some at the ready and monitor water quality regularly.

EQUIPMENT CHECKLIST

Tank — at least 24 x 12 x 12in (60 x 30 x 30cm) but larger if possible.

Stand — make sure it can take the weight.

Hood — always cover the tank and use a condensation tray.

Filter — any type, but get the best you can afford because it is the secret of success.

Heater — get the best heater-thermostat for a tropical tank; ask the aquarium shop for the correct wattage (size of heater) for the chosen tank.

Thermometer — place it where it can be read easily and check it often.

Airpump — plus an airstone and tubing; ask which size will operate your tank (the deeper the water, the larger it needs to be); also, a double outlet may be needed for operating equipment other than an airstone (such as undergravel filtration).

Decoration — use a *fine* gravel and stones from the aquarium shop, never add anything that can dissolve in the water, such as limestone or metal ornaments.

Plants — real or plastic.

Accessories — fish net, fish foods, water treatments, siphon tube, glass scraper ... and so on; there are many items available for the hobby.

Plants absorb nitrates and are therefore extremely useful in keeping the concentration of these compounds under control.

WATER QUALITY

As *A&P* editor **John Dawes** shows, you can't expect to run a successful aquarium without establishing and maintaining appropriate water conditions.
(Photographs by Bill Tomey)

Although the significance of nitrate control has only really begun to be addressed within the hobby in recent years, Far East tropical fish breeders have long been using dense carpets of plants like the Water Hyacinth *(Eichhornia crassipes)* to maintain their water 'sweet'.

Certain things are said so often that they begin to lose their impact. I sincerely hope that this does not apply to the following oft-quoted statement which is probably the single most important **Golden Rule** in the whole of aquarium and pond keeping:

Look after the water, and the water will look after your fish.

If more people took note of this, then countless fishes' lives would be prolonged in a state of good health.

INVISIBLE KILLERS

There is a distinction between water that *looks* good and water that *is* good. Ammonia and nitrites, for instance — those infamous fish killers — are totally colourless in aquarium water, no matter what their concentration. You could therefore have an ammonia/nitrite 'soup' and not be able to detect it, if all you allowed yourself to be guided by were the clarity of water.

Your fish and plants would tell you otherwise, of course, but it would still be possible to miss the link between the lethal water conditions and the distress exhibited by the fish. After all, excessive temperatures (in either direction), inappropriate hardness or pH, diseases . . . and all sorts of other things, can also wreak havoc with the health of fish.

Nitrification

The advice always given for keeping ammonia and nitrites under control is to install an effective biological filter.

Biological filtration (or *purification*, to be more exact) will convert toxic ammonia and nitrites into nitrates through the action of *Nitrosomonas* and *Nitrobacter* bacteria. This process has been covered thoroughly over and over again, both in the pages of this magazine, and in virtually every book ever written on tropical freshwater aquaria. I will, therefore, not go through the various processes involved yet again.

The only point that I would like to make is that many writers have referred to nitrates — the end-products of nitrification — as "harmless". It would, however, be more correct to refer to them as *"relatively* harmless" because, once they get above a certain concentration they, too, begin to become toxic. This level varies according to the sensitivity of the species of fish that finds itself in nitrate-rich conditions.

Clearly, therefore, water quality will suffer if nitrates rise above safe levels . . . and so will the fish.

Denitrification

Plants will absorb nitrates, so a well-planted aquarium is likely to be 'safer' — in broad general terms — than a poorly-planted or bare one.

Water changes will also help reduce nitrate levels . . . but only if the replacement water itself is low in nitrates (something that we can no longer count on with regard to all tapwater supplies).

A shoal of Cardinal Tetras *(Paracheirodon axelrodi)*. This is one of the 'classic' acid/soft water species.

Denitrification is now becoming the 'in-thing', being put forward as the answer to nitrate water quality problems. As awareness of denitrification is becoming more widespread, so manufacturers are providing us with more literature, information, filtration media and hardware to tackle the problem. Algal, trickle and nitrate filters and boxes, along with media such as Siporax, are all now being used to reduce nitrate levels in aquaria.

In essence, denitrification involves the breakdown of nitrates into safe, inert nitrogen gas which dissipates into the air at the aquarium water surface.

So, as efficient *aerobic* (oxygen-requiring) biological filtration removes ammonia and nitrites, *anaerobic* biological purification, properly managed, reduces the risk of nitrates ever reaching dangerous concentrations by converting them into gaseous nitrogen.

The beauty of the combined approach is that both processes can be carried out at one and the same time . . . and not necessarily by having to set up complicated and costly additional equipment.

Personally, I'm delighted to see the growing 'nitrate' awareness that is spreading through the hobby, having long felt that this aspect of water quality control has not always received the attention it deserves.

HARDNESS

The subject of water hardness probably causes more confusion among aquarists than any other. The main reason for this is that there is no single universally accepted scale. Consequently, various figures can be given for the same level of hardness, depending on which units are being used. Gradually, though, things appear to be moving towards the use of the 'parts per million' scale. If and when this becomes universal, life will be considerably easier for all concerned. However, for the moment we have to cope with the existing differences in terminology and units of hardness. It may, therefore, prove helpful to see how these relate to each other.

Hardness is a quality given to water by the amount of salts (mainly of calcium and magnesium) present. If the concentration is high, the water is hard. At the other extreme, water with few dissolved salts is soft. Total hardness can be subdivided into:

(a) Carbonate, Bicarbonate or Temporary Hardness (KH) — the first of these names is misleading as this type of hardness is caused by the bicarbonates of calcium and magnesium. The last name is in recognition of the fact that Bicarbonate Hardness can be reduced or eliminated by boiling. This results in the formation of insoluble carbonates which are then deposited as scale or 'fur'.

(b) General or Permanent Hardness (GH). This cannot be eliminated or reduced by boiling.

Both types of hardness perform important roles in the lives of fish. Extremely low levels of Temporary Hardness, for example, can lead to abrupt changes in pH through lack of buffering capacity. These abrupt changes can result in serious imbalances in the fish, such as acidosis or alkalosis, or even death. Low levels or Permanent Hardness are required by species such as Discus (*Symphysodon* spp.), while high levels must be pro-

vided for African Rift Lake Cichlids.

As far as units of measurement are concerned, these are calculated on the levels of certain calcium salts present in a given volume of water. Since both the salt itself and the volume differ between countries, this has given rise to a number of scales based on American, English (Clark) or German degrees of hardness.

For ease of reference, these may be converted to parts per million quite simply by using a conversion factor. The results can then be compared against a hardness chart:

American Degree x 17.1 = hardness in parts per million.

English (Clark) Degree x 14.3 = hardness in parts per million

German Degree x 17.9 = hardness in parts per million.

Water Hardness Chart

Hardness	Parts per Million
Very Soft	0-50
Moderately Soft	50-100
Slightly Hard	100-150
Moderately Hard	150-200
Hard	200-300
Very Hard	Above 300

Establishing the correct hardness for a particular species is very important. Failure to do so can result in dietary diseases caused through the absence of certain mineral salts which are normally absorbed directly from the water (particularly if the food provided for these fish is also lacking in these compounds).

Damage to delicate gill tissues, inhibition of spawning behaviour, or a number of other problems can also occur.

pH

In the wild, fish are found in water which can range from extremely hard and alkaline to extremely soft and acid. Although these conditions may fluctuate seasonally, or even daily, the magnitude of these fluctuations and the rate at which they take place will normally fall within the tolerance of the particular species concerned. Should deviations from the norm be too great or too abrupt, as in cases of acute pollution, considerable numbers of fish and other aquatic organisms will die.

On a less extreme level, inappropriate pH conditions will place fish under stress, thus opening them up to attack from pathogenic organisms. Relatively small fluctuations from the optimum can, however, be handled without too much difficulty.

Many species, in fact, not only survive, but also breed quite successfully within a range of pH values. Others, like Tiger Barbs *(Barbus tetrazona)*, can survive in varying pH conditions but require soft acid water for the successful fertilisation of eggs. Clearly, pH plays a very fundamental role. Yet, the factors that 'cause pH' are very uncomplicated indeed.

Water is a simple compound, represented chemically by the formula H_2O. If a molecule of water were to be split up, this would result in a positively charged hydrogen atom and a negatively charged hydroxyl molecule. Electrically charged particles such as these are called ions. It is the attraction between the positive hydrogen ion (H^+) and the negative hydroxyl ion (OH^-) that bonds them together into a neutral H_2O molecule. In pure water, the number of H^+ and OH^- ions are equal and balance each other out. Such water is said to be neutral, with a pH value of 7.

However, water is not usually pure. It will, therefore, show an over-abundance of either H^+ or OH^- ions. If there is an excess of H^+ ions, the water will be acidic, with values below pH7 (the lower the figure, the higher the acidity). If, on the other hand, there is an excess of OH^- ions, the water is said to be alkaline (the higher the figure, the higher the alkalinity). The scale itself runs from 0 to 14, strong acids having values around 1 and strong alkalis being represented by pH values between 13 and 14.

As a rule, tropical aquarium fish like water that it is more or less neutral, i.e. pH 6.5 to 7.5. Some species will, of course, have very definite preferences or requirements and these will have to be met.

It is not just the actual pH value that is important, but also the rate at which changes are allowed to occur. If these are too abrupt, fish will suffer or die, even though the original and resulting values may both be within the range normally indicated for species.

The main reason is that the pH scale is not a linear one like most others — it is logarithmic. In effect, what this means is that the intervals between units represent differences that increase by a factor of 10 each time. For example, a pH value of 5 indicates a level of acidity which is lower than that represented by pH6 by a factor of 10 times lower than that represented by a pH value of 7. Looked at in a different way, a water sample having a pH of 5 would require 10 times more neutralising agent than one having a pH of 6.

CLOSING REMARKS

Water chemistry is a big, complicated, fascinating subject which, quite obviously, cannot be covered in any real depth by a single article.

African Rift Lake Cichlids (this is the snail-dwelling *Lamprologus* sp. 'Magara') require hard alkaline water for long term healthy survival.

However, the few topics which I have briefly discussed should show just how important water quality is in the lives of the fish we keep in our aquaria.

I started off by quoting what I believe to be the most important **Golden Rule** of water quality. It will, hopefully, have become apparent as the article has developed just how many other 'sub-rules' are implicit in the text.

To learn more about these and other **Golden Rules,** I would strongly recommend the following book, which has a lengthy chapter on water chemistry that does the subject better justice than virtually any other 'aquarium' book currently available.

The Interpet Manual of Fish Health
By: Dr Chris Andrews, Adrian Exell and Dr Neville Carrington
Published by: **Salamander Books Ltd.**
ISBN: 5 012922 000223

DAVID POOL

Treat foods will be readily accepted by all fish.

FISH HEALTH AND NUTRITION

Dr David Pool, head of the Tetra Information Centre, lays down the main rules of the successful, healthy, 'well-fed' tropical freshwater aquarium.

Within the confines of a tropical aquarium, the fish are reliant on their owner to provide them with a healthy environment in which to live, and a nutritional diet. Fortunately, providing these requirements is very easy, inexpensive and not time-consuming.

The essential or **Golden Rules** of both health and nutrition will be examined in this article. If these are considered, along with the other information provided in this **Supplement**, there is no reason why your aquarium should not be an attractive and healthy environment for both fish and plants.

FISH NUTRITION

Rule 1: *Avoid overfeeding*

Overfeeding fish is one of the major problems which can occur in an aquarium, particularly if the tank has recently been set up. Commercially available foods are very concentrated and nutritious, therefore the fish do not require very much to provide them with a complete balanced diet. Flaked foods, for example, contain less than 10% moisture, whereas the live foods a fish would eat in the wild are made up of over 80% water. This means that flakes are, at least, eight times more concentrated than a fresh food, so the fish require considerably less.

If fish are overfed, some particles of food will remain uneaten and may subsequently decompose, polluting the water and killing both fish and plants.

To avoid overfeeding, feed your fish twice a day on as much food as they will consume within 1–2 minutes. In this way, the fish will eagerly accept the food at each meal and will completely digest all that is consumed.

Rule 2: *Provide fish with the correct diet*

The tropical fish that we keep in our aquaria originate from lakes and rivers and have evolved numerous modifications that allow them to take advantage of many different food sources. Within most community aquaria, there will be fish which prefer a plant- (and algae-) based diet (e.g. Mollies), those which require a mixture of plant and animal material (e.g. Dwarf Gouramis and Tiger Barbs), and others which require an animal-based diet (e.g. Neon Tetras and Angel Fish).

Not surprisingly, it is necessary to feed a variety of foods to satisfy the dietary requirements of all of these fish. The basic diet should be one of the staple foods (e.g. TetraMin flaked food) that will provide a complete diet for all omnivorous fish which include the majority of those kept in the aquarium. This diet should be supplemented with a vegetable-based diet to provide the plant eaters with their nutritional requirements and a higher protein diet for the animal feeders.

There are, of course, certain species or sizes of fish which require a more specialised diet. Young fish, for example, require a diet which has higher protein, as this is essential to allow the rapid growth which occurs at this time.

Rule 3: *Give fish suitably sized food at the right place in the water*

Uneaten food can pose severe problems in the aquarium, as indicated in **Rule 1**. To minimise this, and to ensure fish receive a

TETRA

Bottom-feeding fish require a tablet or granular food.

food that is of a suitable size, we should consider the use of powdered, flaked and stick foods. Fish fry are unable to consume large particles of food, and flakes or sticks would be left uneaten, leading to water quality problems. They should therefore be given a finely powdered food which can be consumed easily. The powder would, however, be ignored by larger fish; in this case, a bigger food is required.

As a guide, if the fish is less than 1.5cm (0.6in) in length, use a powdered food, from 1.5cm to 10cm (0.6 – 4in) in length, use a flake (crumbled for smaller fish), and for fish bigger than 10cm (4in) use a bite-sized stick food.

TETRA

Fish should eagerly accept their food when it is added.

Within the aquarium, you will undoubtedly have noticed that fish feed at different positions in the water. Some feed at the surface (e.g. Swordtails and Mollies), others in midwater (e.g. Discus and many Tetras), and others on the bottom (e.g. *Corydoras*).

It is important that we provide a food at the correct place in the water so that all of the fish obtain sufficient. Stick and flaked foods are ideal for surface feeders. Some of the flakes also sink during the feeding frenzy, providing food for midwater feeders. Granulated foods (e.g. Tetra Prima) are also useful for midwater feeders, as they will gradually sink through the water. Bottom feeders require a food on the bottom, such as a tablet food.

Rule 4: *Take care when using livefoods*

Whenever 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 all the necessary nutrition. This balanced diet will not be provided by just feeding fish with one or two livefoods. Instead, use a basic diet of good-quality flaked, stick or tablet food (depending on fish species) and supplement this with freeze-dried or cultured livefoods.

TETRA

Healthy fish in a good environment — the aim of all fishkeepers.

DAVID ROOT

Ulceration has posed many problems in the last few years.

Livefoods do have some specific uses. For example, newly-hatched Brine Shrimp are essential to get 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 prepared diet.

Rule 5: *Give your fish a treat*

Most keepers like to give their fish a treat food from time to time. Providing these treats do not form the basic diet, there is no harm in feeding them to fish.

