FEBRUARY 1992

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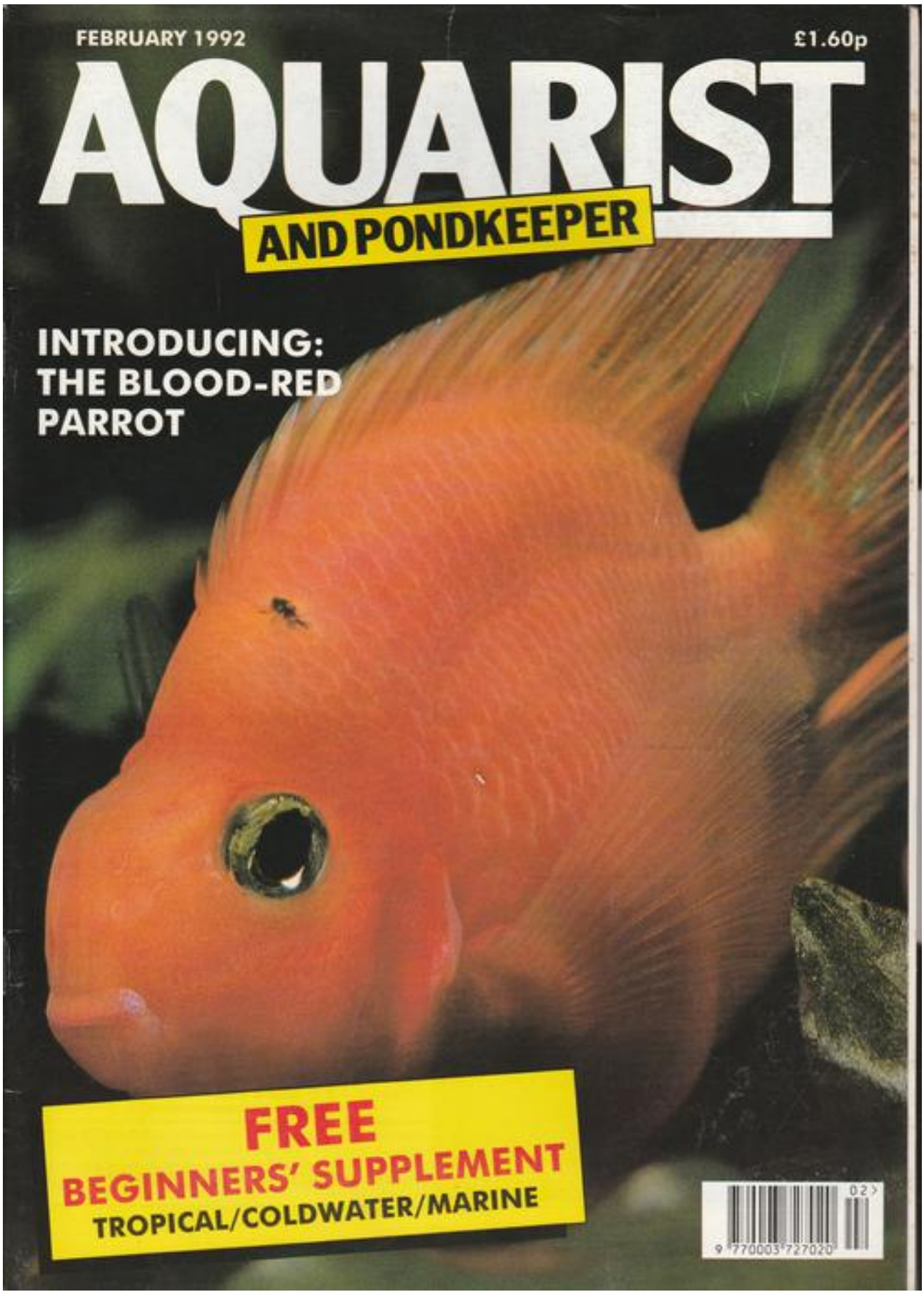

INTRODUCING: THE BLOOD-RED PARROT

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AQUARIST AND PONDKEEPER

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DRACONIAN RUMBLINGS

In January 1989, we published an article I had written entitled **The Dragon Fish Experience.**

It dealt with a visit I had paid to a fish farmer in Singapore who had been breeding Dragon Fish — *Scleropages formosus*. This farmer had been breeding Dragon Fish since the early 1980s and, through our interpreter, had told me that he had already bred quite a lot from previously captive-bred pairs. In other words, he was well into his second captive-bred generation.

Second-generation captive breeding is a requirement that has to be met to CITES's satisfaction before a fish (or any other animal) can be transferred from Appendix I to Appendix II. Such a move allows some controlled sale, as opposed to a virtual ban which can only be relaxed in special cases, e.g. "for research, teaching, breeding or propagation purposes".

Other people and official departments, like the Freshwater Division at Singapore's Field Research Station, had also been breeding *Scleropages* in the 1980s. In fact, the Freshwater Division had (it was reported to me) produced such a surplus, that they were more or less forced to release fish into the lakes in the city's Botanic Gardens and elsewhere, these other localities, quite understandably, being kept secret to prevent people from fishing out the released specimens.

I have been back to see the same breeder since my first visit and have photographed Red x Gold Dragon Fish hybrids, plus a courting adult pair. Therefore, I suppose I could be forgiven for beginning to think that things were starting to look up.

When Indonesia was granted permission at the October 1988 CITES meeting to export 1,500 captive-bred Dragon Fish specimens annually, with increments of 500 per year thereafter, things began to look even more promising (although the news filtered out too late for inclusion in my January 1989 article).

Something now appears to be going badly wrong, though. It seems that more specimens than those allowed are actually leaving Indonesia. Surprise, surprise! When a single breeder can produce well in excess of 1,500 captive-bred specimens with relatively little trouble (once the techniques have been mastered), the totally unrealistic nature of the excessively low token levels granted in 1988 immediately becomes apparent. Sometimes, sheer commonsense just doesn't appear to play a part in decision-making, does it?

I am now beginning to hear ominous rumblings that suggest that Indonesia's concession may actually be withdrawn because they've exceeded their quota. Equally worrying, to me, at least, is the sad fact that Singapore has not even *applied* for a CITES quota!

Where to now, for the majestic Dragon Fish?

John Dawes
Editor

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AND THEN THERE WERE NONE

Every community needs to progress but, as **Jason Endfield** points out, the price can be too high.

This month's feature had me delving into my collection of ancient and modern folk tales again (I hear deep sighs of despair from readers . . .!); but this tale is, I think, one of the more interesting ones. It comes from Mexico, and that is where we must now transport ourselves. So, 'imagination caps' on and here we go:

Picture if you will a tiny community in the Chihuahuan desert, not far from the town of Parras: It is 'some years ago'. There we meet Juán, a farm labourer who, with the other 50 or so members of the small village, scratched a living from the barren landscape.

The key to their survival was, naturally enough, water; there were two springs in the locality and so, a limited amount of vegetation. The delicate balance of this environment allowed the rearing of small numbers of cattle. Therefore, by showing respect for the nature around them, the people of the settlement survived, as they had survived for several generations, with a varying population that tended to adjust with nature itself.

Juán's father had been the village leader and had continued the traditions of the Chihuahuans as his forbearers had done for decades. Juán's father passed on and so, it was Juán's turn to take over as leader. Now, Juán was from a new generation of Mexicans; 'Uncle Sam' was beginning to influence the country and the United States was, for many Mexicans, a model nation.

Juán was ambitious and far-sighted; indeed, so eager was he to be progressive that he devised a whole series of impressive plans to bring his community right into the twentieth century marketplace. He, quite rightly, knew that water was the key to maintaining life in the hostile desert, but, why, he wondered, had nobody before him thought about irrigation to grow crops by creating dams to divert the flow of water from the two natural springs near the village?

What about the introduction of food fishes? Had no one thought about that either? No! Sure, there were a couple of species of minnow and pupfish living in the springs, but they were small and could hardly provide enough food for the villagers. Juán saw the need to raise *real* food fishes. He had heard about them from an American visitor — they were called carp and Juán knew that if large pools were created, the carp should flourish and provide tasty food for his village, with enough surplus to sell to neighbouring communities.

The villagers were impressed with Juán's ideas: "He's certainly got his father's enthusiasm!" they would say (in Mexican, of course . . .), as they all became engaged in building the simple but effective dams, and they were right — his enthusiasm was boundless. In a short time, the springs had been diverted and altered to make small lakes with irrigation channels for crops.

Juán had inherited his father's passion for hard work and achieving goals. Unfortunately, he hadn't inherited his father's respect for nature, or the knowledge of just how nature works. The result, in short, was disaster: the crops failed — there was too much water for some of them, and not enough for the rest; the carp didn't adapt well to the new environment either; and so their progress was slow.

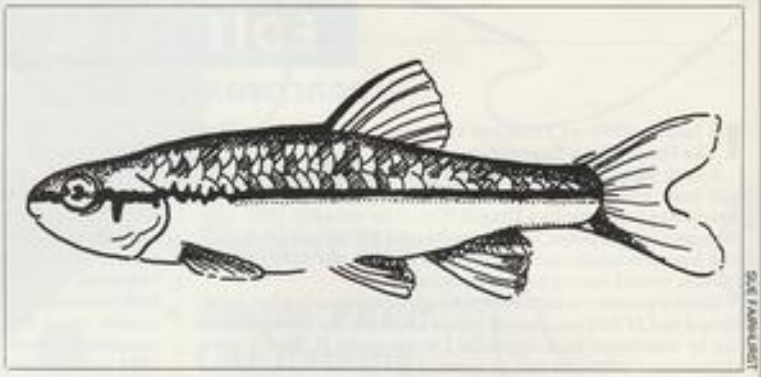
Meanwhile, the minnows and pupfish perished with the alteration to their delicately balanced springs, and the disillusioned settlers dispersed to the big towns and cities, demoralised and cynical, hoping to find prosperity elsewhere. Juán remained for a while, with his carp and his dream, but his dream died, even before the sickly carp, and he eventually left too, unable and unwilling to exist on the now-inhospitable land.

Is the real tragedy of this tale the destruction of the old community? Perhaps, but some would argue that that would have happened anyway. No, I think the tragedy is really the total annihilation of the three native species of fish which were unique to the Chihuahuan springs. Well, that's only my opinion — the opinion of a concerned human being, not to say a concerned aquarist.

It's true, however, that in a short time, all three species were extinct* due to the diversion of the carp. Through its ignorant progress, the settlement had destroyed its wildlife, its environment — and itself.

But it's only a folk tale after all, isn't it? Well, no — it isn't. The terrible thing is that this tale is not fiction; it happened in the Chihuahuan desert 60 years ago. It is a story that has been repeated, usually on a larger scale, around the world, and it is a story that continues today.

As you read this, at least 1 in 320 species of fish are either extinct or gravely endangered. In our ignorant haste to progress, we are destroying our environment at a terrifying rate. Ignorance reaches every level — the Lake Titicaca *Orestias* became extinct in 1950, a few years after trout were introduced to the lake by no less an authority than the US Fish and Wildlife Service!



SUE FAIRHURST

***Dionda episcopa*, the Roundnose Minnow. Its close relative, the Parras Roundnose Minnow is, today, extinct — one of numerous victims of progress.**

Closer to home, I am often astounded by the meagreness of the fines (if any) that massive companies have to pay for the regular 'accidental' spillages of chemicals into our rivers.

After all, though, we can't be too harsh on these progressive companies can we? I mean, as Juán would have said, such progress is our future . . . isn't it?

*Stumptooth Minnow (*Stypodon signifer*)
Parras Roundnose Minnow (*Dionda episcopa plouncifer*)
Parras Pupfish (*Cyprinodon latifasciatus*)

Seaview

By Gordon Kay

TERRIFIC OFI(UK) NEWS

Early November of last year brought terrific news from OFI(UK). Ornamental Fish Industry (UK) have been really getting their act together of late and at their meeting on 6 November, they became a limited company — with **Richard Sankey,** of Tropical Marine Centre, their chairman.

Now, as I understand it, OFI(UK) have viewed 1992 with an outlook akin to "our priority is the freshwater sectors of the hobby — the marine side will have to fend for itself". As you can imagine, I was somewhat perturbed by this stance. However, with Richard Sankey as chairman, this has to change.

TMC is the biggest (and, in my opinion, the best) importer/wholesaler of coral animals in Britain, and Richard — arguably — the most respected man in the trade. With OFI(UK) carrying more clout with everyone these days, I'm a heck of a lot more comfortable about the future now.

LATEST SALT MIX

I've been testing and using the newest seawater mix to hit the UK market, Coral Reef Red Sea Salt from **Red Sea Fish pHarm.** Coral Reef salt is made in the Red Sea with natural chemicals from the Red Sea and surrounding areas.

Its trace elements are distributed in the mixture by a 'new' method that ensures total homogeneity and all biologically active elements found in natural seawater are found in this new mixture. In fact, the manufacturers claim that tests have shown that corals not only survive, but actually grow in water made up with their product.

Obviously, keeping corals is about a lot more than which synthetic seawater one uses, but the product does seem to perform well. It dissolves acceptably well and gives good pH after 24 hours. And — most importantly — my fish haven't complained about me using an unfamiliar salt at all!

Coral Reef Red Sea Salt is competitively priced when compared with other brands and should be available in most shops by the time you read this. It is distributed in Britain by **Coral Reef Technology Ltd** of Byfleet in Surrey — **Tel: 0932 355121.**

PRESTIGIOUS AWARD

You will recall that I mentioned two labelling schemes for the retail trade some time ago. Well, one of them — the one initiated by **Colin Grist** and **Nigel Cruickshank** and called the **Environ Labelling Scheme,** covering both freshwater AND marine species, has won a very prestigious award. I happened to speak to Nigel on 29 November just after he had received a call telling him that the scheme had been voted the European Pet Product of 1991 by the Dutch magazine **PETS Europe.**

Colin was in the Cameroon and knew nothing of all this, but Nigel was very excited. When Colin gets back, I daresay that there will be some serious alcohol consumption in Cheddar! Well done lads.

By the way, there was a full piece by **John Dawes** in December's *AGP*, which you may care to have a look at (see **Pictogram Labelling**).

MARINE TIPS

I have decided this month to replace **Snippets** with something that the beginners among you might appreciate — it does no harm for any of us to refresh our knowledge and outlook, either. So here goes, the first of what could become an 'occasional series'.

There are three factors which will help ensure adequate lighting levels in the aquarium:
① well filtered water;
② spotlessly clean cover glasses, and
③ regular renewal of lamps, especially fluorescent tubes.

When maturing a filter, as well as using a maturation agent, beg some old coral sand from a matured, disease-free aquarium — just a couple of handfuls will do. This will speed up the maturation process by as much as 50%. One word of warning, however, is that if the aquarium whence the sand came has ever been treated with copper, this will have been absorbed into the sand and will have a habit of leaching back into your tank water at the slightest change in water chemistry (ie a drop in pH).

Always remember to switch off power filters for a minute or two when feeding invertebrates. This will prevent their food being sucked in by the filtration system before they get a chance to ingest it.

Still on the subject of power filters, whenever they have been switched off for any appreciable length of time — say, 20 or 30 minutes — be sure to wash them out thoroughly before switching back on. This is because anaerobic bacteria will have started to colonise the filter and started to make a smelly gungy mess which will be released back into the aquarium — possibly polluting it — if you do not.

With undergravel filters, be sure to clean the filter bed at the same time as changing water. This is because the mulm which builds up in a filter bed will, itself, become colonised by bacteria and will — in effect — become part of the filter, with the result that, when you do finally come to clean it, you will be removing part of the filter bed. This could cause you some trouble.

When treating the aquarium for disease, always increase the rate of aeration within it. Many aquarium medications reduce the level of dissolved oxygen in the water (and levels are already low in seawater).