Treat foods that fish will enjoy include fresh vegetables (e.g. peas and lettuce), safe livefoods, freeze-dried foods and special flaked foods.

Tablet foods which stick onto the glass are a good treat food to give. Not only will fish enjoy them, but they also encourage the fish to come to the front glass where they can be viewed more easily. These foods can also be given by hand, to add a new dimension to fishkeeping.

FISH HEALTH

Rule 1: *Prevention is better than cure*

Whenever possible, you should aim to prevent the fish in your aquarium from becoming unhealthy, rather than attempting to cure the problem after it has occurred. Treating unhealthy fish always involves some risk, particularly as the fish concerned will generally be in a weakened state.

Preventing poor health involves maintaining the aquarium and the fish in the best possible condition, as well as avoiding the introduction of disease organisms into the tank. If fish are healthy, their immune

system will be very active and will be able to control any disease organisms that may be present. Maintaining good water conditions, providing a suitable diet, avoiding stress or sudden changes, and ensuring that fish are compatible, are some of the ways in which we can keep our fish healthy.

To avoid introducing any new diseases to the aquarium, it is important that you only purchase healthy fish. Choose specimens which are alert, have erect fins, no obvious signs of disease and are behaving naturally. Some background reading before you purchase a fish will help you to decide what it should look like when healthy, and if it is compatible with the other fish in your tank.

Quarantining all new fish is also a wise precaution. The quarantine tank need not be large or complicated, but simply somewhere to keep the fish for 14–21 days before introduction into the main tank. During quarantine, the fish should be kept in the same water conditions and at the same temperature as the main tank. It is also advisable to administer a general external parasite treatment to the tank to remove any parasites before they pose problems.

Not everyone has a quarantine tank. A less suitable alternative is to treat the whole tank whenever new fish are added in order to control any parasites before they get a chance to spread.

Rule 2: *Treat diseased fish as soon as possible and with the correct remedy*

Early recognition of an unhealthy fish is important if that fish is to be successfully treated. Tropical fishkeepers are in an ideal position to identify unhealthy specimens, as they know the 'normal' behaviour of each fish and so can quickly recognise abnormal behaviour or coloration. Factors which indicate poor health include gasping, rubbing, becoming darker or lighter in colour, listless behaviour and appearing emaciated.

If these signs are observed, it is important to have a closer look at the fish concerned in order to determine the cause. The secret here is not to jump to conclusions. Decide firstly why the fish is behaving as it is and then what could cause it to do so. The possible causes can then be investigated to determine the actual cause.

For example, if a fish is seen to be gasping at the water surface, it is doing so because it cannot get sufficient oxygen (there is more oxygen in the water at the surface). This could be due to poor water quality (e.g. low oxygen concentration, high ammonia or nitrite levels), gill parasites or blood parasites. It is then necessary to decide which of these is responsible.

One clue to the cause of poor health can be found in the time of onset and its rate of spread. There are three main possibilities:

① Only one or two fish are affected and the problem does not spread to any other fish. This suggests a non-infectious disease or malfunction.

② A small number of fish are affected initially, but this number gradually increases. This suggests an infectious disease.

③ All of the fish in the aquarium are affected (or all of the fish of the same species or size) and occurs very quickly. This suggests a water quality problem.

Other clues to the cause of bad health can be obtained by carefully examining the fish for signs of parasites. This can be achieved in the aquarium, but it is better if the affected fish is placed in a large polythene bag where it can be viewed from all sides.

Routine water quality monitoring will allow problems to be detected and corrected before they adversely affect the fish.

By taking the diagnosis stepwise and considering all of the likely causes of poor health, it is usually possible correctly to identify why a fish is unhealthy.

It is then possible to undertake the correct remedial action in order to overcome the cause of poor health. This course of action is far better than trying a range of different treatments in the hope that one of them will be successful.

Rule 3: *Remember water quality*

The quality of the water within the aquarium is vital for the health and survival of the fish and plants. Poor water quality will result in the fish behaving unnaturally, showing poor coloration and being susceptible to disease, while the plants will fail to grow and become discoloured. In severe cases, poor water quality can result in the death of both plants and fish. A surprise to many people is that, in most cases, the problems that occur with fish can be traced back to incorrect water quality.

Pollutants, such as ammonia and nitrite, resulting from the decomposition of organic waste, are a particular problem. Fortunately, careful tank maintenance involving the use of partial water changes will help to minimise such problems. Chlorine in tapwater is also a problem and should be controlled by using a good-quality dechlorinator to treat all new tapwater.

Livefoods collected from the wild can contain larval parasites — in this case, tapeworm larvae inside a copepod.

Routine water quality testing is advisable in all aquaria to enable you to detect and correct water quality problems before they adversely affect your fish. As a guide, you should test the water at 1–2 week intervals, or more frequently if the aquarium is being changed in any way, or new fish are being added. Test for pH, ammonia, nitrite, nitrate and hardness.

Rule 4: *Undertake regular partial water changes*

In an aquarium, regular partial water changes are, perhaps, the key to success and will go a long way towards keeping an aquarium and its fish in good condition. Such changes are far better than allowing the water quality gradually to deteriorate due to no water changes at all, or exposing the fish to the marked fluctuations resulting from an annual total clean-out.

Ideally, you should change 25–30% of the water at 2–3 weekly intervals. At each water change, any debris that has accumulated in the aquarium and gravel should be removed. The gravel may be cleaned by stirring with your fingers (in non-planted areas) and siphoning away the disturbed debris, or, better, by using a gravel cleaner which will clean the gravel without clouding the water.

The replacement water should be the same temperature as that in the aquarium and should be dechlorinated using a tapwater conditioner. At the same time as you conduct a partial water change, the filter should be cleaned. The use of a gravel cleaner as described will clean an undergravel filter although, occasionally, the siphon tube should be placed down the uplift tube of the filter to remove debris from under the filter plates.

The media from box filters should be removed and quickly rinsed in old aquarium water. The aim here is to remove just excess debris and not wash off the filter bacteria. For this reason, do not rinse the filter media under the tap, as the different temperature and chlorine will kill all of the helpful bacteria.

Rule 5: *There is no substitute for knowledge*

Understanding the requirements of fish and plants will enable you to maintain them in the best possible condition. Such information is widely available in **Supplements** like this one, the *Aquarist & Pondkeeper* magazine, and in the many aquatic texts.

In case of difficulty, or if you are unsure about any point, contact me at:

The Tetra Information Centre,
Lambert Court,
Chestnut Avenue,
Eastleigh,
Hants.

Modern high-tech equipment and aids make life considerably easier for today's aquarists when compared to those of even 10-15 years ago.

ADVANCES IN TROPICAL AQUARIUM KEEPING

Dick Mills reviews some of the latest developments.

Research in recent years has led to the development of a whole range of filtration media using new materials such as open-pore sintered glass.

Before we get down to details, it might be prudent to stand back and take a look at the overall aquarium picture. There have been such advances made in recent years that it's now an everyday occurrence where you can buy the whole set-up, just add a mains plug, water and tank decorations and you're almost immediately into fishkeeping.

The technical prowess in moulding plastics and in the quality of acrylic tanks has made this possible to a degree almost unimagined a few years back. The interesting thing is that this ability to achieve an 'instant' aquarium is not limited to one particular price range. At the bottom end, you have the 'Starter Aquarium' packages (say, 45-90cm — 18 to 36in — tank lengths) often with a choice of filtration systems, through the mid-price system-tanks with filters constructured into the tank design, right up to the fully-integrated computerised, self-monitoring (and self-adjusting) state-of-the-art aquariums at the 'money-no-object' extreme.

The one drawback of these systems, especially bearing in mind the beginning hobbyist, is that outwardly, there is hardly any 'learning curve' to be overcome, and it is all too easy for the 'instant aquarist' to go wrong through having too much, too soon. However, you cannot really appreciate advances unless you have had some experience in the hobby, when you are then in a better position to judge whether or not they are real improvements or not.

FILTRATION

Power filters

One of the first 'extras' bought, once the initial settling in period has passed, is a **Power Filter** and, in the past, it was too easy to dash out and bring back the wrong model as, in the excitement of the moment, you thought that biggest was best.

Most modern filter manufacturers now give excellent marketing advice on the suitability of their products and tailor them to specific tank sizes, so don't waste your money on 'over-filtering' (see **Berti Gesting's** current *A&P* articles on *why* not to over-filter or over-oxygenate). If you can't quite run, financially-speaking, to a full-blown filter then up-grading your biological filter system could be better than nothing.

Powerheads are easy to fit and the latest models on the market not only have variable flow, variable direction and optional extra aeration, but also reverse-flow facilities too. Filters are available which can be used in alternative ways: for instance, impeller units from some new designs (such as Aquarian's) can be used separately as powerheads.

Filter media

Filter media have also come a long way too, from basic 'floss.' The bias has turned, from merely trapping the suspended debris, to a more comprehensive treatment of water, with the accent more in chemical and biological cleansing.

Some of the new-generation water treatments can now incorporate multiple toxin-removal qualities.

More and more filter media are offering more and more useful surface areas for biological bacteria colonisation, whether it be the 'inside and outside' surfaces of Siporax rings, or ceramic pipe fragments, the entire double-sided area of Springflo tape, or all the multitudinous spikes of Bio-Balls.

When setting up a new aquarium, or after a major clean-out, the use of the new water treatment products such as Safe Water will accelerate the re-establishment of biological bacteria for the added comfort of your fishes.

Ammonia removal

The task of ridding the aquarium of ammonia and its associated by-products has been helped recently by the publicity given to **zeolite**, the ammonia-absorbing material. Putting a bagful of zeolite in the power filter is the easiest way to do it, and the zeolite can be re-activated when exhausted by soaking in strong salt solution.

Alternatively, the use of sub-gravel Nitrex boxes will also assist in nitrogenous material removal. Some filters have dedicated filter-medium pads; made for specific purposes; these are usually of a sandwich construction and, for example, may feature carbon/zeolite or carbon/peat combinations to suit your particular aquarium's requirements. (See **Product Round-up** in this issue of *A&P* for details of new filter media and ammonia-absorbing materials).

'Particulate' filtration

To make the filter even more efficient in collecting even the smallest particulate (I'm allowed one new technical word per article!), there are several liquid 'filter-aids' available, which help to bind these up into bigger lumps for easier trapping.

TEST KITS & TREATMENTS

Kits

Whatever water treatment you use, you must have some means of monitoring its successfulness, apart from the apparent well-being of the fish.

Modern-day test kits are quite able to withstand long shelf-life, especially the foil-wrapped 'dip-sticks' from Aquarian or the dry reagent types from Interpet and others.

Do make sure the test kit you are using is suitable for the type of water (or conditions) you want to test; freshwater Nitrite Kits are broader-measuring than those for marines (freshwater fish can stand larger amounts of nitrite) and so may not 'detect the lower amounts of nitrite that may be highly toxic to saltwater species.

It's not only water treatment where accurate measurement is possible, for now you can make use of a **Lightmeter** (alright, calling this a test kit *is* stretching things a bit!) to see just how much light is reaching the bottom of your tank; don't forget well-filtered water, and a well-cleaned cover glass, both let more light through to start with.

Treatments

Water treatment starts right at the tap and you should use suitable **dechlorinators** (eg Aquasafe, Water Safe etc) when adding replacement tapwater. Once any relevant test kit (or even electronic testmeter) has pinpointed any out-of-tolerance parameters, then there are almost an equal number of additives to put things right, **pH adjusters** and so on. (Of course, if you have enough money, you can set up a complete monitoring system to do it all for you — but where's the fun in that?)

There seems to be a fine line in distinguishing between **Water Softeners** (Water Guardian) and **De-Ionisers** (Waterlife and Eco-System etc); it appears that water softeners only remove carbonate hardness while de-ionisers also remove nitrate, pesticides and toxic metals.

Reverse Osmosis Units also provide very pure water, but remember that whatever water purifying system used, it will work rather slowly, and the smaller (cheaper!) units may not always be practicable for large fish-house water supply needs.

HEATING

Heating has gone 'hi-tech' too, especially in the control side of things. More and more thermostats are using micro-chip technology, and there are several external types (Techna-quatic, Rocon, Uno Nova and the latest Aquarian range) which offer anything from basic heat control to extremely comprehensive alarm and memory systems plus, in some cases, recorded printouts too.

Advantages of using external controllers (all have associated temperature-sensing probes either hanging in the water or built into the heater), include that they don't take up valuable swimming space, can be easily adjusted and can be remotely mounted (out of any little fingers' reach!)

On the actual *use* of heat, the Dennerle dual-circuit system takes things further than just maintaining aquarium water temperature at desired levels. The Duomat 1200 thermostat runs two separate heating systems — the normal immersed type of heater for main water heating, and a low voltage, sub-gravel cable heater for the better growth of aquarium plants.

At most times, this results in gravel (plant roots) temperature being 0.5-1°C (0·9-1·8°F) higher than the surrounding water temperature. Due to this gentle heat in the substrate, very slow water currents are induced which give bacteria time to use all the excessive oxygen in the substrate, thus otherwise useful plant nutrients are not oxidised and put beyond the use of the plant root systems.

'Particulate' filtration (now, there's a good word!) by means of 'clumping' agents makes the removal of even the finest suspended matter possible.

A novel alternative way of substrate heating is also provided by Dennerle: using a sub-gravel tube, a 'T' piece and an adapter to fit most heater/'stat units, water is pumped from an external power filter, diverted past the heater and on under the gravel, emerging from the top of an uplift tube into the main aquarium again. (Note: although the 'circuit' could be seen as that of a reverse-flow filtration system with a built-in heater, no water emerges below the gravel).

The Dupla range of heating equipment also includes a low-voltage heating cable for substrate heating, but this can be fixed to the inside glass of the aquarium, to be used on its own, in substrate-free rearing-tanks, or in tanks containing heater-and-cable-destroying, substrate digging cichlids.

LIGHTING

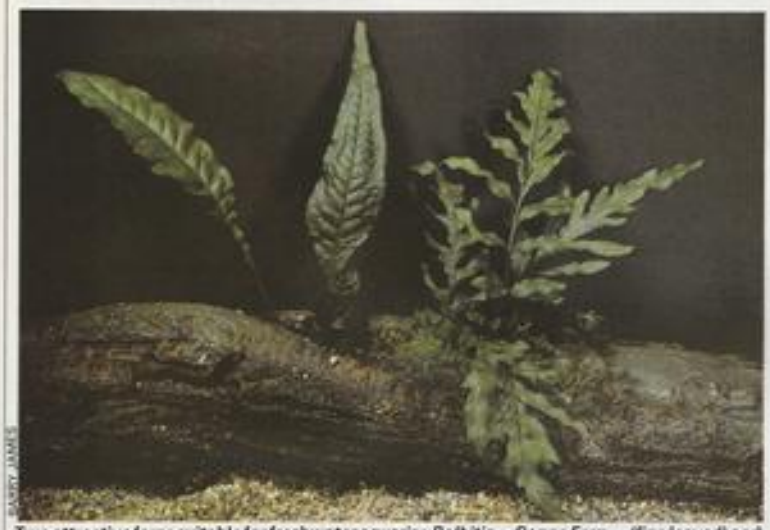
Now that the darker days are with us once more, fishkeeping has moved inside and 'tropical interests' are coming to life. Have you thought of replacing your fluorescents — I bet their performance has dropped off a bit since last winter!