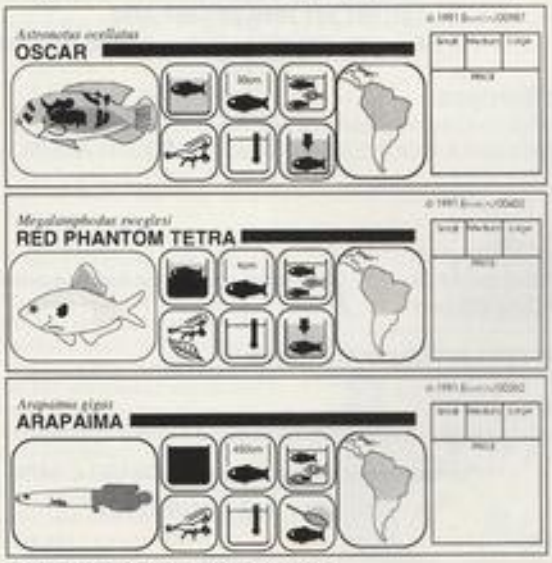
Well, that's all we've got space for folks, but there will be more **Marine Tips** in the future.

SHARK 'DRILL-BITS'

The Horn Shark lays eggs which look like drill-bits. They are soft and pliable when laid, but they harden within a matter of hours.

The female, on laying an egg, will pick it up in her mouth and place it in some nook or cranny in a rock so that the baby within it can grow in safety.

Meantime, I'll be with you next month.



Three of Environ's award-winning labels.

Tomorrow's Aquarist

By David Sands

A 'HAT-TRICK' FOR LOUISE

As you can see from the photograph in this month's **TA, Louise Lilly-white** and I met up at the Supreme Fishkeeping weekend at Weston-super-Mare. I have to thank **Ken Best,** the secretary of Mid-Sussex Aquarist Society, for taking the pictures of our historic meeting (some of the pictures made me look like a canvassing politician, and others were downright unflattering!).

It was difficult for Ken to produce a picture of us both smiling in unison. . . . Louise didn't appear to like having her photo taken, while I seemed desperate at the time to have a picture of myself with my tongue sticking out. . . .

Louise admitted that she and **Phil Hollings** had corresponded (see previous **TA** for the full mystery of **TA** pen pals) and that she and the Mid-Sussex club were having a good time. The club seems to welcome young members and they meet at the Jack and Jill (no, not nursery members) public house at Clayton, in the rear family room, every second and fourth Thursday in the month.

The Mid-Sussex is the club to be at the moment as they are in their 26th year and **Andy Feast** won the Supreme Champion award at Weston for the fourth time (does he keep the cup?) with a super 15-year-old *Botia nigrolineata* — or Chain Loach — as we knew them when I 'were nowt but a lad' (that's Northern talk for you Sussex girls and boys!).

The age of the *Botia* qualifies it as a **TA** reader, according to Ken, who I felt was trying too hard to be a promoter for his club.

This is the third time in succession that Louise has appeared in this column and it must end or else people will start talking . . . !

NEWS FROM OUR READERS

Mr G J Lander, from 6 Wilmot Walk, Wash Common, Newbury, in Berkshire, wrote to me, but his letter is undated so I'm not sure when it was written (knowing my filing system, it was probably 1990!). He was curious if there was a club in his area. I remember Newbury having an active club, so perhaps they will write to Mr Lander directly.

He also wanted to know more about Sparsholt College so perhaps someone can help him there too.

Paul Robertson, of Sark Road, Liverpool, tells me a story about how his wife caught his three-year-old son pouring Promin onto his one-year-old brother's head. When asked if he'd eaten any, the answer was no, and when asked why he had done it in the first place, the youngster replied that it would help him grow!

Paul thinks he picked the right food, although I would have said that fry food might have had a greater effect!

Thanks for the story Paul. I will send you some flaked food in the next few weeks.

BRITISH MARINE LIFE STUDY SOCIETY

Last year I wrote about my Cornwall excursion when **Derek** and **Pat Lambourne** and **Terry** and **Doris Cruickshank** wandered about the beaches 'rockpooling' or looking under rocks for all kinds of wonderful things.

Stan Kemp, of Kingfisheries in Beckenham, called me and quickly pointed out that any rocks upturned should be placed back and great care should be taken to see that nothing is damaged. This, I knew, but perhaps I should have warned everybody else. . . .

Then a letter arrived from the **BMLSS** providing me with information about this group which is also known as the Marine Life Natural History Society. They produce a journal entitled *Glaucus* which features rockpooling, diverse reports, and a forum etc. I have yet to complete the form to see a sample copy of the journal, but I must admit that for anyone interested in native marine ecology, or simple 'rockpooling', it sounds like just the job.

The aims of the society are to study the fauna and flora of the UK shoreline and seas, to publish and distribute knowledge about same, and to promote ideas and projects relating to conservation of the same, but not as activists.

I wish its organisers well and, should you be interested, please write to **Jane Barrett,** at the **Marine Life Study Society, 1 Half Moon Village, Newton St Cyres, Exeter, Devon EX5 5AE.**

What an address. . . . I would love an address like Half Moon Village.

TA READERS

I look forward to seeing **TA** readers at the various shows and talks I will be associated with this year. I know I'm at Stafford AS on 11 February, and Corby and District AS on 17 May (40th anniversary) and the Isle of Wight in June. I should also be at the Yorkshire Festival, Sandown and the British Aquarist Festival this year.

Perhaps we could have a picture gallery of **TA** readers with addresses for pen pals? What do you think?

The Adams family would like to be pictured with their pet piranha. If you are invited to tea, it might be the piranha who gets to eat!

Finally, competitions yet to be entered: **TA Pen Pals, Showing Fish** (is it wrong, is it OK for some species of fish and not others?) and your **Favourite Fish.** Let's see those letters come thundering in.

Happy Fishkeeping!

Books

Underwater Guide: Maldives

By: Peter Nahke and Peter Wirtz
Published by: **Verlag Stephanie Naglschmid, Rotebühlstrasse 87A, 7000 Stuttgart 1, Germany**
ISBN: 3 925342 51 1
Price: DM 48 including German VAT but excluding p & p.

Remember the unusual item entitled **A Window in the Belly** which we published in the November 1991 issue of *A & P?)* Well, its authors, Drs Peter Nahke and Peter Wirtz, having collaborated on this and other features (we have some more waiting in the wings for future issues of *A & P*), have now got together to produce a colourful guide to many of the reef fishes found in the Maldives.

This is not an aquarium guide, of course, although many of the fish are well known within the marine hobby, but an aid to the easy identification of these fish underwater.

Many of the Maldives' numerous islands (it's been called the Kingdom of the Thousand Atolls) have excellent facilities for divers of all levels of expertise, and with this exotic destination becoming ever-more-popular with tourists, there's long been a need for an easy-to-follow guide to its most accessible fish species. Diving is not allowed below 30 metres around the islands, so what we end up with in Peter Nahke's and Peter Wirtz's very useful and attractive book, is an excellent selection of the shallow water species, plus some of those that are found in both shallow and deep water.

In total, about 150 species are featured, all of them illustrated in colour, some of them also being represented by pictures of both adults and juveniles. Facing each colour page, the text (written in German and English) includes common and scientific names, a few very useful paragraphs with relevant information on the species depicted, such as ultimate size, habits, diet, sexual dimorphism (where relevant), etc. Supplementing this are simple diagrammatic 'symbols' indicating the fishes' preferred habitats on the reef, their daytime/nocturnal/twilight habits and their depth distribution.

Bearing in mind that so many of the fish mentioned are well known within aquarium circles, *Underwater Guide: Maldives (Unterwasserführer Malediven: Fische)* would make a very worthwhile addition to any marine aquarist's library . . . irrespective of whether or not he or she is a diver of any description. And, of course, should you be planning a trip to any coral islands or reefs anywhere in the Indian Ocean, this book is detailed enough, small enough (although it's got 168 pages of text) and bound well enough, to serve as an excellent and durable field guide on your travels.

John Dawes

Dr Burgess's Mini-Atlas of Marine Aquarium Fishes (mini-edition)

By: Warren E Burgess, Herbert R Axelrod and Ray Hunziker
Published by: **T.F.H. Publications, Inc**
ISBN: 0 86622 404 1
Price: £20.95

Under normal circumstances, you wouldn't really regard a book such as this as being 'mini' in any way: if you include its three indices in the count, the *Mini-Atlas* has a total of 1,023 pages. It also contains over 1,900 full-colour photographs!

Then again, everything's relative. So, if we compare it to its 'big brother', *Dr Burgess's Atlas of Marine Aquarium Fishes*, which contains over 4,000 full-colour pictures, then, I suppose, the latest publication could, with some justification, be correctly referred to as the *Mini-Atlas*.

Much of the (limited) text of the first sections, plus all of the photographs in the extensive Pictorial Identifiation Section (from page 34 to page 672) come, as expected, from the parent book. However, come page 673, the *Mini-Atlas* has a surprise in store in that it forms the contents page to an extensive final Marine Aquarium Set-up and Maintenance Section, which runs from here to page 925.

Therefore, in essence, what we have are two books in one, the latter section constituting quite a thorough and substantial volume in its own right. This is the same arrangement that was adopted some time ago for the freshwater equivalent and is one that, I think, works very well.

The contents list of the marine aquarium section covers all the main aspects of the hobby, from tank construction through to breeding marine fishes, this last section containing some very interesting photographs of fish spawning in the wild and in aquaria.

If you already possess the *Atlas*, then buying the 'mini' equivalent could (viewed in one way) be regarded as a somewhat wasteful way of going about obtaining a guide to marine aquaria. Viewed another way, though, you could easily spend £20.95 on a separate aquarium book and *still* not get as much guidance as that contained in the 252 pages that constitute the final section of the *Mini-Atlas*. I can therefore see even some owners of the original, more expensive (£54.95) *Atlas* buying this latest publication and feeling that their money has been well spent.

This is despite the fact that some of the artwork in the otherwise well illustrated final section, is really quite poor. In particular, I would pick out pages 712, 713, 717, 718 (probably the worst of the lot), 732, 821, 826, 828 . . . and a few others. Sooner or later, I think the question of artwork should be addressed by the publishers, because both the style and quality of some of the non-photographic illustrations that have been appearing in a number of TFH books for some time now, is well below that of their texts and their usually high-standard photographs.

COVER STORY — BLOOD-RED PARROT

Photograph: Bill Tomey

The Blood-Red Parrot is an extraordinary fish by any standards. It's also one of the newest, having been 'launched' last June at **Aquarama '91** in Singapore.

There are quite a few stories flying about regarding the true nature of this most unusual fish. For example, there's a rumour that it was first developed in Singapore, but that the 'creator' exported it to Thailand, from where it is now re-imported into Singapore for eventual export to world markets!

Some also say that the fish is 'colour-fed' and that the 'blood-red' hues are bound to fade with time. We'll see soon enough.

Perhaps one of the most interesting debates centres round the true 'nature of the beast'. It seems possible that one of the species from which this hybrid was developed is the Severum. But what has it been crossed with? There have been claims that the second parental species is the goldfish! Then, of course, there's the question of future generations of Blood-Red Parrots. Are the specimens doing the rounds fertile? If so, what will the offspring be like? And . . . should we be keeping such a fish at all? If not, then what about Fancy Goldfish . . .?

Be sure not to miss Bill Tomey's feature on the Blood-Red Parrot elsewhere in this issue of *A&P*.

In the *Mini-Atlas*, the photographs are, as in the bigger version, mostly very good indeed. The system of symbols which has, quite rightly, proved so successful in the freshwater and marine *Atlases* in conveying maximum information with maximum economy, has also, quite sensibly, been retained.

Dr Burgess's Mini-Atlas of Marine Aquarium Fishes: Mini-Edition represents unbeatable value for money. I'm therefore certain that this book will prove to be a great success . . . it certainly deserves to be.

John Dawes

Cyprinid Fishes: Systematics, Biology and Exploitation

Edited by: Ian J Winfield and Joseph S Nelson
Published by: **Chapman and Hall**
ISBN: 0 412 34920 5
Price: £60

I really must do something about clearing up my state of growing confusion regarding the Cyprinid genera, *Barbodes*, *Barbus*, *Capoeta* and *Puntius*. I thought I would be able to do so when I received a review copy of this superb, massive (667-page) volume, the third in Chapman and Hall's **Fish and Fisheries Series** (see Mary Bailey's review of No. 2: *Cichlid Fishes*, in the September '91 issue of *A & P*).

Sad to say, though, I'm none the wiser. All four nominal genera are, indeed, mentioned at numerous points in the text, indicating that they are considered valid by the various highly-respected authors concerned, but we are not given any real indication of just what the distinguishing criteria are.

Cyprinid Fishes is, generally, about broader subjects, consisting of no less than 22 major review-type chapters, each written by one or more leading authorities in the world of Cyprinid biology. Admirably edited by Ian Winfield of the Institute of Freshwater Ecology (author of our bi-monthly **Paper Round**) and Joseph Nelson of the Department of Zoology at the University of Alberta, the text is divided into three sections, though this is not indicated either in the Contents or within the book itself.

To quote the editors: *"The first part discusses what cyprinids are and where they are to be found through a series of chapters on evolution, diversity and distribution. The biology of individuals is then considered in terms of their basic life process, and then finally, reviews are given of cyprinid populations and communities and the ways in which they interact with the rest of the freshwater ecosystem, including Man."*

Taking this breakdown further, I think that the first part consists of nine chapters, starting off with **Systematics and Biogeography: An Overview** (this is an excellent chapter by Gordon Howes of the Natural History Museum) and ending up with **Cyprinids of Australia** by Andrea Brumley of Australia's Kaiela Fisheries Research Station, taking in other topics like fossil Cyprinids, morphometric, molecular and cytological studies, and Cyprinids of Eurasia, South East Asia, Africa and the New World.

I found this part the most readable and interesting of the three, no doubt because of my personal leaning towards distribution and intra- and inter-specific relationships.

In the second part, digestion, diets, energetics, ecophysiology, growth, production and reproduction are all given equally thorough treatment. Of these, my personal 'choice chapter' was **Reproduction and Life History** by the recently deceased Chris Mills (late of the Institute of Freshwater Ecology), again, because of my interest in the subject.

As far as I can make out, chapters 18-22 form the third part which deals, among other things, with social behaviour, migrations, eco-systems, fisheries and aquaculture.

Understandably, in view of the overall academic tone of the book, *Cyprinid Fishes* is written in formal, no-nonsense language. There are no colour illustrations (again, as expected) and very few black and white ones, but this will, in no way whatsoever, detract one iota from the immense value of the text, diagrams and charts that go to make what must surely be the most up-to-date, comprehensive review of Cyprinids in existence.

At £60, it is expensive for all but the 'seriously affected' Cyprinid enthusiasts, but both they and all other interested aquarists should, at the very least, insist that their local library obtains a copy of this superb publication.

John Dawes

New Series

Helping Hand

By Kevin Fox

Phoenix-like, **A Helping Hand** is re-born and brought to you courtesy of the person above — the one not full of water! I know what you're thinking; how could all that beauty and intelligence be tied up within the one perfect package; but that's life (I used to be modest, but now that I'm perfect, what's the point?).

As you can see, I'm a *'raspberry'* too — Stoke Mandeville-speak: Raspberry Ripple = Cripple, geddit? Mind you, I do put myself about quite a bit; that is, when and where access permit. How many times have you tried to hoist yourself up in your chair to see into a tank at a dealer's, or asked them to speak a little slower and louder? Didn't someone once make a record called *I Love The Sound of Breaking Glass*? With the narrow alleyways and impossible wheelchair turning circles in some shops this ought to be their anthem!

Personal run-down

So, who am I and what's going down? Well, the full SP is far too horrific (read boring), so I'll just skim over the essentials. I've been keeping fishes ever since . . . well, let's settle for a very long time. I am by no means an expert. After all, an expert is simply someone who gets to know more and more about less and less until they end up knowing everything about nothing.