Triton lamps have a long life with a 'sudden demise' effect that leaves you in no doubt that they need replacing. One way to prolong the life of tubes is to fit **Pulsestarters** — electronic replacements for the normal Choke-start units; these units help by reducing the otherwise life-shortening start-up 'flicker' of the tubes.

For those 'open-topped tanks' some advances have also been made in those superb pendant Halogen, Mercury-Vapour and Metal Halide lighting units; most refinements have been to make the lamps run cooler and usually means that the hot-running ballast units have been removed from the lamp enclosure for mounting elsewhere. Some units may also require the not-too-remote siting of transformers (other sources of unwanted heat). It is important to

PLANTING A FRESHWATER TROPICAL AQUARIUM

Expert guidance on successful plant cultivation from **Barry James** of Everglades Aquatic Nurseries



BARRY JAMES

Two attractive ferns suitable for freshwater aquaria: *Bolbitis* — Congo Fern — (fine leaved) and *Microsorium pteropus* — Java Fern.

The main basic rule in planting tropical aquaria is: GIVE THE PLANTS THE RIGHT CONDITIONS UNDER WHICH TO GROW, AND NATURE WILL DO THE REST. This simple premise may seem perfectly obvious but it is ignored by the vast majority of aquarists, either through ignorance, or through an unwillingness to spend the necessary cash to do the job properly.

VARIABLE FACTORS

The plants we use in aquaria came originally from a wide spectrum of tropical and sub-tropical climatic regions located in all the major continents. Within these areas, aquatic vegetation is found in many different aquatic biotopes. Streams, pools, ditches, lakes and rivers all contain their complement of plants. This, of course, means that the species concerned are capable of surviving in both stagnant and flowing waters.

BARRY JAMES

***Limnophila sessiflora* — 'Ambulia' — is a delicate-looking background subject.**

Some species are, however, highly specialised and can survive only in one or the other. Others are more adaptable and can succeed in both, albeit with some changes to their structure.

The water temperature may vary considerably, both on a regional and seasonal basis, as do the chemical and electrical characteristics of the water itself.

In addition to this, soil types in the beds of watercourses will vary considerably over even short distances of the same stream. In the fast-flowing upper reaches plants may have to grow jammed between rocks as the bottom has been washed clean of finer debris. The stream or river may then enter dense forest where the fallen tree trunks and branches impede the water and slow it down. Here, the plants may be growing in a bed of leafmould which overlies the base soil. Later, the forest thins and the stream bed may contain mud banks, areas of sand, gravel or pebbles. This shows just how adaptable aquatic plants are in their environment.

Higher aquatic plants, as opposed to the algae, are all terrestrial plants which have returned to the water over the millenia. Most are flowering plants and set seed as part of their reproductive processes. Most bodies of freshwater are unstable and the amount of water they contain will vary with the seasonal rainfall pattern. During the drier periods many species produce emergent foliage and it is at this time that they also flower and produce seed.

CONSTANT FACTORS

So far I have emphasised the variable factors of the various ecosystems. However, there are also many constants which are perhaps more important if we are able to plant our aquarium correctly.

Firstly, we must consider soil types. Although the stream bed may be overlaid with various unconsolidated sedimentary deposits, the land surrounding it and the bed of the stream itself will invariably, in tropical regions, consist of a type of clay known as Laterite.

This clay is reddish-brown in colour on account of the fact that it contains a high percentage of iron, an element that is vital to plant growth as it is the basis of the molecule chlorophyll which is the 'catalyst' that enables the plant to utilise sunlight in its metabolic processes. Under anaerobic conditions which occur in deep mud, acidic conditions tend to prevail, enabling the iron to be dissolved and, in solution, can be absorbed by the plant roots.

Extensive research in the field has also shown that most other nutrients are available owing to constant upwelling from springs bringing these materials from deep within the earth's crust. It has also been found that, withing the area of root activity, the temperature varies little from the water above.

Warm roots

So, when we set up our aquarium, we must first ensure that the roots are kept warm.

BILL TOMEY

***Ceratopteris* — the Indian Fern — has very bright attractive fronds.**

This can be accomplished by modern technology by laying in a heater cable on the base of the aquarium. Alternatively, an Ultratherm heating mat of the low wattage variety can be placed beneath the aquarium. Both devices can be wired in parallel with a submersible heater, which will heat the water. I would recommend a good quality electronic thermostat to control the output of heat.

Laterite

The next step is to install the Laterite which is available, for example, under the brand name of Everite No 1. One 500 gram (17·6oz) pack is sufficient for three square feet (0·28sq m) of base area. This material comes complete with basic fertiliser and growth hormone root promoters. This is mixed dry with approximately 7lb (3·2Kg) of ¼in (0·6cm) gravel for every square foot (900 sq cm) to be covered. The material is then covered with 2-3in (5-7.5cm) of $^{3}/_{16}$in (0.5cm) well washed gravel.

Decor

At this stage the hard furnishings such as rockwork, bogwood, Simlawood are added. It is normal to construct a terrace or terraces — depending on the width of the tank — as this increases the depth and perspective of the finished scene and makes the arrangement of the plants easier. It also enables the mulm which accumulates, easier to remove.

Water

The next consideration is the water itself. For preference, use a 50/50 mixture of rainwater and tapwater. Firstly, fill the tank half full, playing the water gently onto a saucer to prevent disturbance of the substrate.

We will defer the planting process until the rest of the equipment has been considered.

Lighting

Modern lamps have made it relatively easy to simulate the properties of sunlight. For tanks up to 15in (38cm) deep, I use Triton lamps at 20 watts per square foot of surface (900 sq cm) area. This will give adequate illumination.

For deeper tanks of 18in (45cm), I prefer to use lamps with more penetrating power. I use 75 watt Halogen A for 18in (45cm) deep tanks and 100 watt Halogen A for tanks 24in (60cm) deep or more. I use one of these lamps for every 1·5 square feet of surface area (1,350 sq cm).

Whatever lighting you are using, the total illumination per day should be exactly 10 hours.

Carbon

Plants need a wide variety of chemical elements as foodstuffs. One of the most important is carbon. This element is absorbed by the plant as carbon dioxide (CO_2), a gas present in the atmosphere but often deficient in aquaria. This can be remedied by the installation of CO_2 diffusion equipment.

Various manufacturers such as Sander offer simple manual systems, but for sophisticated automatic arrangements, one must look to companies like Denerle. Although expensive initially, the running costs are low and well justified by the enhanced plant growth which ensues when such equipment is installed.

Any powered filter system will be fine for plants, but the COC 400 from Dennerle is designed for the job and, as well as being a very well designed filter, it also incorporates the CO_2 reactor and heating element all in one unit.

BILLY WHITLOCK

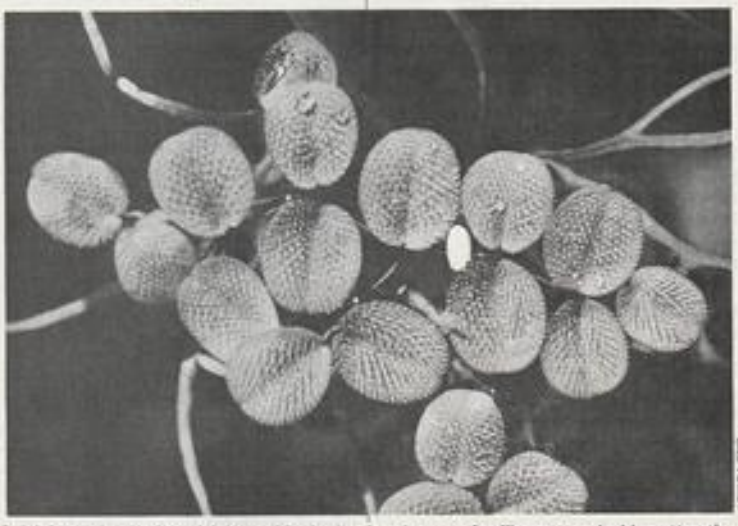
***Lilaeopsis novae-zealandiae* is an excellent foreground plant.**

PLANTING

I am inclined to plant the tank when full, as I can see the developing effect as I work.

Background

The background is planted first. In this area we use fast-growing plants, most of which have no definite limit of growth, and which therefore need regular pruning to retain their shape. Buy them in lots of 5 or 10 stems and loosely tie them together with soft



BILL TOMEY

***Salvinia* species can be used to provide shade, absorb excess fertilisers . . . and add an attractive touch to the water surface.**

BARRY JAMES

***Gymnocoronis* — the Spade Leaf — grows to over 15in (38cm) in length and is therefore good as a background plant.**

lead wire. Remove the lower two sets of leaves and ease the plants gently into the gravel so as not to bruise the stems.

Most species of this type are sold as top cuttings without roots. Do not worry about this as they will produce healthy new roots in about 10 days. The purpose of the lead is to hold them down until they do.

Middleground

Middle-ground plants have a definite final height. They consist of (mostly) rosette-forming types. Some make imposing specimens, so allow plenty of room for sideways growth. Others such as *Vallisneria tortifolia* grow to only 8in (20cm) high and are planted in little clumps.

Foreground

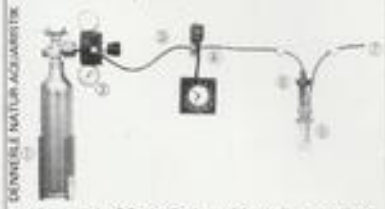
The foreground is, in my opinion, best planted with plants grown hydroponically in pots, as these diminutive specimens are often quite difficult to handle if purchased loose.

Do not forget the ferns and mosses, some species of which grow attached to bogwood and rocks. They can give a most charming and professional effect.

Floating plants

Finally, add a few floating plants. These are simply placed on the surface of the water.

CO_2-supply with magnetic valve to shut off the CO_2-supply at night



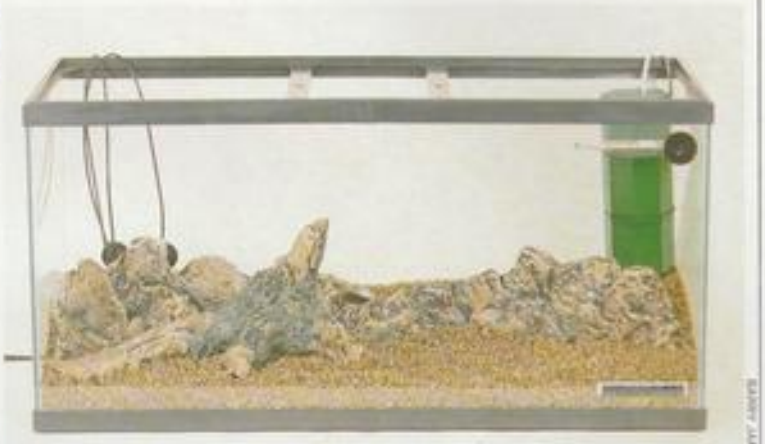
DENNERLE NATUR AQUARISTIK

1. Dennerle CO_2-cylinder with wall mounting bracket
2. Profi 2000 regulator with needle valve
3. CO-Proof hose
4. Magnetic valve, timer operated
5. Check valve (non-return valve)
6. Bubble counter
7. CO_2-appliance inside the aquarium, i.e.: CO.C Bio-Filterstation

They contribute greatly to the well being of the tank by removing excess fertiliser elements and also help in the battle against algae by filtering the light.

Maturation

Now the tank is up and running, leave the lights on for 48 hours before returning to the normal period of illumination. It is usual, though not essential, to leave the tank to settle down for a week or so before the introduction of the fish. In the meantime, add trace elements, such as Everplant D, on a daily basis as these essential ingredients will be quickly lost to the system by colloidal action and oxidisation, and so must be constantly replenished.

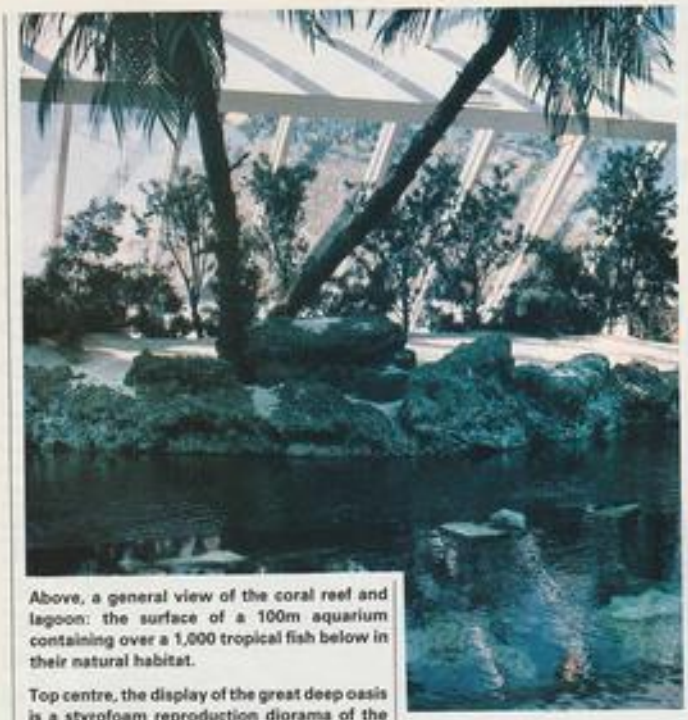


BARRY JAMES

An aquarium set up (minus hood, plants and water) with double gravel layer, undergravel heating cable, thermometers (two — one near the gravel and one near the eventual water surface), power filter and artificial bogwood (Simlawood).

LIST OF RECOMMENDED PLANTS FOR TROPICAL FRESHWATER AQUARIA

Scientific Name	Height in inches (cm)	Position in Aquarium
Bacopa caroliniana	15 (38)	Background
Cabomba caroliniana	15+ (38+)	Background
Egeria densa	15+ (38+)	Background
Gymnocoronis spilanthoides	15+ (38+)	Background
Hygrophila polysperma	18 (45)	Background
Limnophila sessiflora	18 (45)	Background
Ludwigia mullertii	18 (45)	Background
Myriophyllum elatinoides	18 (45)	Background
Nomophila stricta	18+ (45+)	Background
Rotala macranda	15 (38)	Background
Vallisneria spiralis	18 (45)	Background
Anubias barteri	12 (30)	Middleground
Aponogeton crispus	12 (30)	Middleground
Aponogeton boivianus	15 (38)	Specimen — Middleground
Ceratopteris thalictroides	12 (30)	Specimen — Middleground
Cryptocoryne species	8 (20)	Various — Middleground
Echinodorus species	15 (38)	Various Specimens — Middleground
Nymphaea maculata	18+ (45+)	Specimen — Middleground
Vallisneria tortifolia	8 (20)	Middleground
Acorus gramineus var: *pusillus*	4 (10)	Foreground
Anubias nana	4 (10)	Foreground
Cryptocoryne nevillii	3 (7·5)	Foreground
Echinodorus tenellus	4 (10)	Foreground
Hydrocotyle vulgaris	2 (5)	Foreground
Marsilea crenata	3 (7·5)	Foreground
Lilaeopsis species	3 (7·5)	Foreground
Ceratopteris cornuta		Floating
Limnobium laevigatum		Floating
Salvinia brasiliensis		Floating
Bolbitis heudelotii (Fern)		Attach to Bogwood
Microsorium pteropus (Fern)		Attach to Bogwood
Vesicularia dubyana (Moss)		Attach to Bogwood



Above, a general view of the coral reef and lagoon: the surface of a 100m aquarium containing over a 1,000 tropical fish below in their natural habitat.