(**Editor's Note:** *Stephen Smith, our 'Coldwater Jotter', once told me that 'expert' consisted of two words: 'ex', which means 'a has-been', and '(x)pert', which is a drip under pressure!*)

I've just finished writing a book on fishkeeping entitled *The Tropical Fishkeeper's Handbook*, to be published in the spring of 1992 by **Argus**. I mention this, not only as a plug (who's he kidding?), but to reassure you that I do know a little bit about keeping fishes.

I am an ex-professional photographer, college lecturer and hippy, who was booted out into early 'retirement', aged 39! It appeared that I had some small talent for scribbling, so I've been writing magazine articles since 1985, mainly on technical subjects such as photography, telecommunications, computers and astronomy which I used to teach at my son's school. Since 1987 I've been writing full-time and am just preparing the groundwork for my fourth book. Well, it's better than sitting on your backside all day, isn't it? So much for me, what about the column?

H H Aims

The idea of **Helping Hand** is exactly that: a column dedicated to disabled or housebound aquarists. That doesn't exclude able-bodied people at all, of course. In fact, quite the reverse, so I insist that you turn the page back immediately! We need each other like a boiled egg needs salt, or hot toast demands butter! Together we'll work wonders and change the world!

Let me define 'disabled': I don't just mean wheelchair users, I mean people who, no matter what the reason, are either confined to their homes, or suffer some physical impairment which inhibits their everyday activities. The general idea is that I act as an information exchange.

For example, some disabled person will have had a problem of some sort and eventually found a method or cure. Then there's someone else in Warmington-on-Sea who has exactly the same problem but can't find a solution. I hope to act as the switchboard which connects people with the answer they seek.

So as you see, this column is going to be highly dependent on input from you. Do you have a problem, or any tips? Do you have any opinions on the aquatic scene in general, or a specific point to make? If so, then please, write to me at the *A & P* offices.

My eventual hope is that a society for disabled aquarists will emerge, where the combined knowledge of people who spend most of their days with their fish friends would have formidable synergy which could offer the hobby so much.

That's the gist of the **HH** column. Of course, I'm very receptive and responsive to your needs; remember I share your problems too, so any suggestions should be written on the back of a £20 note and sent directly to me (!). No, seriously — if you have any suggestions as to how you want **HH** to run, then don't be afraid to drop me a line.

The only condition I make is that if you require a personal reply you *must* include a stamped addressed envelope. No SAE, no reply; my postal and telephone bills are already pretty awesome! If I'm to be your *Don Quixote*, then you'll all have to be my *Sancho Panza*.

In my personal experience, disabled aquarists get a rough deal, more through ignorance than malice, so let me know where and how you suffer most in your aquaristic activities because of your disabilities.

Getting things going

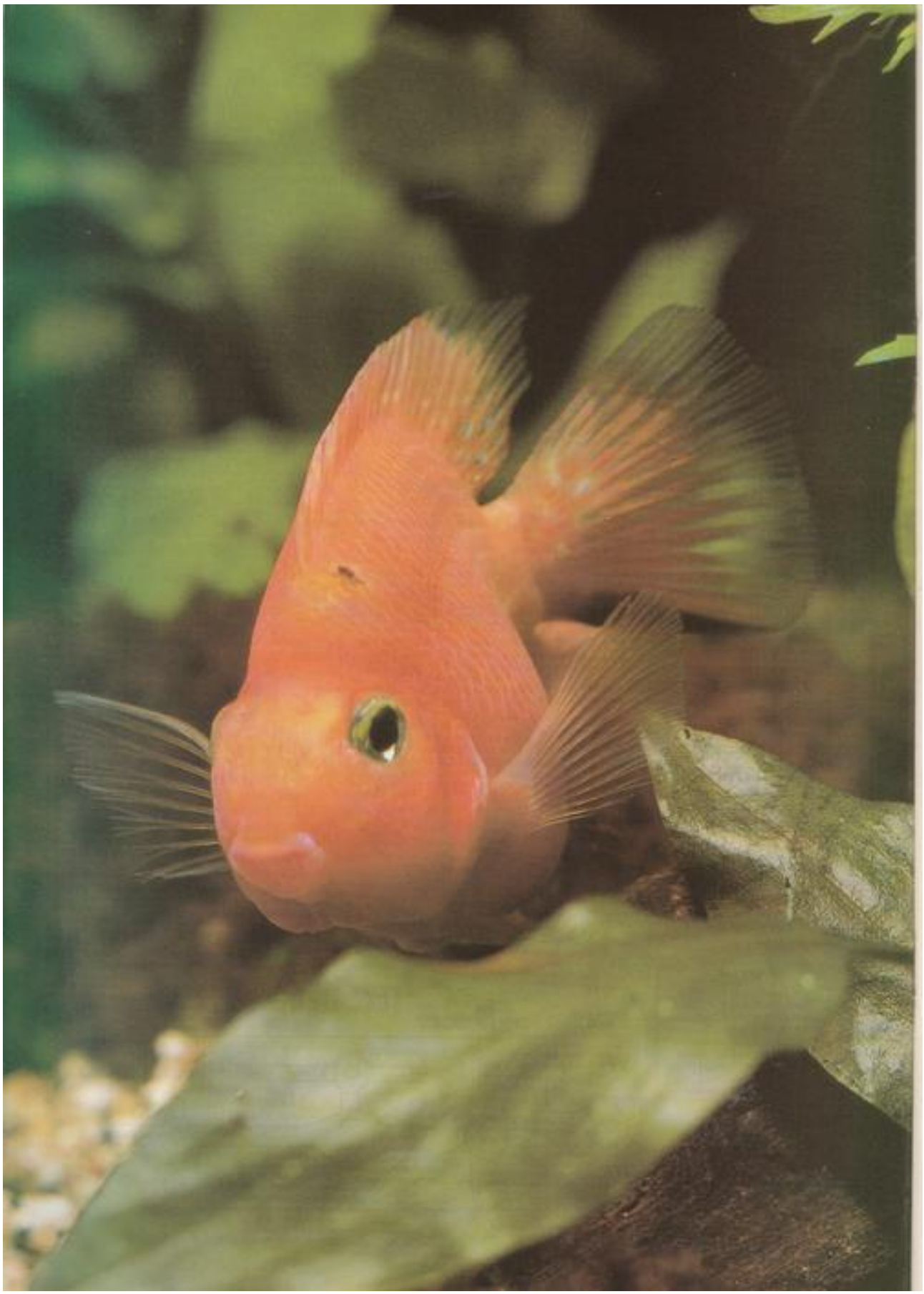
Finally, as this is the first **Helping Hand**, I have no readers' letters to respond to or pass on. So, to get things moving, how about this:

Disabled or housebound people can often feel cut off from the world. So, all you club chairpersons of the various aquatic societies around the country, why not get in touch with your local Social Services, and find out where to make contact with an organisation dealing with disabled people?

Arrange an exhibition just for them, and introduce them to the fascinating world of fishkeeping. You could just be changing their lives! Any club secretary requiring details of how to arrange such an exhibition can contact me for a fact, sheet on setting up a show for the various types of disability, what to offer and what to avoid.

As the hobby is mainly centred around the home, what better therapy could there be? I know my fishes have often taken the sting out of a 'bad day'!

See you in a couple of months.



Spotlight

THE BLOOD-RED PARROT FISH

Bill Tomey reports on a remarkable new fish which has recently begun to be imported into Europe from China and other Far East exporting countries.

Photographs — unless otherwise indicated — by the author

The origins of the recently imported and beautifully coloured Chinese Parrot Fish, or Chinese Red Parrot, or Blood-red Parrot, or Red Parrot Fish, is surrounded by a veil of secrecy. Experts in the field of ornamental fish wonder about its origins and are astonished by the large number of adults, as well as young, of this fish coming onto the international market.

The fish has everything aquarists go for: it possesses an appealing colour, is relatively small, and shows an interesting behaviour. However, keen aquarists like to know what kind of fish they are keeping, and this is where the problems start. So far, the real identity of this fish is a mystery. The Chinese seem to have a monopoly in the marketing of the Red Parrot and thus, logically, don't show any desire to unveil their secret.