Top centre, the display of the great deep oasis is a styrofoam reproduction diorama of the mid-oceanic ridge only normally observed from deep submarines, such as the French exploratory submarine Nautile. The complex multi-sensory display reproduces the views and sounds of the mechanical arms of the submarine as it operates at depths three miles down from the surface. At this level there is very little oxygen and the majority of creatures are sulphur-breathing. The specimen displayed is a deep water Blenny and is related to the Blenny species normally found in harbours.

Top right, this Grouper *(Epinephelus flavocoeruleus)*, was given to Nausicaa by the Dunkirk Aquarium. It is a comparatively young specimen having spent 14 years in captivity during which time it has grown from 2½in (c6·4cm) to just over 24in (60cm) and now weighs approximately 10lbs (4·5kg). It is anticipated that it will survive for a further 30 years. This specimen becomes bad tempered when removed from public display. It is particularly attracted to people wearing white clothing!

Right, a segment within the shark tank. The number of people shown in the picture gives some idea of the size. The sharks can, and do, swim from floor level, around, up, across and over the visitors' heads. A truly incredible experience!

Far right, note the "Crab-like" structure made of fibre-reinforced concrete and tinted glass. The harbour and cross-Channel boats can be seen in the background, and part of the extensive sandy beach in the foreground. Walking distance from harbour to Nausicaa, about five minutes. For family with children, say, ten!

SUBMERGED IN

Brian Deaville and **Gill O'Donnell** report on a unique marine centre located a mere hop across the Channel.
(Photographs, unless otherwise indicated, by Fernand Damotte)

How often have you had the opportunity to combine a family day out with the chance to research, explore and really submerge yourself in your hobby? The answer is probably never(!) which is why the concept behind the Boulogne-sur-Mer National Ocean Centre is so exciting.

Named **Nausicaa**, the Centre is the only one of its kind in the world. It aims to further the knowledge of the scientist, the hobbyist, the amateur and the curious alike, in observing and listening to the oceans and some of their inhabitants. Additionally, it provides a fascinating day out for the family.

Opening in May this year, Nausicaa is the point where the ocean comes ashore, and provides a unique learning/pleasure experience featuring over 15,000 square metres of multi-sensory displays and activities in specially designed settings. It is more than just an aquarium, an exhibition or museum; it is a unique celebration of the aquatic universe brought to life in a series of dazzling displays.

Stunning displays

The adventure begins with a voyage to the centre of the sea, where the visitor encounters the underwater world of plankton — the first link in the food chain — and a vast cycloramic display of the myriad varieties of life in the ocean depths, accompanied by the

THE HOBBY

hunting cry of the whale. A strong sense of the theatrical permeates the centre, so that the visitor becomes completely immersed in the marine experience, both visually and acoustically.

Passing through to 'The Aquaterrainium', where species of sea life from all the world's oceans are to be found in their natural habitats, there is a sparkling display of light and colour. By far the most stunning is the skillfully recreated tropical lagoon, a 100-metre aquarium where more than a thousand tropical fish glide and dart through a multitude of corals. Here, the visitor can experience the wondrous sensation of passing from the surface down into the depths without the necessity of a snorkel!

Coldwater aquaria

Leaving behind the multi-coloured shoals, the visitor moves onto the cold sea aquaria. There are fewer species in these waters, but the fish are more abundant, which is why fishing is mainly practised in the cold seas.

In the Mediterranean aquarium you are confronted by crustaceans with audible clapping claws and mandibles, while in and around 'the wreck', congers and muraenas (morays) abound. Carefully designed panels offer views of the seas from all angles, including a bird's eye view of a rockpool.

The 'tuna diamond', on the other hand, provides a fish's view of a fishing expedition, and is an unforgettable experience. The tuna swim in a giant inverted diamond aquarium, which appears to be suspended from the ceiling. Meanwhile, gigantic mirrors create the illusion that the visitor is also immersed in this watery environment. Gradually, spotlights create a display of hidden nets as the expedition begins . . .

A specially constructed deck section of an industrial trawler provides the next dramatic effect, for the visitors find themselves on a North Sea boat in rough weather at the dead of night. Against this cold and windy backdrop, the story of trawling is revealed, to the accompanying hum of the winches.

Farming and management

But Nausicaa is not just about sensation and emotion. Many of its exhibits are designed to foster a greater understanding of sea life and the role man plays in maintaining a balance in the oceans, for, paradoxically, man knows more about space than the sea.

Yet, while the sea can live without us, we cannot live without the sea. Consequently, Nausicaa displays features on both marine farming and marine management. In this sector, there are gigantic animated maps which allow visitors to act out the roles of scientist, fisherman, politician, shipping magnate or ecologist and to view the effects of their decisions on the ocean's resources.

Nausicaa also aims to develop research and technology, and one of the Centre's most unusual features is the 40-metre long 'testing tank'. Here, the visitor can see, and participate in, research into a variety of fishing techniques and safety procedures, providing a unique opportunity for scientists, professionals and the general public to exchange views.

Other offerings

In some instances, actual 'hands on' experience is encouraged. In the terrace area, for example, there are vast, open low-level tanks where visitors are at liberty to feed and stroke the basking skate and some species of ray. A further tank also allows for close encounters with urchins, crustaceans and starfish.

It is hoped that the Centre will be able to respond to everyone's demands for books, photographs and information. A 120-seat cinema shows a continuous programme of sea-life films, and the Centre boasts the largest marine media centre/video library in Europe. There are also video booths, reading rooms, study rooms and a wide range of modern communications equipment.

The library possesses a catalogue of over 5,000 titles, and 4,000 references of maritime books, while its video section has 5,000 titles, and 4,000 references of maritime books, while its video section has 5,000 slides and 300 films, all of which are immediately accessible, and a large quantity are in English. There is also a unique data bank, unequalled in Europe.

Perhaps the most unforgettable feature of the visit is the moment when the visitor enters the shark pool. Safe in the undersea vantage point, within this panoramic aquar-

M. Stephane Henard, seen here in his office, with a recent edition of *A&P*, (sensible man!), is 'Responsible Aquariologie' at Nausicaa, the Boulogne-sur-Mer, French National Ocean Centre.

"I was in on the ground floor, as it were," M. Henard said, "having been involved in the project from its conception in 1983. Since then, inspired by the fundamental alliance of leisure and knowledge, we have been planning our programme and seeking the architectural design that can be seen today.

"There is no programme like Nausicaa in the world, and although it is a major French State Project, costing some £16 million, it has been substantially sponsored by the EEC, and every major Aquarium in Europe has contributed, in some way or other, to the final production.

"We have achieved our ultimate objective by utilising a wide range of techniques, and, by the use of theatrical sets and innovative multi-media displays, produced a complex in which learning is both easy and fun. Everything combines to ensure that pleasurable experiences of the eyes and ears go hand in hand with the acquisition of scientific, technical and practical knowledge."

ium, it is an awesome experience to watch graceful specimens swimming above and around you, apparently unconcerned by your presence. The fish, having long been accustomed to the gesticulatory presence of humans within their environment, can be photographed throughout the centre.

The philosophy of the centre is to allow visitors to witness marine life in its normal routine and natural environment. Where the routine worlds normally remain hidden, specially contrived panels expose them and allow for close observation. Conditions within the centre mirror reality, so that fish are seen displaying their normal behaviour, attitudes and daily reflexes.

The aim is not to display a wide range of species, but to show the usual interaction between them. Therefore, each aquarium is designed to show the permanent dwellers, their neighbours and predators in their natural habitat, and each aquarium illustrates a topic and was designed according to the fish, their need of space, hiding places and light.

If, after all these fishy goings on you still have time to fill, then the centre also offers a gift shop, restaurant, café and leisure pool. The facilities are well planned and lively, comprising a jacuzzi pool, terrace area, ½ Olympic size pool and toddlers' pool, as well as a snack bar, café and entrance onto the beach at Boulogne.

And all this, and more, is only twenty-odd miles across the Channel from the Kent coast!

HOW TO GET TO NAUSICAA

By sea: Ferry from Dover or Folkestone to Boulogne.
By plane: Land at Le Touquet — 38 km to Boulogne.

WHERE TO?

Boulogne-sur-Mer, on the beach almost opposite the main harbour entrance.
Boulevard Sainte-Beuve — 62200 Boulogne-sur-Mer.
Public information: (010 33) 21 30 98 98
Administration: (010 33) 21 30 99 99

WHEN?

Open to the public daily: April/September 10 am - 8 pm.
October/March 10 am - 6 pm.

HOW MUCH?

Adults: £4-50 (fr 45-00)
Children: £3-00 (fr 30-00)
Groups — Special discount on application in advance of visit.

Letters

Dolphinaria, Fishkeeping and Conservation

I was somewhat surprised by the tone of Colin Grist's letter (August, 91) attacking Mr Chambers (see **Seaview** — April '91) for his comments on dolphinaria and related issues. Although the views of Mr Chambers could have been expressed in slightly more diplomatic language, I found myself agreeing with much of what he said. I fully agree that dolphinaria have a deserved place in the culture of the United Kingdom, albeit with necessary improvements to the way in which the animals are housed.

Mr Griss says that closing dolphinaria has nothing to do with the fishkeeping hobby. I believe he is being incredibly naive in such an assessment. Those opposed to Zoos and dolphinaria give every impression of wishing to legislate against all forms of animal husbandry; thus, once dolphinaria have been closed down, these negative people will simply move on to another target, i.e. fishkeeping.

Even now, we see the same type of people in Germany calling for extremely limited 'Positive Lists' of species that will be allowed to be kept; such sentiments are frequently reiterated by 'animal welfare' and environmentalist groups in the UK. Therefore, how Mr Grist can disassociate the two aspects of animal husbandry is beyond me.

Mr Grist then asks "Why else would the WWF and the Marine Conservation Society commission Dr Elizabeth Wood to develop the Eco-Labelling scheme?" I can suggest a simple reason: on all previous evidence, the system will, once in place, be used by the extremists to ban more and more marine species from importation.

Just look at the evidence of the past two decades. The so-called environmentalists told us they were not against animal-keeping, just against taking from the wild, yet now we see the advent of 'Positive Lists' that seek to ban the keeping of species, irrespective of whether the individuals are wild-caught or captive-bred.

Example two: the Dangerous Wild Animals Act of 1976 was brought into being to control (not ban) the keeping of species capable of killing people. Now, with the extremist lobbying of the Department of the Environment, we have the ludicrous situation whereby such harmless creatures as Squirrel Monkeys and Tamarins are listed as dangerous!!!

Example three: the 1981 Wildlife and Countryside Act allowed for a few species of native bird to be exhibited at bird shows, provided they are captive-bred and closed-rung. The Act also includes a provision for addition to such a show species list, provided the species to be added is bred in reasonable numbers each year. Despite the passing of ten years, not a single avian species has been added to the showable list, in spite of the fact that several species, most notably the Crossbill, are bred in large numbers on a frequent basis. The reason, again, revolves around lobbying by extremists.

The fourth example concerns the World Wide Fund for Nature, which always claims to base its policies on the scientific principle of sustainable utilisation. However, the WWF have been noticeable by their complete silence over the recent clamour to ban commercial bird imports, despite the fact that many countries, such as Guyana, receive a very considerable proportion of their Gross National Product from the practice of sustainable utilisation of wildlife which would obviously be totally undermined by import bans in the Western world.

The final example relates to how CITES has been misused by the environmentalists. Again, the concept of protecting endangered species, by a listing on Appendix 1, (which effectively bans commercial trade), is a very laudable one. But how has it been used? CITES Appendix 1 now contains block listings of entire groups of flora and fauna, within which are contained many species that are not at all rare and, indeed, are in some cases abundant. Thus, no-one could seriously suggest the Kestrel is anything but common, yet it remains on CITES Appendix 1 for the simple fact that Diurnal Birds of Prey are block-listed in their entirety, with little or no scientific validity.

Yes, much of the historical evidence suggests that legislation, once enacted, is pushed beyond its original intent by the 'animal-welfare' and 'environmentalist' lobbies.

Mr Chambers, in his original letter, made comment as to Gordon Kay's and David Sands' apparent willingness to compromise with these so-called environmentalists. While these two individuals, are, I am sure, fully committed to the fishkeeping hobby, I would share this concern, having read these two gentlemen's writings. Colin Grist should reflect on why it is that animal keepers are perpetually asked to make compromises and never our extremist opponents.

The would-be chiefs of conservation among environmental organisations would have us believe that they and their ilk are the only people capable of being truly 'green' and conservation-minded. I would point out that reading *BBC Wildlife*, the occasional viewing of a wildlife programme on TV, and the once in a while 'I love animals' statement does not make a committed conservationist. On the other hand, people who live and breathe animals 365 days of the year certainly are, and such are the world's animal keepers!

In summary: yes, we animal keepers should, at all times, be prepared to have dialogue with those environmentalists who acknowledge the worth of captive animal husbandry and the conservational credibility of its proponents. Unfortunately, such environmentalists are few and far between at the current time. To those totally opposed to animal keeping, (judging by their actions, the great majority at present), we must give vigorous opposition.

I'm sure many animal keepers dislike intensely, as I do, the 'holier than thou' approach of so many environmentalists. For myself, I need no lecturing on commitment to conservation and wildlife in general. I have conducted field trips at my own expense to places as diverse as Western Samoa and Togo to study wildlife and discuss environmental questions with native government officials. I give 5% of my annual salary to conservation projects, and was one of the first breeders of such endangered species as Rothschilds Mynah and Yellow-faced Parrotlets.

Animal keepers should not feel at all defensive when being compared to our opponents; the comparison would come out very favourable indeed!

Dr J. A. Collins,
Cobham,
Surrey.

Dr Wood comments

Dr Collins' personal answer to the question *"why else would the WWF and Marine Conservation Society commission Dr Elizabeth Wood to develop the Eco-labelling Scheme"* reveals a suspicious mind which I hope is not shared by others. The Marine Conservation Society and WFF are not extremist, neither am I, and neither is the Eco-labelling scheme! We are developing this scheme not as an underhand way of banning trade, but as a positive way of bringing about improvements. It is disappointing that Dr Collins sees *"the great majority"* of environmentalists as a threat.

Real extremists are reluctant to listen or compromise but make much of their side of the argument, sometimes with misinterpretation or misinformation thrown in for good measure. I am sure that they exist in equal number among hobbyists, traders and environmentalists, but hope they are in the minority.

The Marine Conservation Society is trying to produce rational and workable solutions to problems that most people connected with the trade admit exist. If we felt it necessary to call for a total ban, we would not be wasting our time working on guidelines!

On a final note, I agree with Colin Grist that closing dolphinaria has nothing to do with the fishkeeping hobby. Completely different welfare and conservation issues are involved.

Dr Elizabeth Wood,
Marine Conservation Society.

Koi Calendar

By David Twigg

By the time you read this column the show season will be over and I will have been left with memories of some lovely days out looking at wonderful selections of Koi. That is the beauty of a show; it gives the ordinary Koi keeper a chance to see some of the best fish in the country and time to appreciate the finer points of those fish.

Our knowledge is improving all the time as we talk to other Koi keepers and dealers alike. Sharing experiences, good and bad, with other visitors leads to the development of new ideas and the subsequent improvement of both the Koi in our ponds and the ponds they live in. New filter media, for example, are always appearing on the market and there is bound to be a difference in results obtained by people with differing systems.

Talking of filter media brings me to a chat I had with a couple of people about reducing the quantity of blanket weed in ponds. Following the experience related, and having read the advertising matter, I have decided to give Siporax the chance to reduce the amount of blanket weed in my pond.

While being a great believer in the benefits of a coat of blanket weed on the walls of my pond, I could well do with a lighter maintenance load. A couple of buckets full of excess blanket weed daily at the height of the season is not unusual for me (raked, as mentioned in a previous **Calendar**) and I have still to 'VAC' off the bottom afterwards to remove the rest! I will be reporting upon results at a later date.

JOBS OF THE MONTH

This is the month when you will probably need to find time to erect your winter cover. Please be careful not to disturb your fish too much in the process; a stressed fish is a susceptible fish, and that is not what you want when feeding is reduced, if not stopped, before going into a long British winter.

Some Koi keepers still believe in turning off their filter systems during the winter months. While I believe this to be a 'suspect' practice, if it *is* done, it must not be done suddenly. A gradual slowing down of water flow and feeding must be undertaken, such that changes in water quality do not adversely affect the Koi.

Possibly the biggest problems come in the spring when the system is restarted. The filters must be thoroughly cleaned and disinfected and will take several weeks to come up to normal running condition.

Filter 'seeds' such as Polybac and ABA can be used to speed up bacterial activity, but it is still a stressful time for the fish. I think that Koi keeping has developed to the point where not only all-year filtration should be the norm, but serious consideration should be given to heating the pool during the long British winter so that our Koi are kept at peak health all year round.

WHAT'S ON IN OCTOBER

Meetings

3 — Middlesex & Surrey Borders Section BKKS. Guest Speaker is **Andrew Richards** on *Koi Varieties*. Contact Steve Gould on 0932 848147.

9 — South Hants Section BKKS monthly meeting at the Denmead Church Hall, Hambledon Road, Denmead, Hants at 8pm. Details from Tony Price on 0705 261085.

13 — Northern Section BKKS. Monthly meeting at St James Hall, Pendleton. Contact Tony McCann on 061 794 1958.

13 — Mid-Somerset Section BKKS. At 2pm **Alan Rodgers** presents *Koi Appreciation* in West Monkton Village Hall, Taunton. Contact Alan Purnell on 0458 72132.

16 — Crouch Valley Section BKKS monthly meeting at Laindon, Basildon. Guest speaker is **Bill McGurk**. *Japanese Experience*. Contact Allan Ward on 0268 543600.

16 — Mid-staffs Section BKKS. Monthly meeting at 8pm, RNA Club, Elmore Green Road, Bloxwich. For details of what's on ring Joan Rutter on 0543 876699.

RECENT TRIPS

During July I visited two Koi dealers: **Japanese Water Gardens** and **Avenue Fisheries.**

Bernard Channing of Japanese Water Gardens has appointed a new manager. **Paul Stacey** is well known in the Koi treatment world and has the responsibility for the health of the many hundreds of fish passing through JWG every week.

Another large formal pool (7½ thousand galls — c 34,000 litres) has been built to house the ever-growing stock of high quality Koi, and Paul kindly demonstrated the finer points of the filter and heating systems to me.

Together with the 6½ thousand gallon (c 29,500 litres) Japanese style ornamental pool, JWG has over 20 thousand gallons (over 90,000 litres) in all dedicated to Koi. Plans are already under way for three more pools to be built during the winter months. I look forward to seeing them up and running and full of Koi.

My second port of call was **Avenue Fisheries.** This was the day that the August *A&P* was published and I found that, by coincidence, **John Dawes,** our Editor, had written an **Out and About** article describing the new premises to which **Steve Field** has moved Avenue Fisheries.

The 16 ponds, almost 40,000 gals (some 180,000 litres) of water, have well established filter systems. These were matured for almost a year running them in parallel with 'The Avenue'. To quote Steve, "It was an expensive but well worthwhile exercise". The 'New' Avenue Fisheries has been set out in the same way as its predecessor, with lots of in-ground, out-of-ground, formal and ornamental ponds. Each of these ponds is set up with one of a variety of filter systems so that the visitor planning a new pool can get an idea as to which most suits his/her needs.

I look forward to admiring next year's matured look of the large scale planting programme that Steve has recently completed.

DAVID TWIGG

Main photograph, the large ornamental pool at Japanese Water Gardens. Inset, part of the layout at the 'New' Avenue Fisheries.

OUT AND ABOUT

AQUARIUM FISHKEEPING EXHIBITION 1991

By Robert Kirkup

(Photograph by the author)

This is my first Festival report, and I would have much preferred my good friend, Mervyn Strange, were here to write it instead. Sadly (as already reported in *AGP*), the Festival organiser tragically suffered a heart attack and died three days prior to the build-up to the event.

For the organisers, exhibitors and traders, this put a gloom over what should have been one of the season's premier festivals. Indeed, many hundreds of visitors, on their approach to the A of A stand for their annual chat with 'Merv', were saddened to find him no longer with us. Mervyn was an outstanding hobbyist with charm, charisma and personality. He was known to aquarists the length and breadth of the country and will leave a huge space in our hobby. I feel we will never see the likes of him again; I hope I'm wrong.

The A.F.E. took place on June 8 and 9, at the usual venue in Esher, the Sandown Exhibition Centre, whose facilities have proved excellent in the past and again so this year.

The price of an adult ticket (£3.50) proved to be a little high when compared with W.A.F. and S.A.F. and this was dropped to £2.50 during the last hour on each day; the disabled and young children were allowed in free. Once inside the exhibition hall you encountered the usual array of traders catering for the hobby and the home, with the bar and restaurant close at hand.

For the artistic fishkeeper there were a good number of furnished aquaria displayed and, with **Anglo Aquarium Plant Co.** being nearby, you did not have far to go to pick up some specimen plants for your own aquaria back home. I took a liking to the large-growing African species, which would be at home in aquaria of a metre or so in depth; a snip at £6. There were also some beautiful flowering varieties of *Aponogeton* and *Cryptocoryne*.

Among the many varieties of rockwork and bogwood on offer, I was very impressed with the African bogwood for sale from **Monkfields**; every piece had a character all of its own. The **'Aquarian'** stand was on hand manned by **David Sands**, who was showing off some new lines, one of which was an aquarium heater-stat that is tough enough to withstand the most 'affectionate' cichlid.

There were several traders of tropical and coldwater fish in attendance, together catering for our every whim. **Stockport Tropicals** had their usual selection of Discus and Killies, including some splendid Turquoise Discus, with a body size of 15cm diameter (6in). **Tropical Impex** had an array of South American fish, some nice and rare specimen catfish, including three specimens of *Brachyrumdia* cats at around £3 for 10cm (4in) fish. **J.M.C.** catered for the novice, with thousands of inexpensive and colourful community fish, and for the specialist with some fairly large specimen fishes.

I was drawn to Monkfields Aquatics again and again. In response to the demands of perfectionist aquarists for highly coloured fish, all of the traders are bringing in some wild caught fish. Monkfields are combining business with fishkeeping and are breeding some of these, which has resulted in the prices being halved and the fishes being accustomed to our water. All of the traders were stocking adult dwarf cichlids, which looked unbelievably colourful and as if they were ready for spawning.

Among all of this, we usually find the competitive fishes in the form of the 'Big and Beautiful' display and the tableaux. But this Festival was to be different; all of the exhibiting aquarists, their tableaux displays, furnished aquaria and fish, were to be found in a hobby village at the top of the hall, unless your initials are T.C.?

Beautiful wild-caught cichlids were among the highlights for me at this years's A.F.E.

Twenty-two societies were involved with tableaux and displays, and the amount of information on display regarding breeding, identifying and care for the fishes was priceless. On top of all this, the trade stands were manned by the exhibitors throughout the show, answering any questions the visitors wished to know, usually on the fish they had bought or intended to purchase.

The specialist societies were in good attendance with the **British Marine Aquarists' Association, Rainbowfish Keeping Society, Catfish Association, Anabantiod Association, International Characin Association,** and the **Southern Livebearers Aquatic group** . . . manned by a Scot!

A number of lectures were arranged by the Association of Aquarists, including **Alf Stalsburg** from Norway on his fish collecting in South America in 'surround sound'; **Mike** and **Gina Sandford** on catfish and the Dutch aquarium, and **Brian Walsh** on breeding tropical fish.

The first place in the tableaux was contested by two very good entries and was narrowly won by **Scorpion A.S.**, with a fantastic Chinese Dragon, complete with marching feet. It was great to see a 'non-box' tableau making an appearance. Second place was **Nottingham A.S.** with their attractive and tidy fire-engine, the envy of tableaux builders (being a trailer in disguise, it is quick to erect and dismantle).

The 26 individual classes were heavily represented, with the judges frequently commenting on the quality fish they were judging. By night-time the **Best in Show** short-list consisted between a 40cm (15.7in) Suckermouth Cat, a Blue Limia, a *Pseudomugil signifer* Rainbow and a Khuli louch. Eventually, the Best Fish in Show was chosen from the 'Big and Beautiful' display, and, was a *Pterygoplichthys* catfish, this time a *P. gibbiceps*. The fish was in immaculate condition and presented itself well over the three days. His proud owner, who had sleepless nights while his baby was away from home, is **Mark Guscott** from **Bracknell A.S.**

The 'Aquarian' trophy for **Best Pair** was contested

between a pair of *Limia versicolor* and a pair of *Barbus fraseri*, the barbs (owned by **Terry** and **Doris Cruickshank**) hooking into the trophy. **The Best Breeders** and **Best Livebearer** award again would be returning to Washington in the North-East with a team of *Pseudomugil signifer* and a Blue Limia female. **Best Coldwater Fish** came from **Sunderland C.&P.K.S.** and was a blue and white Bitterling *Pseudoperilampus ocellatus*.

The winners of the **Sandown Superbowl**, by a large margin, were **Rob** and **Karen** from Washington with 74pts.

Editor's Note

Modest guy that he is, Rob has avoided mentioning that he and his wife won the Best Breeders and Best Livebearer awards. The 'Rob and Karen' who won the Sandown Superbowl are, likewise, Rob and his wife.

John Dawes

EDGE EXPANSION

By Stephen Smith

(Photograph by the author)

Wherever your favourite pet shop or aquatic centre is located, chances are that at least some of its supplies will have come from **Edge Aquatics**. Decked in familiar blue-and white livery, the company's vans seem to be on just about every motorway or trunk route in the UK, so I was fascinated to see for myself the origins of this particular 'species'.

The company was formed by **Richard Edge** and **Peter Mills** some twelve years ago, and has since developed into one of the country's leading aquatic wholesalers. Just twelve days prior to my visit, Edge Aquatics had moved into new 28,000 square-foot premises in Redditch, Worcestershire, where holding facilities incorporating over 1,000 tanks were well under construction.

All this from small beginnings indeed. Richard has always been a keen fish breeder and, in his own words, "Having too many of too few fish", he sold his surplus stocks, as well as cultures of live *Daphnia*, to pet shops in and around his Birmingham home.

Similarly, Peter Mills used to distribute home-produced *Tubifex* from his bicycle, before managing a franchise in a Birmingham store. It wasn't long before these two dedicated hobbyists opened up small premises in Bromsgrove, before moving on to larger premises nearby. "Every inch of space was used", remarked Peter, "it was a real Aladdin's Cave!"

Twelve years later, after a search lasting almost two years, the pair were able to find a suitable location, providing room for expansion at a price they could afford.

Edge Aquatics currently occupies 15,000 (about 1,400 sq m) of a capacity of 28,500 square feet (nearly 2,650 sq m), leaving plenty of scope for expansion. "We provide everything for the aquatic hobby, except for marines" explained Richard. "Now that we have the space, we hope to provide for that area of the hobby, too."

Pride of place is the purpose-built fishroom. Still under construction during my visit, the fishroom will house over 1,000 tanks when completed. Over 300 tons of concrete were used in the preparation of the structure, which has been painted and insulated.

A centralised filtration system with an undertank reservoir of over 1,000 gallons (4,500 litres) is maintained by fish-house manager **Tony Jackson** and, according to Tony, "It provides the best possible conditions for the fish."

Aquatic livestock is obtained from all over the world, including Singapore, South America, Africa and Thailand, but one of the most important sources of supply is the hobbyist.

"We will pay a keen commercial price for hobbyist-produced fish," explained Peter. "After all, that is how we started, and it's our way of encouraging the hobbyist. Also, home-produced fish are acclimatised to British conditions and so require a shorter anti-stress period."

Among the examples of home-produced stock which caught my eye was a magnificent collection of Angels, as well as some impressive *Corydoras*.

Supplementing the supplies of livestock is a full range of dry goods and accessories of almost every leading brand, and delivery is supported by a fleet of five vehicles. "We prefer to undertake our own deliveries, within reason," stressed Richard, "And we pride ourselves on our availability and reliability.

"The job is, quite simply, a 24-hours-a-day, 365-days-a-year vocation, but the enjoyment is unbeatable."

Edge Aquatics, Pisces House, Windsor Road, Redditch, Worcs B97 6DJ. Tel: 0527 60088; Fax: 0527 61006. Contact Richard Edge, Peter Mills.

Peter Mills, left, and Richard Edge, celebrate moving into new 28,500 square-foot premises in Redditch, Worcestershire.

Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Each query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. *Please indicate clearly on the top left hand corner of your envelope the name of the experts to whom your query should be directed.*

All letters must be accompanied by an S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.

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

HERPETOLOGY

BALANCED TERRAPIN DIET

What is an adequate terrapin diet?

The diet should be as varied as possible and should include pieces of raw *lean* beef and earthworms (*not* the red-banded types from compost heaps). In addition, well soaked pelleted dog food (high protein or extra calcium varieties), **BP Pond Pride Pellets, TETRA ReptoMin Food Sticks** and **SERA Raffy P** are also eaten with relish. Dried 'Turtle food', which consists mainly of dried *Daphnia*, has little nutritional value and *should not* be used.

However, even the most nutritious pelleted food should form only one component of the overal diet offered to captive terrapins.

Further details about BP Pond Pride floating fish food, Tetra ReptoMin Food Sticks and Sera Raffy P 'Turtle and Cichlid Food' can be obtained from:

BP Nutrition (UK) Ltd, Pond Pride Customer Services Department, Wincham, Northwich, Cheshire CW9 6DF.
Tetra Information Centre, Lambert Court, Chestnut Avenue, Eastleigh, Hampshire SO5 3ZQ.
Sera (U.K.) Ltd, 32 Mermaid Court, London SE16.

Treating the food given to terrapins with cod-liver oil (as is often recommended) 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. In any event, cod-liver oil 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 also avoid feeding fish flesh, including 'white-bait' 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 should not be used.