The first official public appearance of the Red Parrot — at premium prices: Aquarama '91, held in June '91 in Singapore.

A pair of Red Parrots hiding in a shady spot in one of my aquaria.

Sideways on, the full extent of the unusual body shape of this fish can be appreciated.

BEHAVIOUR IN THE AQUARIUM

As I wanted to photograph this 'new' fish, one of Holland's leading importers kindly offered me some specimens for this purpose. The Red Parrot is a remarkable fish with an unbelievable shape, something between a cichlid and a . . . goldfish! I agreed to study the 'Parrots' and report back to the importer on their value as aquarium fish.

Seen through the eye of a photographer, the colour was absolutely tempting; I was therefore unable to resist . . . and so, some Parrot Fish 'landed' in my tanks.

Once in the aquarium, the fish showed very odd behaviour. They went into a shaded corner and stood there, almost motionless, except for their gill-covers, which were moving very fast. They stood there, to my amazement and worry, for about five days,

seeming unable to change their position, exhibiting only fright.

Even the slightest movement outside the tank made them 'fly' like a flash of light through their environment, seemingly unable to control and orientate themselves, other than eventually to resume 'standing' on the same spot.

As far as I was able to observe, they refused any food and I could see their condition declining fast. I admit to being disturbed and alarmed by the strange behaviour. What was going on? My experience told me that the fish were under extreme stress. But why?

The lay-out and arrangements in the aquarium allowed them to roam the bottom undisturbed; light and shade were equally present, some plants and rocks provided protection; the temperature was 23°C (72°F) and the bottom gravel was of a dark tone. There wasn't a single reason I could think of for the heavy stress symptoms.

SOLUTION

How was I to solve such a problem? As in most cases of stress in fish, the solution was found by simply adding some nice tame Platies of the same colour as the newcomers into the tank.

Soon, the miracle happened! After some hours the Parrots started moving, first awkwardly and carefully, later, slowly surveying their new environment. Form then on, it took only one day more and they started to search for food.

After some six days of their hunger-strike they showed an amazing appetite, with a clear preference for mosquito larvae, white worms and so on, which they took from the bottom just as goldfish do. Defence of a territory, threatening, fighting and courtship behaviour, however, was typical of cichlids, like *Cichlasoma* or *Mesonauta*, as it involved digging small pits into the top layer of the gravel, pushing and 'hunting' each other, side bumping, mouth pulling, and so on.

BODY SHAPE

The shape of these fish is most remarkable, so much so, that it is difficult to determine whether they are genetically deformed or stunted on purpose for commercial reasons. The fins show every feature of a cichlid.

The downward pronounced nose line ends up in a kind of hooked spout-shaped mouth with a somewhat extended upper lip. This is exactly why — indeed with some imagination — the Chinese came to the popular name of Chinese Parrot Fish.

Judged on the appearance of the body shape, fins, and behaviour, it is quite logical to think in the direction of genetic deformation which, as is generally known, often occurs from lengthy in-breeding (these deformities are sometimes referred to as 'culture deformities'). These thoughts are supported by the often complete absence of gill cover, or the presence of deformed ones, a condition known as open gills. Such deformations frequently arise in captive-bred cichlid 'races' and 'strains' such as Angelfish, Discus and other popular cichlids, and the Chinese Parrot Fish seems no exception.

COLORATION

Regarding the colour, we are in the dark too. The 'brilliant' nature of the colour seems too beautiful to be natural. It is possible, therefore, that the Chinese Red Parrot Fish found its origin in the cross-breeding of some non-related cichlids, coincidentally followed by a genetic colour mutation.

Another possibility is that the fish was created through genetic manipulation between two or more races and/or strains of aquarium fish. If this were true, then one wonders about the future consequences.

In spite of these considerations,the remarkable shape and beautiful colours of the Chinese Red Parrot Fish seems to have pre-destined it for popularity in the aquarium world.

Editor's note

I first came across this remarkable fish last June at its official 'launch' at Aquarama '91. See **Cover Story** *elsewhere in this issue for further details.*

John Dawes

BASKET FISHING IN NIGERIA

Photographs by Ann and Grant Weir; watercolours by Ann Weir

Ann and **Grant Weir,** of West Coast Tropicals in Nigeria, describe the fascinating techniques employed to collect one of their best-known fish, the incredible Long Nose.

The village of Ologbun is situated some 160 kilometres (100 miles) east of Lagos, on the edge of the rain forest belt. The village itself is located on top of a hill, overlooking a myriad small streams and rivers which feed the river Oni.

Ologbun is home to two basket fishing companies. One was formed only last year, but the other, headed by Pa Abati, has existed for over 10 years. Now over 60 years old, 'Pa' no longer takes an active part in the fishing, but the fishing rights in a stretch of the main stream belong to him and he is entitled to some 30% of the proceeds of the fish caught there.

His son 'T.A.' (27) is the 'Chairman' of the company, which has a total of nine active members, all between the ages of 19 and 30 . . . or so they say. Chief Balogun, the General Manager, gave his age as 30, but admitted that he was born in 1939! (He later confessed that he had stopped counting at 30!)

The G.M., besides being in charge of the pre-season preparations, such as weaving the fishing mats or walls used in basket fishing, is also responsible for dividing up the proceeds of the catch. The Chairman's duties are to cut the riverside reeds, direct the labour of the other members in the stream and to manipulate the all-important baskets.

UNPREDICTABLE SHORT SEASON

The heaviest rainfall in the rain forests of Nigeria is normally experienced from May to October and it is then that the fish breed. Last year, however, the rains fell early, which led to anxiety among the basket fishing companies, whose season is very short — March and part of April only.

FOUR KEY STEPS IN BASKET FISHING

Once an area has been fenced in, swathes of reeds are cut, starting from the centre and moving outwards until only two broad swathes are left nearest the side walls.

One of the two remaining swathes is then cut away and, after a wait of about 30 minutes to allow the fish to swim across and shelter in the remaining reeds, the mat wall on the cleared size is dismantled and re-erected around the uncut reeds.

The far and near patches of reeds are then cut to leave a band stretching across the centre.

With the 'Chairman' inside the enclosure, the mat is drawn in encircling the remaining reeds which are removed and thrown out over the mat walls, leaving the fish in clear water from where they can now be easily collected.

True to tradition, Abati and company had started to basket fish in early March. The unexpected early rains had caused problems with their schedule as, by mid-March, the main stream had swelled to unseasonal proportions. The Elephant Nose (or Long Nose, as it is known here, the name Elephant Nose being reserved for *Mormyrus longirostris*) — *Gnathonemus petersii* — leave their foraging areas in the riverside reeds during the rainy season and proceed upstream to their traditional spawning locations. However, nobody knows exactly when. The 'company' hoped that they would still be feeding whenever the weather and the water level allowed them to basket fish.

ILLICIT GIN

On Good Friday, 29 March, the village awoke to the sound of rainfall on its galvanised iron roofs, but when dawn broke, the drizzle had stopped and the 'company' was on its way down to the main stream. A spot some 3 kilometres from the village, conveniently located next to an illicit gin still, had been chosen for the day's fishing.

Illicit gin had received its title during the colonial era which ended with Nigeria's Independence on 1 October 1960. The British had tried to licence gin stills, many of which were located in the bush or jungle, and impose some degree of sanitation. After independence, stability returned to the illicit gin business and nobody bothered to try to legalise a time-honoured institution.

The locals fished and farmed but didn't operate gin stills. Samson therefore tapped the riverside *Raphia hookeri* palm trees, whose fronds are used for fish traps and mats, collected the vitamin- and yeast-rich juice from the flower stem at the top of the palm, allowed it to ferment for 24 hours and then distilled the residue three times to obtain his gin, or 'Agogoro', as it is called locally. The freshly gathered unfermented juice, which is, besides the vitamins, also high in fructose and sucrose, provided sustenance for Abati and company that day.