TETRA

ReptoMin, one of several nutritious terrapin foods which are accepted with relish.

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

TROPICAL

CARDINAL SEX

Would you please tell me how to sex my Cardinal Tetras? I would also like to know what sort of aquarium conditions, food and decorations are best for this species.

Paracheirodon axelrodi, the Cardinal Tetra, originates from the Rio Negro in Brazil, so it requires soft, acid, brown water at around 25°C (77°F) and open spaces among aquatic plants to congregate. They do like a dark base, so add a layer of black gravel in these areas.

Cardinals are shoaling fish, so you must have six or more. The females are slightly heavier (broader) than the males, especially when swollen with eggs.

AREND VAN DEN NIEUWENHUIZEN

Cardinals are reasonably easy to sex. The second fish from the top is a male — the others are females.

Cardinal Tetras are now bred in the Far East fish farms, Florida and Brazil, and these are considered a good community fish with no special requirements, treated tapwater of any hardness accepted. However, for breeding, the original soft, acid water is essential, as well as floating plants to cast shadows . . . the fry are photophobic.

Use crumbled flake food and infusoria for the fry.

Do not make the mistake of buying small (12 or 15mm — 0.5 to 0.6in) Cardinals. To survive the trauma of travelling they need to be almost adult (20mm — 0.8in plus).

The Neon and Cardinal Tetras are the top selling community fish in Europe and USA.

MARINE

FLUORESCENT DAWN/DUSK

I have recently become interested in marine fish and have found that there is a vast amount of information available with regard to the practical aspects of the hobby. I have taken my time in setting up the tank, as advised in most of the books I have read on the subject, where there is plenty of advice on heating, lighting, types of filters and water quality, etc. However, I have not been able to find any details which deal with my particular problem — or should I say, a problem that other fish keepers must have met, and that is lighting.

I have been trying to figure out a system which makes my lighting (two fluorescent tubes) come on early in the morning from dark to full brightness over a gradual period, in other words, imitating the natural day and night cycle.

I have written to various lighting companies about this problem but, so far, with no success, and am writing to you now in the hope that somebody might have already devised such a system. It seems to me that, as a lot of emphasis is put on eliminating stress for marine fish, such a system has already been thought of.

I am afraid I must disappoint you. To the best of my knowledge, there does not exist an electronic device which would allow you, manually or automatically, to dim fluorescent tubes gradually. Similarly, it is not currently possible to turn fluorescent tubes on gradually as though simulating dawn breaking over a real coral reef.

The reason for this is that flourescent tubes need to be exposed to a certain 'switch-on' voltage before they will trigger off and light up. Nothing happens at all in the way of light emission until this switch-on voltage is reached and then the tube switches on immediately at full lighting power.

The only way I have ever managed to get around this problem in my own aquaria is to fit a small bed-head *incandescent* lighting tube rated at 40 watts inside the hood, as well as the fluorescent tubes. Then, by connecting the incandescent filament tube to a light dimming switch you obtain the following sequence:

Ⓐ Evening

(i) Turn off all the fluorescent tubes.

(ii) Five minutes later slowly dim out totally the incandescent tube over a period of 4–5 minutes.

(iii) 15 minutes later, open the room's curtains and turn off the room lights. If the room lights are on a dimmer switch, so much the better, though this isn't absolutely necessary as it will be found that the fishes will have assumed nocturnal colours and retreated to their dormitories during the 4-5 minutes of dimming out the incandescent tube.

Ⓑ Morning

(i) As dawn slowly breaks, and skylight enters the room through the window, the fishes will slowly become more active until you come downstairs. Then you:

(ii) Turn on the room light.

(iii) 15 minutes or so later, slowly begin to light the incandescent tube slowly, turning on the dimmer over a 4–5 minute period.

(iv) When the incandescent tube has been fully lit for a further 15 or so minutes, then

(v) Turn on the fluorescent tubes.

You are absolutely correct in your assumption that suddenly plunging an aquarium into total darkness at night and doing the reverse in the morning is extremely damaging to all coral fishes and is a major cause of stress in the home aquarium, causing wounding by panic swimming in the dark and even shocking fishes sufficiently to bring on disease outbreaks.

Someone will surely make a fortune one day soon by producing a device which takes care of all the above, automatically.

CORAL WORLD — ELAT

Dimming room lights gradually allows fish to find a safe resting place (such as a cave) for the night.

COLDWATER

MISSING FINS — NO PROBLEM

One month ago I bought two new Fancy Goldfish to add to my collection. They were eventually introduced into my existing tank and appeared to settle down quite well.

On close examination, though, one specimen has no anal fins at all and, as far as I can make out, no anal opening either!

First, I would like to put your mind at rest concerning the apparent lack of a vent in one of your fish. I am sure that the fish could not have survived if that were indeed the case, so I believe that you need not worry on that count. Neither should you worry about the lack of anal finnage which is a common fault found with many fancy varieties of the Goldfish.

VIC CAPALDI

Extra — or missing — fins usually pose no real problems to Fancy Goldfish, as this healthy 'double-dorsal' Shubunkin demonstrates.

In Goldfish 'Standards', or the rules laid down which are applied to show-quality fish, there are many requirements to be met if the fish is to be deemed to qualify as a show standard specimen. In the twin-tail types the fish must have two anal fins, otherwise it would be disqualified in competition.

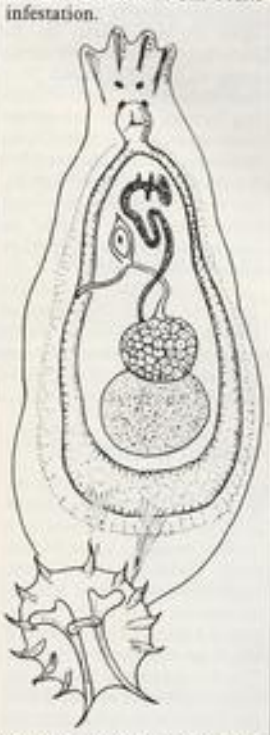
However, two fins are only essential in show fish, or if their owners are so discerning that they seek out perfection and cannot accept less. In fact, there are many fish in each spawning that will have either a single anal fin or, to a lesser degree, none at all. Lack of a fin does not appear to pose a problem in their ability when swimming, so, unless your intention was to enter this fish in competition, you can safely forget about such details.

KOI

'UNSOCIABLE' KOI

I recently bought some Koi and released them into my pond. A week or so later they became inactive and unsociable. Later, they spent a great deal of their time around the waterfall. Now they are dying off one by one. Do you know what's happening?

The problem you are experiencing is, I'm sorry to say, very common. The symptoms you describe sound very much like those of Gill Fluke infestation.



The Gill Fluke *(Dactylogyrus vastator)* can wreak havoc, particularly among stressed, weakened fish.

All fish play host to many parasites which, in the normal run of things, present no problem as the fishes' own immune system can cope. However, the stress of being purchased and transferred to a different quality of water (even of better quality), is often sufficient to cause an explosion of the parasites, with the results you describe.

Good water quality is essential, both in preventing and subsequently treating this disease, for which there are several proprietary medications widely available.

The only sure way of preventing this type of tragedy in the future, is for you to quarantine and automatically treat every single fish you purchase. This, of course, entails using a separate tank for the newcomers and, as you say you are a beginner, I'd recommend you to purchase two excellent books which will be of enormous help to you.

They are: *The Interpet Encyclopedia of Koi*, and *The Interpet Manual of Fish Health*. The two together will probably cost less than one of the Koi you have lost, and could well prevent you from losing more. The second of these books will tell you exactly which medication to use for quarantine purposes.

I take it that your pool water quality is up to scratch and that your filter is adequate for the job.

INEVITABLE HYBRIDS

My Koi pool also contains a mixed assortment of fish: Golden and Blue Orfe, Goldfish, Crucian Carp, Tench and Rudd. It is possible that cross-breeding can take place, as I appear since last year to have acquired some very different looking fry?

It's more than just possible for cross-breeding to take place in a mixed fishery, more like inevitable! There have, in fact, been deliberate attempts to cross Koi with Veil-tailed Comets etc. in an attempt to breed long-tailed Koi.

I don't intend to enter the arena of fishy ethics and will not be drawn but, unless you are a dedicated Koi keeper (having a mixed pool does not come into this category), I'd be inclined to say now(!), other than enjoy your 'different' fish.

PLANTS

SPINDLY ALGAL PROBLEM

I recently changed from an undergravel filter to an external one. For a while, the plants grew like mad. I even had to keep breaking them off and replanting the shoots.

I then started to find that the plants went spindly and weak and became covered in algae. Now they won't grow at all. I clean off the algae but they re-appear in a very short time. Your advice would be appreciated.

I think your main problem is that you purchased bunch plants. These types, as you stated, grow well for a few months but then become spindly and weak and eventually die off unless all growing conditions are met.

Buy a more balanced mixture of plants next time which includes some specimen plants and other long-lasting species such as *Cryptocoryne* species or *Anubias*. Algae thrive when plants are absent or not growing strongly.

'COIR'/HORTAG PLANTS

I am setting up a 48in (120cm) tank for rearing Goldfish fry. The water in my area is hard. I use expanded clay pellets (Hortag) but would also like to add a layer of 'Coir' (peat substitute) underneath. The water will then be filtered via an Eheim external power filter.

What plants would you suggest for this set-up?

I don't think that the 'Coir' is such a good idea. It will do nothing for the plants and may rot down and cause a decay situation to result which, in turn, could pollute your aquarium. For Goldfish, the Hortag alone will be fine.

I assume that you want the plants to act merely as a refuge for the fry. I would suggest *Fontinalis* (Willow Moss), *Ceratophyllum* (Hornwort) and *Myriophyllum elatinoides* (Milfoil). All these are fine-leaved plants and will provide good cover.

Bunch plants (this is *Hottonia inflata*) often go spindly after a time unless all their requirements are met.

Koi Talk

By John Cuvelier

ARTILLERY FRY FILTRATION

Last month you may recall my bemoaning the fact that this year's Koi spawning appeared to have resulted in mostly infertile eggs. Wrong again!

There are literally hundreds of small and highly coloured fry swimming around in their hatching pool. This unexpected abundance has caused a major rethink regarding the question of filtering this installation, in view of the fact that with such a large potential bio-mass growing at an incredible rate, filtration will be essential if mass mortalities are to be avoided.

Speed being of the essence, a simple trickle-type filter was decided upon, using materials already to hand, apart from the medium which was immediately ordered. I decided to utilise Siporax as it seemed a good opportunity to put some of the claims for this material to a good practical test, as well as satisfying my own curiosity (if not reservations) about this wonder material.

The actual chamber consists of a cylinder moulded in polypropylene obtained as government surplus. These cylinders offer a wealth of uses to the D.I.Y. aquarist as, not only they immensely strong, but they also possess a cam-fitting lid complete with 'O' ring seal. Believe it or not, their M.O.D. use was for containing the propellant charges for artillery pieces!

With a height of almost 30 inches (75cm) and an inside diameter of almost 6 inches (15cm), they form an ideal basis for a filter system and could, of course, be plumbed in multiples. Mine were obtained from: **Henry Krank Ltd, 100/102 Lowtown, Pudsey, West Yorks, LS28 9AY. Tel. 0532 569163.** This company sells them as underground storage containers for . . . small valuables???

A small amount of work resulted in two perforated perspex discs being installed as supports for the 6 litres (1.3 gal) of Siporax to be used, a length of 1¼in (3.2cm) domestic waste pipe as a return to the pool and a miniature venturi being fitted to the lid to aerate the incoming pool water prior to 'trickling'. The rows of small white protrusions seen in the picture are the ends of lengths of poly' tubing angled inside the canister in such a way as to permit air to enter, yet prevent the escape of water. That this works is evidenced by the amount of bubbles entrained in the filtrate as it exits.

JOHN CUVELIER

My newest invention — a fry-pool trickle filter.

The all-important prefiltration is obtained by mounting a matrix of 1¼in (3.2cm) waste pipe within one of those plastic Handy Boxes from the D.I.Y. centre, covering with a layer of gravel and coupling up a pump to the piping. I only used this size of pipe because it was already to hand, but ordinary ¾in (1.9cm) overflow pipe would do just as well, but don't forget you need plenty of slots or holes cutting in it to ensure an adequate flow. This method will be already familiar to those readers who can remember the early days of Koi keeping and undergravel filters.

The pump selected was a Lotus 300 which sits nicely on top of the gravel pre-filter and has sufficient flow to permit any slight 'tuning' which may or may not be required. Just to help things along a bit, I seeded the new filter with a few bacteria-loaded hair rollers from an existing filter.

I'm really looking forward to evaluating the effectiveness of this lash-up and, at least, I hope I've laid to rest any lingering suspicion that this scribe is inherently opposed to 'high tec' materials which continuously make an appearance on the market! I do admit to being an avowed sceptic over some of the claims made about new products but then, I've had a lifetime's experience at it in the water industry where many so-called seven day wonders have fallen by the wayside following a period of 'in the field' use.

Incidentally, before anyone informs me of the fact, I'm well aware that my home-built trickler is far from beautiful, but it is intended to be functional, just like the hatching pool it serves.

THAI KOI

While calling in at **Kenchester** the other day to purchase the Lotus pump, I sat down and had a chat with **Malcolm Edwards** the proprietor, whose first words to me were, "Have you had a look at the Koi from Thailand yet"? As it happened, I hadn't, an oversight which was soon rectified.

To say I was surprised is an understatement, as these 4-inch (10cm) Koi were something else! For sheer colour range and pattern, they're going to take some beating. In fact, Malcolm thinks that the Thais have already pushed Israel down a step in the quality tables. Don't get me wrong, these are not exhibition quality Koi, but merely Koi for the average Koi keepers to buy for their pools (the true Koi-keepers)? What's more, the consignment arrived complete with health certificate. I dare not divulge just how many Malcolm has already ordered for next year!

PRE-WINTER CLEAR-UP

It seems very sad that the end of another season will soon be upon us as, thanks to an inclement summer, we don't seem to have had much of a year. Personally, I'm not looking forward to the pre-winter clean-up as, having myself been somewhat under the weather for the past two months or so, my pools and garden have been rather neglected which, of course, has a knock-on effect as regards catching up.

I fear that this year will see the chest waders coming out of storage as my poolside plants have run unchecked and can now only be reached effectively from within the pool.

WATER BABIES

Talking of which reminds me that we had our first accidental incursion of our Koi pool by a human recently. Some friends from Yorkshire stayed overnight en-route to their holiday destination and their twelve-year old daughter decided she'd like to get a bit closer to the Koi. The first inkling we had was the sight of her head forging across the length of the pool. Funnily enough, the lass had just completed a survival course run by her school, so she took it all in her stride (once she'd got over the shock of immersion).

Needless to say, I was not too amused at having to crank up the washing machine at gone 10 pm! As if that was not enough, the following morning, while father was filming the pools and garden prior to going on their way, her 8-year-old sister decided to walk across my hatching pool (I think) and ended up soaked to the waist!

After eight years here without incident, we had two water babies in the space of 24 hours. Takes some believing doesn't it?

Books & video

Catfishes of the World (Supplements 1990)

By: David Sands
Published by: **Dee Bee Books, Sycamores, 4C Bannister Hall Drive, Higher Walton, Preston, Lancs PR5 4DE. Tel/Fax: 0772 30869.**
Price: £12.00

Whenever you embark on a project that includes *". . . of the World"* in its title, you know that, as soon as you begin writing the first volume, you need to be thinking of updates and **Supplements**. Full marks, therefore, to David Sands for his undimming enthusiasm and tenacity over the years since he first produced Volume 1 of *Catfishes of the World*.

The long-awaited latest batch of updates is now out, so catfish enthusiasts should get their orders and cheques ready and sent without delay.

A new species of callichthyid catfish, *Corydoras araguaiaensis* (Siluriformes, Callichthyidae) from the Rio Araguaia, Brazil. (David Sands, February 1990).

A new species *Corydoras araguaiaensis*, (Sands) Holotype 32 mm SL deposited in the Zoology Museum, Leiden. A series of paratypes (24mm-31 mm SL deposited at the Institute of Taxonomic Zoology, University of Amsterdam, 1989.

Dorsal 1/7 and 1/6 dorsolateral scutes 22, ventrolateral scutes 20, five bars in the caudal fin and dorsal fin lightly spotted. Pectoral spine lightly serrated. Dorsal 1/7 and 1/6. Body depth 15.0. Body width 10.0, Head length 31.0.

Colour in preservative: grey-white with spots merging into rows at either side in the meeting of the lateral scutes. Colour in life (see picture): Cream-beige background covered in black spots smaller than the eye. *Corydoras araguaiaensis* is black dotted on the head and much less robust than the two other species compared in literature. *Corydoras sterbai* (see TFH botsheet, bottom photo 224.00 - inlaid) type material is diagnostically white dotted on the head while *Corydoras haraldschultzi* (see TFH botsheet 222.00 - upper photo) is reticulated. Both species have distinctive orange pectoral and ventral fins clearly visible in living specimens.

The new **Supplements** are produced in the now-familiar format of illustrations, both in colour and black and white, backed up with appropriate text and, in the case of *Corydoras araguaiaensis*, the first scientific description of the species.

The loose-leaf sheets that make up these new **Supplements** (ready-punched with holes in the right places to be slotted into the Supplement ring folders) add a great deal of welcome hitherto unpublished information, both on species not previously featured in *Catfishes of the World*, as well as on some that have already appeared.

An example of the latter category is the Tiger Shovelnose (*Merodontotus tigrinus*), first illustrated and discussed in Volume 3 (Auchenipteridae and Pimelodidae, published in 1984). New information in the **Supplements** (including a proposed common name — Royal Zebra Shovelnose Catfish) brings us right up to date with this spectacular species, even though its name appears as *Meredontotus tigerinus, Mereodontotus, merodentotus* and *mereodontotus* — all incorrectly spelt in one way or another.

It's a bit of a shame that this, along with the repeatedly incorrect spelling of Columbia for Colombia, should have infiltrated the text at some point in the production process. No doubt, however, these slip-ups will be ironed out for the next reprint which, if these **Supplements** prove to be anywhere as successful as they thoroughly deserved to be, may well be just round the corner.

The full list of species dealt with in **Supplements 1990** is as follows:

VOLUME ONE: CALLICHTHYIDAE
P1990/1 *Corydoras davidsandsi*
P1990/2 *Corydoras nijsseni* (description)
P1990/3 *Corydoras nijsseni*
T1990/1 *Corydoras nijsseni* (aquarium behaviour).
P1990/4 *Corydoras araguaiaensis*
T1990/2 *Corydoras araguaiaensis* mimic
P1990/5 *Corydoras araguaiaensis* (new species)
P1990/6 *Corydoras burgessi*
P1990/7 *Corydoras burgessi* mimic
T1990/3 *Corydoras melini*
P1990/8 *Corydoras* 'so called *latus*'
P1990/9 *Corydoras punctatus*

VOLUME TWO: MOCHOKIDAE
P1990/10 *Synodontis multipunctatus* new field studies
P1990/11 *Synodontis angelicus* coloured variety
P1990/12 *Synodontis* albinism

VOLUME THREE: AUCHENIPTERIDAE & PIMELODIDAE
P1990/13 *Brachyrhamdia rambarrani*
T1990/4 *Brachyrhamdia* a valid genus
P1990/14 *Merodontotus tigrinus*
P1990/15 *Brachyplatystoma juruensis*
P1990/16 Juvenile *Phractocephalus*

VOLUME FOUR: ASPREDINIDAE, DORADIDAE & LORICARIIDAE
P1990/17 *Bunocephalus hypniurus*
T1990/5 List of valid genera, species and synonyms
P1990/18 *Acanthicus hystrix*
P1990/19 *Acanthicus adonis*

VOLUME FIVE: BARGRIIDAE & OTHERS
P1990/20 *Ictalurus natalis/Noturus gyrinus*
T1990/6 Ictaluridae species list

I hear through my grapevine that the print run does not run into thousands, so I would therefore urge all catfish fans to order these indispensable updates as soon as possible to avoid disappointment.

John Dawes

The Reef Tank Owner's Manual

By: John H. Tullock
Published by: **Aardvark Press**
ISBN: 0 09091 70150 6
Price: £14.45
Distributed by: **Coral Reef Technology Ltd., 62 High Road, Byfleet, Weybridge, Surrey KT14 7QL. Tel: 0932 355121; Fax: 0932 349718.**

Readers who are already familiar with Albert Thiel's many 'Aardvark Press' marine aquarium books will, more or less, know what to expect, stylewise and contentwise, from *The Reef Tank Owner's Manual*.

Following the precedents set by those other books, the *Manual* deals with its subject in great detail, leaving few, if any, stones unturned in the process. It is also written in easily digestible language, with the author presenting each topic intelligibly and comprehensively, at the same time not blinding the non-technically trained reader with science. Complex subjects are not avoided; neither are they presented in patronising terms. I therefore compliment John Tullock for having the good sense to adopt this approach.

I also warmly commend him for repeatedly stressing the importance of providing the best possible conditions for the various organisms. To quote from the Introduction:

"One theme that you will find throughout this book is the importance of approaching marine organisms with the respect and consideration for their needs that these animals deserve. This is the first principle of conservation, and conservation, not only of coral reef organisms, but of all the world's natural resources, is a goal we must all work to promote."

Subjects covered in this extremely useful book range from basic equipment and live rock, to food additives and understanding scientific names, classified under the following main chapter headings: Basic Equipment, Seawater and Biological Filtration; Light and Lighting Systems; Live Rock; Water Analysis and Routine Maintenance; Advanced Techniques; Creating the Reef Environment; Reef Habitats of the Florida Keys; Deep Reefs and Caves; Invertebrates that Require Light; Macroalgae; Crustaceans; Fishes for the Reef Tank; Nutrition in the Reef Tank. There is also a list of abbreviations, trademarks and brands, a bibliography and an index.

So where are the weak links? For a start, there isn't a single photograph in the 272 pages that make up the book. There aren't too many diagrams either, and some of those that have been included could have done with being bigger. Somewhat nigglingly, and surprisingly, bearing in mind the thoroughness of the text, is that none of the scientific names are written in italics — the universal format for such names.

I could also have done without the occasional bits of 'mutual back-slapping' in which the author and publisher praise each

other's excellence. Readers of both this book and Albert Thiel's own publications will know perfectly well that both deservedly command respect among knowledgeable marine aquarists.

With regard to the missing/absent photographs, it could be said — with considerable justification — that their inclusion would have raised the cover price beyond the £20 mark. This may well be a very valid point, since by keeping the price down to the great-value-for-money level of a mere £14.45 the publishers may have thus ensured that more people will be able to enjoy, and derive benefit from, the undoubted merits of the very sound text and advice embodied in it. On the other hand, I would happily have paid £25 for a well-illustrated version of this highly informative publication.

John Dawes

Freshwater Fishes of Peninsular Malaysia

By: A. K. Mohammad Mohsin and Mohd Azmi Ambak.
Published by: **Penerbit Universiti Pertanian Malaysia.**
ISBN: 967 9952 14 2
Price: £17.50

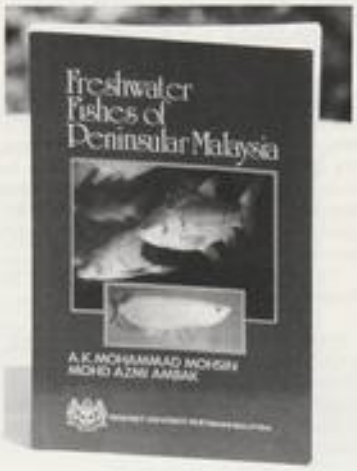
Books on 'local species' by qualified 'local authors' are fairly rare, so it was with interest that the above was approached.

Peninsular Malaysia, as far as fishkeeping interest stirs, starts southwards way past where the tourists stop at Phuket Island, and continues right down to Singapore. In between, there is a vast treasure house of fishes but, as elsewhere in modern times, development by Man (as well as destructive fishing methods using explosives and tuba root poisoning with derris) has resulted in a diminishing number of truly native fishes in the area.

Over 100 species are identified as being freshwater species to Peninsular Malaysia, but accompanying tables also indicate the location of related species in adjoining geographical areas such as India, Thailand, Burma, Borneo etc. Hobbyists particularly interested in water conditions are well catered for, as complete analyses are provided for each collection area: not only are pH and dissolved oxygen levels given, but the latter is given for various depths of water, too.

Readers struggling to keep species alive in aquariums may be annoyed to know that the very same species are so prolific in nature that they are used as food fishes. Much of these fishes' life cycle revolves around the life cycle and harvesting of rice (another of the national Malaysian diets) as many fish are raised to maturity in the flooded rice paddy fields.

The book sheds light on many aspects of fish information collection: apart from geographical details of the various collecting zones (anything from jungle stream to mountain forests), methods of catching etc, there is the range of scientific parameters that the scientists apply once the species are safely in their grasp. Measurements of length and body proportions are followed by ray and scale counts; advice is given as to the best ways of doing some of the fiddly fins, especially the pectorals where varying magnifications of microscope settings may be needed.



Where each order of fishes includes sub-orders, an identifying key is provided. Under each species' description, ray counts of Dorsal (D), Pectoral (P1), Pelvic (P2) and Anal (A) fins are given, together with the number of Lateral Line Scales (LLS). Soft and hard rays are differentiated by the use of Roman numerals (iii–iv) and Arabic numerals (6–7) respectively. Natural diet details are quoted from 'on-the-spot' stomach content analysis. (*Osphronemus* are fed on tapioca when cultured in ponds for food). For students of common names, the local Malay names are provided.

Although the work is obviously aimed at ichthyologists, hobbyists will derive authoritative identification information and no little local insight into the fishes featured. The book is available from **Steven Simpson Books, P.O. Box 853, Brighton, Sussex BN1 5DY (Tel: 0273 727328, Fax: 0273 203754).**

Dick Mills

The Singapore Experience

Filmed and produced by: Stan Kemp
Available from: **Kingisheries Ltd., 308 Croydon Road, Beckenham, Kent BR3 4HR. Tel: 081 650 3716.**
Price: £9.95, plus 70p (p&p).

The Singapore Experience is No. 12 in the Kingfisheries series of videos, and is probably the best of the lot.

The film runs for 1 hour 10 minutes and, during that time, the viewer is taken on a grand tour of **Aquarama** (see my report elsewhere in this issue of *A & P*), a behind-the-scenes and 'in-front-of-the-scenes' visit to Singapore's latest aquatic spectacle — the Underwater World on Sentosa Island, and a leisurely stroll around some of Singapore's numerous fish farms.

I've reviewed Stan Kemp's videos before in *A & P* and have made the comment that one should not expect to get a 'BBC Natural History Film Unit' type of product. The reason for saying this is that, if you are looking for a slick, cut and thrust, media-conscious video, you won't get it. Stan's approach is a very personal, laid-back, 'intimate' one which even includes some picture sequences that would end up on the proverbial cutting room floor in TV-geared productions.

From our point of view as aquarists and pondkeepers, though, we must thank our lucky stars that, in Stan's videos, these sequences form a vitally essential part of the package. It is here that we get the 'juicy bits' that we all crave for.

What TV company would dare to show aquaria with green/turbid water? Yet, this is precisely what Stan Kemp does, proving in the process that is not the *appearance* of the water, but its *quality* that allows Singapore Discus breeders to produce such stunning fish.

What TV company would bother to show us rows of small, not-particularly-attractive all-glass aquaria, each with a single Water Hyacinth, where tetras are spawned? And what commercial broadcasting enterprise would linger over one of these tanks, repeatedly trying — and eventually succeeding — to focus in on a few eggs lying on the bottom?

Well, Stan Kemp does this, and a lot more, in his attempt to bring us a real flavour of what it's all about. To my mind, he's succeeded on all counts, showing us, in between the less spectacular shots (which I personally found very interesting) some absolutely superlative Singapore Discus, Guppies and Goldfish — although the naming of some of the Fancy Goldfish is a bit out (some of the Pompons are Ranchu, and Ryukins are referred to at one stage as Fantails), while the impressive black and white Panda is unnamed.

In the **Aquarama** section, we are shown some 'new' fish, including the Blood Red Parrot, a picture of which I've included in my own report, and some of the very latest equipment . . . signs of things to come, as far as we, in the UK, are concerned . . .? We are, of course, also treated to some of Stan's astute insights, all delivered in his usual, unflappable, very personal style.

I've known Stan for several years now, but only through 'phone calls, faxes and letters. It was therefore a great pleasure meeting him for the first time at **Aquarama**, thus, at long last, putting a face to the friendly voice. Suitably attired in 'tropical' gear, sweat pouring from his brow, and video camera 'ingrown' into his right shoulder, it made me think just how fortunate we are that there are such people about whose enthusiasm, knowledge and experience we can all benefit from from the comfort of our armchairs.

John Dawes

PRODUCT ROUND-UP

BY DICK MILLS

Boyd Enterprises

VITA-CHEM is new fish vitamin introduced by **BOYD ENTERPRISES**. The new, most effective concentrated environmental vitamin has been tested over three years; it is a pre-stabilised multi-vitamin which is not only water- and tissue-soluble (a distinct advantage) but is made from naturally-occurring substances bonded with natually-occurring amino acids.

The marine version contains no less than 37 naturally-occurring extracts from live organisms, the freshwater counterpart having a very creditable 30. The 4oz (113gm) sealed plastic bottles are the regular size, with one-gallon bottles available for breeders and hatcheries.

Results claimed following regular use include increased growth, intense natural colours, natural vitality and appetite restored, with increased resistance to disease, rapid fin regeneration and the creation of natural and breeding instincts in captivity.

Also from Boyd is CHEMI-PURE, an exceptionally long-life filter medium: fish and invertebrates have been kept up to five years in the same water thanks to its amazing efficiency.

The point is made that the old ideal of crystal-clear water, that was the 'be-all and end-all' aims of filter medium makers, no longer applies. The three ion-exchange resins used in conjunction with the activated carbon all produce beneficial reactions: (i) exchanging alkali excesses from the carbon to give a majority of negatively-charged ions (previously-used high-efficiency activated carbons resulted in shock- and stress-producing positive ions); (ii) neutralising excess acids with a time-release alkali; and (iii) removing ammonia, but only the amount in excess of that required for nitrification.