SETTING UP

By 7.30 am the company had reached the gin still and were staking out the river at a point where it was some 10 metres wide and a maximum of 2 metres deep. Reeds, planted in the shallows the year before, had grown out some 4-5 metres towards the centre of the river. They began to surround the reed bed with stakes made from 4-metre long, straight branches, at 1½-metre intervals. They then attached mats, each 3 metres high and 6 metres long, to form a three-sided wall enclosing the reed bed, using the bank of the river as a natural wall.

At about the same time that Abati and company reached the gin still, two members of our staff and ourselves set out from our tropical fish conditioning centre some 60 miles (96 kilometres) east of Ologbun, with oxygen cylinders, plastic bags, hand nets etc.

At 9.00 am we reached the village and immediately began our descent to the valley below, accompanied by various members of the village who helped us with our loads.

Recent rains had turned the path into a sea of mud and swelled the streams we had to cross. One of our helpers all but disappeared into a 1½-metre deep hole, much to the very obvious enjoyment of his fellow villagers. Some 45 minutes later we had reached the gin still and could witness the company at work, or submerged for the large part in the water.

We had been warned that we must wash before we set off that morning. All those present during the fishing had to start clean or otherwise the catch would not be good. One of our party, by his own admission, hadn't bothered bathing and was expelled to the far bank where he was forced to sit out the proceedings. Only after all the fish had been removed from the river was he allowed to rejoin us.

UNDERWAY

By the time we arrived, the total fishing area of some 100 square metres had been fenced in by the woven mats. The Chairman then took to the water and started in the middle of the enclosed reed bed cutting a swathe through the reeds about 2 to 3 metres wide towards the bank.

As he cut, making plenty of noise as he did so, the other members of the company removed the cut stalks with long hooked sticks reminiscent of oversized shepherd's crocks and pulled them onto the bank. The centre swathe cut, the chairman then cut, with his cutlass or machete, identical swathes on either side, until only 2-metre wide swathes of reeds remained at both sides of the mat wall.

We guessed that, in foregone days, the Chairman and members were encouraged in their work by their rhythmic chanting; that day we were reminded of the modern age by a portable radio/cassette which croaked out high life music from the opposite bank. The presence of hawks overhead and monkeys and parakeets in the surrounding bush brought us back to reality.

The Chairman then moved to the growth of reeds on one side of the mat wall and carefully cut into these. They were then

The Long Nose *(Gnathonemus petersii)* — the main 'target' species.

Red-eyed Tetras *(Arnoldichthys spilopterus)* also figure regularly in our basket fishing catches.

removed equally carefully, until just one line of reeds was left. The Chairman and members then all retired to the river bank to partake of the fresh palm juice and the loaves of bread which we had brought along for them by popular request.

At least 30 minutes elapsed, during which time the G.M. explained that all the fish would be congregating in the cool remaining reed-protected river within the wall. It was very hot, with the temperature around the 35°C (95°F) mark and, although the river temperature was much lower, who could question him, especially as we know that the Long Nose is a very intelligent fish that can detect even minute changes in water temperature and composition.

THE FINAL PUSH

As soon as the Chairman deemed that all the fish were sheltering in the reeds, he gave an order, and part of the mat wall was dismantled and re-erected around the uncut reeds. The fenced-in fishing area was thus reduced to around 15 square metres. Then the Chairman cut away ⅓ of the reeds furthest from the riverbank, before moving to the bank and cutting towards the centre. This left a reed patch in the centre measuring approximately 4 square metres.

With the Chairman in the centre, the mat was drawn closer again and encircled the remaining reeds and the Chairman, who then carefully removed the reeds, weeds and debris from the river bottom by throwing them over the top of the mat wall.

'Gassing' the fish with oxygen in preparation for the journey ahead.

As he worked, the colour of the water turned from brown, to grey, and then to black, as a fantastic mass of fish — most between 10 and 15 centimetres long (4-6in) thrashed around churning up the water surface.

The Chairman then called for the all-important basket. It was nowhere to be found! A heated discussion took place, but there was no obvious culprit and, indeed, it had been nobody's specific job to bring it from the village in the morning. Now, somebody was detailed and he raced back 3km through the mud and bush to the village to retrieve it. Nobody minded the delay, which had obviously happened before, and would happen many times again.

The Chairman relaxed inside his 'wall', while the other members moved the green

The 'company wives' carry the first loads back to the village . . . after much hard bargaining!

keep net for the Long Noses to the proximity of the wall, and we went back to catching the shelterless *Aphyosemion* and *Polycentropsis abbreviata* (African Leaffish) which had been rendered homeless by the removal of the reeds, but had escaped through the wall and were now lining the river bank.

Some lucky fish leapt to freedom though. We saw, for example, a 2-kilo Aba-Aba (*Gymnarchus niloticus*) leap past the Chairman's shoulder and over the top of the wall!

'HARVESTING'

The basket arrived. It was passed to the Chairman and he dipped it into the fish-infested water and passed it quickly over the top of the wall. It was then partly submerged next to the keep net.

The Long Noses were sorted out and put into the keep net, while the remaining fish, later to be eaten, were poured into the bottom of the canoe. These unfortunate fish largely consisted of *Gnathonemus moori*, *Pollimyrus nigripinnis*, *Petrocephalus simus*, *Marcusenius angolensis* and *castelnaui* (all different types of 'Elephant' Nosed fish or Mormyrids), *Xenomystus nigri* (African Knife Fish), various *Hemichromis* (Jewel Cichlids) and *Tilapia*, also Dark Brown Snakeheads (*Parachanna obscura*). Only the last did we not feel sorry for, as they all soon became a motionless mass.

The wall was then moved inwards until there was barely room for both the Chairman and the basket. Five minutes later, the last fish was removed — it was two in the afternoon.

FINAL COUNTS

It was finally our turn to do some real work. We approached the keep net and quickly counted out the Long Noses into partly water-filled bags and 'gassed' them with oxygen for the journey home. Our people then turned their attention to other keep nets, close by, which held Long Noses from previous days' fishing. These were also counted and 'gassed'.

The 'company wives' then carried the plastic bags containing the fish up to the village, having first bargained hard for their fee. The men of the 'company' stayed at the gin still to divide and sell the remaining fish — we had paid immediately for the fish we had collected at a price agreed weeks before. We left the 'company' to celebrate the day's basket fishing; obviously, the proximity of the gin still was not a mere coincidence!

The catch included 487 Long Noses and, despite the apparent free use of the cutlass on the reeds, there was not a single cut on any of the fish. The same applied to a further 985 fish, caught over the previous three days, which we collected from the keep nets located further up the river. They were all in excellent condition.

Three hours after we had collected and gassed the fish, we were unpacking them at our conditioning centre. They are now in aquariums in England and the States where we hope to be winning new, or delighting old, friends. The *Aphyosemion* were *A. bivittatum* between 10 and 12 mm (0.4-0.8in) long. They will remain in our conditioning centre until they reach the popular selling size early this year.

Outside inspection tanks at West Coast Tropicals. Many fish are kept and bred in these.

'CLUBS'

It is common practice in Nigeria for groups of friends to get together to form 'clubs'. The club normally consists of 12 monthly wage earners. At the end of the month, each contributes a similar amount and each member in turn collects the month's contributions. They regard this as a form of saving, while giving the monthly recipient a lump sum to spend on a luxury such as a radio/cassette or even part of the dowry for a wife.

There is no bank within 20 kilometres of Ologbun, let alone electricity or pipe-borne water, so the formation of the 'company', who work part-time during the year towards one or two month's full-time work, is their form of saving.

In a country where the minimum labourer's wage is around 10 naira a day (50p), the 'company' made over N500 for their day's basket fishing, and some days the figure even reaches N1,000! The continuing and, indeed, the increasing, popularity of the Long Nose can only enhance the incomes of 'companies' such as Abati's and the riverside rural communities as a whole.

On arrival at West Coast Tropicals, all fish are conditioned thoroughly in these tanks before sale.

FOOTNOTE

Within a week of the reeds being cut, they are replanted on the banks of the streams and rivers, ready for the next year. So, perhaps, if you buy a Long Nose from your supplier or pet shop in April/May 1992, the chances are it was caught by basket fishing in Nigeria, by Abati and his enthusiastic 'company'.