Particularly valuable in marine tanks, where it gently raises the pH value, Chemi-Pure is chemically active for 6–8 months and substantially slows down acidification no matter which brand of sea-mix is used. In freshwater tanks, Discus and Cichlid keepers will appreciate its ability to remove ammonia and other nitrogenous wastes. Each unit of Chemi-Pure will treat up to 40 gallons (c180 litres) of water (simply place the dacron bag containing the medium in the filter chamber).

Full details of these products from: **ENGLISH WATER GARDENS, London Road, Washington, West Sussex RH20 3BL (Tel: 0903 892006/ 892408; Fax: 0903 892006)**

Aquametrics

If you didn't manage to get to GLEE (Garden Leisure Equipment Exhibition) at the National Exhibition Centre in September you will have missed seeing the new range of garden ponds and liners from **AQUAMETRICS** making their debut at the Show.

AQUAMETRIC PONDS are manufactured to a very high tolerance from hard-wearing, high-density polyethylene vacuum-formed in a wide range of designs and sizes. They are frost-resistant, shockproof and impervious to UV — and completely safe to fish and plants.

DRAKATECHNOFOLIE POND LINERS, for attractive ornamental ponds and lakes to your own design, are made of durable UV-stabilised plastic and carry a 20-year guarantee. The liners come in five standard widths or ordered pre-welded in any shape up to 70,000 sq ft (6,500 sq m).

Attractive ornamental ponds, lakes and reservoirs can be designed and built with Drakatechnofolie pond liners available in the UK from Aquametrics Ltd.

Also on show were the Dutch-originated PLASTICALL high-grade, reinforced glass-fibre polyester ponds. Made using specially-designed moulds to a scientifically-balanced ratio between water volume and surface area, these European-popular ponds come in a wide range of sizes.

Finally, especially for garden centres, aquatic outlets and pet shops, the range of pre-packed, UV-stabilised vinyl SUPRALENE liners are competitively priced; available in six sizes from 8ft x 6ft 6ins (2.4 x 2m) to 14ft x 13ft (c4.3 x 4m) and guaranteed for six years, they are supplied shrink-wrapped on an attractive point-of-sale stand.

Full details of all products from: **AQUAMETRICS LTD., Curzon Road, Chilton Industrial Estate, Sudbury, Suffolk CO10 6XW (Tel: 0787 881735; Fax: 0787 71013).**

Dennerle

The name **DENNERLE** may not be too familiar, and its range of products can never be said to be 'run of the mill' being, as they are, at the front edge of aquarium technology.

the emphasis of the Dennerle System is on providing the healthiest environment for fish by using correct plant culturing conditions. This involves CO_2 dosing, differential heating of both water and nutrient-enriched substrate, correct lighting and simultaneous fast-slow filtration systems (see *Latest Advances* in the **Supplement** which appears in this issue).

Details of all Dennerle products can be obtained from: **DENNERLE NATUR-AQUA-ISTIK, Berti Gesting, Aquatic World, 6 Rysworth Bridge, Crossflatts, Bingley, W. Yorkshire BD16 2DK (Tel: 0274 569200).**

Fritz Pet Products

Z-ROCKS from **FRITZ PET PRODUCTS** sound like something out of a children's sci-fi cartoon adventure (you can almost hear them saying "Quick! Break out the Z-Rocks . . ."). However, they are a practical, as well as decorative, addition to the aquarium.

The current villain in the underwater scene (both in fresh- or saltwater) is ammonia; Z-Rock, or to give it its correct scientific name Clinoptilolite, is a naturally-occurring zeolite material. Another advantage (as far as aquarium decoration is concerned) is that it is available in lumps, as opposed to the more well-known granular form used in filtration systems to absorb ammonia.

It should be noted that while Z-Rock will clarify discoloured water in marine aquariums, it will not remove ammonia from such systems. The reason for this is quite easy to explain — zeolite is re-charged by soaking for 24 hours in salt solution!

So, Z-Rock will fulfil all the decorative, refuge-providing, spawning sites, bacteria-colonising sites that other types of rockwork do, with the added bonus that it also controls the levels of ammonia, although it will not cure existing problems on its own. The pure whiteness of Z-Rock acts as a contrasting colour to the greeness of freshwater plants and marine algae, but soon takes on a more subdued hue when coated with algae and other micro-organisms.

FRITZ PET PRODUCTS

Z-Rock from Fritz Pet Products gets to the 'rock bottom' of the problem.

The Z-Rock 'family' includes Z-Rocks, Deco Stones, Mini Chips, Super Zeolite and Z-Rock Brightener.

Also from Fritz is HOT ICE; slabs of brilliantly-coloured 'ice' add extra interest to aquarium and terrarium displays, but can also be used effectively in craft and floral projects too. It is available in large pieces, or in an assortment of small and medium pieces in either mixed or clear coated colours.

Details from: **FRITZ PET PRODUCTS, P.O. Drawer 17040, Dallas, Texas USA 75217-0040.**

Trilcot Ltd

Still on the subject of aquarium decorations, **TRILCOT** offer an unprecedented array of materials (including Z-Rock) ranging from Aquarium Gravel (Super, Small, Medium and Large Grades, 8 Single colours or mixed), Old English and Barleycorn Quartz, Canterbury Spa, Coral Sand, Coral Chips, Tufa Rock, Corals (Mixed White, Blue and Red), Barnacles, Shell Packs, Specimen Shells, Sea Fans, Rocks (Honeycomb, Lava, Rustic, Pink Speckled, Westmoreland, White Spar), Petrified Wood, Slate (Blue Green, Purple) to Driftwood and their own 'TRILWOOD'.

Two grades of Lytag Aquarium Filter Medium complete the aquatic range, although Trilcot go on to include Aviary, Pigeon, Poultry Grits, Cuttlefish Bone and Bird Sand too.

Visitors to the Supreme Weekend of Fish-keeping at Weston-super-Mare in November will have a chance to see these products at first hand as Trilcot will be exhibiting there.

Details of products, stockists etc from: **TRILCOT LTD., Boardsides, Boston, Lincolnshire PE21 7PB (Tel: 0205 358058/363144; Fax: 0205 358059).**

Indentiplug

Next time you're grovelling around in the fish-house unravelling a tangle of electric cables, trying to trace the originating plug on a malfunctioning piece of equipment might not be quite a good moment to tell you that one answer to your problem is already available.

For the miserly sum of 35p each, you can obtain 'identity cards' for each mains plug: each **IDENTIPLUG** PLUG-TAG simply slips over the three pins of the standard 13amp plug and its 'label' is clearly visible above the plug when in the mains power socket.

To date, five 'titles' are available — Fish Tank, Kettle, Heater, Video and Fridge; the alert hobbyist will quickly see that while not every separate piece of aquatic electrical equipment is catered for, the plastic label can easily be reversed and a more pertinent legend written on the blank side — Tank 1, Tank 2, Lights, Air-Pump, Filters etc.

As a special **introductory-offer** to *A&P* readers, Identiplug will supply any two Plug-tags **FREE OF CHARGE** on receipt of an S.A.E.

Write to: **IDENTIPLUG U.K., 18 Kirklands, Strensall, York YO3 5WX (Tel: 0904 490282/490794).**

Identiplug — on special offer to all *A&P* readers.

PRODUCT NEWS

Tetra

You may think it would be hard to improve on the Number One Spot, but that's just what **TETRA** are claiming during their Ruby (40th) Anniversary Year of TETRAMIN FLAKE FOOD for Tropical Fish.

The latest celebratory promotion offering 25% EXTRA food free through special packs, has stimulated the highest sales levels of TetraMin ever recorded in the UK.

Such is the demand, that readers are urged to take advantage of this offer wherever they see it — stocks cannot last much longer!

Details of all Tetra products (and don't forget their 24-hour Helpline on **0703 643339**) from: **TETRA INFORMATION CENTRE, Lambert Court, Chestnut Avenue, Eastleigh, Hants SO5 3ZQ (Tel: 0703 620500).**

Aquamail

AQUAMAIL, the well-known Mail Order aquatic specialists have added to their comprehensive range items of interest to the more technically-minded hobbyist.

DUPLA products are much sought after by marine aquarists in particular, and their accurate Test Kits (for Nitrate, Phosphate, Iron and Carbon Dioxide) are now available from the comfort of your own armchair (plus a short health-giving stroll to the postbox!). Also just as easy to order are Dupla Carbon Dioxide Systems and Duplaplant 24 trace elements.

Additionally, Aquamail now have a range of ECO-SYSTEMS REACTORS; these free-standing, self-contained filter modules are clear plastic vessels which can be connected to an external filter, or water pump, for extra water treatment using X-NITRATE, X-PHOSPHATE, SIPORAX, Carbon, Ion Exchange Resins etc.

Within the same range are low-cost MICRON- and SUB-MICRON CARTRIDGE FILTERS. DE-IONISERS (not just for the Discus-orientated hobbyist, you know) and a new AUTOMATIC WATER-CHANGE SYSTEM for marines, plus an expanding interest in aquarium plants make Aquamail's catalogue well worth looking into.

For further information contact **Noel Egan** at: **AQUAMAIL, Tynwald Mills, Isle of Man (Tel: 0824 801849; Fax: 0824 801848).**

Diary dates

British Killifish Association

The Annual Convention of the British Killifish Association will be held on the weekend **4-6 October.** This event brings together members both from the UK and Europe and will feature local and continental guest speakers. Further details are available from the BKA Convention Committee, c/o John D. Holt, 35 Parliament Street, Bury, Lancs BL9 0TE.

Goldfish Society of Great Britain

The 1991 annual Open Show of the G.S.G.B. will be held at St. Paul's Church Hall, Chigwell Road, Woodford Bridge, Essex, on **Saturday 5 October.** Fish auction: 1.00 p.m. Refreshments available all day. Further details from Stuart Elton, on 0206 563844.

Wyke Show Society

The Wyke Show Society Open Fish Show will take place on **Sunday 6 October** at the Spring Bank Community Centre, Hull. Full details from the Show Secretary, Mrs P. A. Barker, 42 Woodcroft Avenue, Inglemire Lane, Hull HU6 8LH. Tel: 0482 856994.

Halifax Aquarist Society

The 1991 H.A.S. Open Show and Auction will be held on **6 October** at Forest Cottage Community Centre, Cousin Lane, Ovenden, Halifax. Booking in: 11.30 a.m. - 12.45 p.m. Judging: 1.00 p.m. For further details contact David Shields on 0422 360116.

Doncaster & District Aquarist Society

The 21st Open Show of the Doncaster & D.A.S. will take place on **Sunday 13 October** at Don Valley Comprehensive School, Doncaster. Full details from G. R. Flint, Show Secretary, 37 Copley Crescent, Scawsby, Doncaster DN5 8QW.

Northern Goldfish and Pondkeepers Society

The 1991 N.G.P.S. Open Show will be held at the Trinity United Reformed Church, Delamer Road, Altrincham, Cheshire, on **Saturday 19 October.** Benching: 9.00 a.m. - 11.00 a.m. Judging: 11.00 a.m. - 1.00 p.m. Along with snacks, raffle and tombola, there will also be a Fish Auction (all are welcome to Bring-and-Buy). Entry forms for the show are available from the Show Secretary, Alan Ratcliffe, 2 Borrowdale Close, Burnley, Lancs.

Alan Evans, the N.G.P.S. Honorary Secretary, cordially invites all other aquatic societies which have a coldwater section to send in details of future Open Shows which he will be pleased to advertise free of charge in the N.G.P.S. Newsletter. Contact Alan at 15 Blenheim Close, Hollins, Bury, Lancs.

Blyth Aquarium Society

The Blyth 1991 Open Show will take place on **Sunday 19 October.** For further information contact G. P. Hunt (Show Secretary), 12 Tyne Street, Ashington, Northumberland NE63 9HX.

Leeds A.S.

Leeds Aquarist Society Open Show to be held at Collingham Hall, Collingham Bridge, **20 October 1991.** Doors open from 1.00 pm. Benching 12 noon to 1.00 pm. Large auction.

Ilford & District Aquarist's & Pondkeepers' Society

Ilford's Annual Exhibition of Fish will be staged on **26 October** at Christchurch Hall, Wanstead Place, Wanstead High Street, Wanstead, Essex. Doors open: 11.00 a.m. approx. Visitors please note that this is *not* an Open Show. For full details contact R. Downer, 5 Suffolk Drive, Laindon West, Basildon, Essex.

Reigate and Redhill Aquarist Society

There will be a 'Bring and Buy' sale held by Reigate and Redhill A.S. on **21 October.** Venue: Strawson Hall, Albert Road, Horley, Surrey. Doors open: 7.30 p.m. Start: 8.00 p.m., with refreshments at about 9.30 p.m. Non-club members are welcome. Further details from Jeremy Spence (P.R.O.), 60 Railey Road, Northgate, Crawley, West Sussex RH10 2BZ.

I.G. Discusfish e. V.

In conjunction with Deutsche Cichlidengesellschaft e. V. (D.C.G.) — Region Niederrhein, and Heinrich-Böll-Gesamtschule, the I.G. Discusfish e. V. is promoting the first International Discus Exhibition in Oberhausen, Germany, on **23-24 November.**

There will be more than 60 tanks exhibiting Discus from Germany and other European countries, information stands, a raffle (1st prize — a complete Reverse Osmosis set-up from Mercator), experts on hand to answer questions, plus a full lecture programme. Lecture topics will include *Basic Equipment for Keeping Discus, Cultivation of Discus, Breeding Discus* and *Discus Illnesses and How to Handle Them.* Speakers include **Dieter Untergasser** and **Herbert Scheideler.**

Venue: Heinrich-Böll-Gesamtschule, 4200 Oberhausen - Sterkrade Nord, Scmachtendorfer Str. 165, Oberhausen. (Entrance in Dudeler Str).

Entrance fee: DM3 (adults), children (up to 14 years) free. For full details, contact Herbert Scheideler, Bergstr. 40, D 4100 Duisburg 17, Germany. Tel: Germany 02066-1749. Hotel bookings: Hotel Gerlach, Oberhausen. Tel: Germany 020 86-8981.

Viviparous — Livebearer Information Service

The Viviparous International Guppy Show will be held during the Supreme Festival of Fishkeeping at Weston-super-Mare on **8–10 November.**

Entries are being restricted to Viviparous members and overseas visitors only. Judging will be to IHS standards. Further information and entry forms from Graham Seddon, Fancy Guppy Section Manager (Viviparous — Livebearer Information Service), 119 Victoria Road, St Budeaux, Plymouth PL5 1RY.

News from the societies

British Cichlasoma Study Group

The newly-formed British Cichlasoma Study Group has been set up to bring together "people addicted to the keeping and study of the *Cichlasoma* group of cichlids".

According to 'The Thoughts of Chairman Andy' in the first issue of the group's new magazine, it is not essential "to keep these animals exclusively. In fact, you do not have to keep them at all — it is enough that you have an interest in them and want to keep up with the progress of other Cichlasomaphiles!"

There is an Information Pack which costs £5 (deductible when joining). Membership is £15 per year (£7.50 for juniors).

Further information is available from B.C.S.G., 93 Banks Lane, Offerton, Stockport, Cheshire SK1 4JK. Tel. 061 406 7390 (Please enclose an S.A.E.).