New Series

Growing Tips

By Barry R. James

This is a new column devoted to aquatic plants and their cultivation. I shall have news of new species and varieties from around the world whenever possible. In addition, innovative technological advances in equipment will be introduced and discussed, while the latest publications will be reviewed and criticised. I shall also be looking at the use of materials, both natural and artificial, which may be used in aquascaping.

I shall not be neglecting the water garden either and, in season, will be dealing with hardy aquatic plants for garden pools and exotic species for pools under glass.

Correspondence from readers on any aspect of aquatic plant cultivation will always be welcomed, and I will take on board suggestions for topics to be considered in future issues. I look forward to hearing from you.

Editor's note

'Apical meristems', the points of growth in many plants, are also known as 'Growing tips'. As Barry's new regular slot for plant lovers will be dealing with botanical issues and plant growth, as well as handy hints for cultivation and propagation, we felt that **Growing Tips** would be an apt 'double-edged' title for the series. We hope you agree.

JOHN DAWES

PLANT PROFILE

THE HAIRGRASSES

The folk name for this group of plants is a misnomer as they are not grasses at all, but belong instead to the family Cyperaceae, a group of rush-like plants which include Papyrus (*Cyperus papyrus*), the renowned Egyptian Paper Plant.

JOHN DAWES

Clump of Hairgrass growing in the wild by a stream in Malaysia.

BARRY JAMES

***E. acicularis* — one of the smaller species of Hairgrass.**

BARRY JAMES

***E. xingua*, the Giant Hairgrass, can grow to 12in (30 cm) in length.**

Hairgrasses belong to the genus *Eleocharis*, derived from the Greek 'Helos' — a marsh — and 'chairo' — I rejoice — because the group is often found in marshes.

There are over 90 species in this genus which has a worldwide distribution. Many are coarse, rampant plants, often growing eighteen inches (45 cm) or more in height. A few, however, are dainty plants which perform well in aquaria. Three species are readily available in Europe.

Cultivation

Hairgrasses are not the easiest of plants to accommodate. They prefer a fine rooting medium with a consistency of 1/8 — 3/16th inch (0.3 — 0.5cm) in particle size. The lower portions should contain a little laterite or peaty soil.

The plants are best cultivated hydroponically in pots and transferred intact into the aquarium. No fertilisers are necessary, as these plants thrive best in an impoverished environment.

Illumination should be generous, but the intensity must be such that the plants don't become enmeshed with thread algae, as this is very difficult to eradicate once established.

Propagation is by runners in most species. In suitable conditions, this is rapid, the plants soon forming a dense carpet. Seed is freely set by specimens growing emersed and, being very tiny, can be carried long distances, by air currents.

Some species produce viviparous plantlets on the ends of the leaves. These will bend over under their own weight, and, where they touch the ground, will take root. *E. vivipara* is often called Walking Hairgrass in recognition of this habit.

Some of the larger species produce tubers, particularly *E. dulcis*. This species hails from China, where the tubers are eaten as 'Water Chestnuts'. This can cause some confusion with *Trapa natans* which rejoices under a similar name.

Selected Species

***Eleocharis acicularis* (Needle Grass, Hairgrass)**

This species has a wide distribution, with the exception of the Tropics. However, it is cultivated in many tropical countries for aquarium use.

It is a perennial marsh plant bearing rosettes of 2-16 filiform leaves which arise from a creeping, subterranean rhizome that branches freely. The inflorescence is like a small brown pointed club and is borne on the tops of the flower stem.

It is an excellent aquarium plant, flourishing in both tropical and coldwater aquaria. It is best planted towards the front of the tank, where it normally reaches a height of 2-4in (5-10cm) sometimes more.

***Eleocharis xingua* (Giant Hairgrass)**

I think that there are several species masquerading under this name. I have collected virtually identical plants in Africa and the Far East, and have also had them turn up in shipments from South America.

The Giant Hairgrass is a larger species than *E. acicularis* with stems some 1-2mm (0.04 — 0.08in) in diameter. Very upright in habit, up to around 8in (20cm) in height, the weight of the stems cause it to adopt a weeping habit as it approaches its maximum height of 12in (30 cm).

Growth is fast at temperatures above 70°F (21°C), but the plant will overwinter at about 55°F (12.8°C).

***Eleocharis vivipara* (Weeping Hairgrass)**

This species hails from the sub-tropics of the south-east states of North America. From a rather coarse rootstock, the plant throws up a mass of filiform stems. When submerged, masses of viviparous plantlets are formed at the apex of the stem where you would expect a fruiting body to be formed.

Well-grown specimens of this plant form an inpenetrable jungle of interwoven foliage. Success or failure with this species depends on just the right balance of light: too little, and the plant refuses to grow; too much, and it can become infested with thread algae.

PLANT NEWS

I have just received the latest journal from the newly reformed Aquatic Gardener's Association of the USA. This society, like our own plant society, disintegrated some years ago, but has recently reformed and seems to be going from strength to strength.

Vol 4, No 5 is devoted to the control of algae in all its forms in ornamental aquaria. The dreaded Hairy Red Alga (*Audouinella*) is such a pest to aquatic plant growers, that I think it is worth commenting on this article by Neil Frank.

Those interested in joining this society may do so by writing to: **Dorothy Reimer (Membership),83 Cathcart Street, London, Ontario, Canada N6C 3L9.** Subscription is $28-00 and must be sent in US currency.

Chemicals To Control Algae (The Use of Copper)

By: **Neil Frank**

Aquarists will often say that chemicals should never be used to control algae, or that they should only be used as a last resort, when all else fails. What role, if any, do chemical algicides play in the management and control of algae in the aquarium? Do chemical algicides kill plants? Can the use of these chemicals harm fish? Are the products on the shelves of aquarium stores safe, if used as directed? This article addresses all these issues.

The first and most fundemental rule when tackling an algal problem, is to try to avoid the introduction of algae in the first place. The steps to be taken initially to prevent the introduction and establishment of algae in the aquarium may be summarised as follows:

① Start with an algae-free situation.

② include, but do not initially feed, algae-eating fish.

③ Plant the tank heavily with fast-growing species to soak up the surplus nutrients.

④ Subsequently, keep the basic nutrients (nitrogen, phosphorus and potassium) down to a minimum.

⑤ Carry out regular water changes, using rainwater or deionised water if possible.

⑥ Carry out regular routine maintenance, using scrapers, magnetic cleaners and siphons, etc to remove any algal colonies which may appear.

If, in spite of all these precautions, algae in one form or another appear in an aquarium and start to flourish, then chemicals are the only option left, short of stripping down the tank once again.

One alga, in particular, is very hard to eradicate. This is the Furry or Beard Alga (*Audouinella*). It is a short, filamentous alga whose fronds vary from light to dark green, appearing almost black in some cases. There is probably more than one species currently causing the problem. It attaches itself to plants, rocks, gravel and the glass itself. Strangely enough, it is one of the few freshwater genera of the division Rhodophyta or Red Algae.

The only chemical which seems to be effective is copper sulphate. This is available commercially and is dissolved in distilled water. Chelated elements and salt are added to prevent the copper compound being split up by chemical reaction. Most preparations of this kind sold in stores are quite safe to use. Neil Frank recommends the use of 0.5 mg per litre to get rid of furry algae. Control is about 90%, but re-infestation will re-appear after 9-12 months (Probably as a result of algal spores which are quite resistant to the chemical).

Although not 100% effective, copper is the only treatment with a good possibility of success against this most irritating organism.

Note: if copper is used over a long period, it is advisable to test the concentration with a Cu test kit. This way you can ensure that the concentration does not build up to levels at which it would prove toxic to fish or higher plants.

BITTEN BY THE KOI BUG

It was just supposed to be a small fish pond! In the end, **Robert Brookes** and family even moved home to accommodate the ever-growing collection of Koi.

Photographs by Stephanie Brookes

For some time now, I have been meaning to put pen to paper with my own cautionary tale for all would-be Koi keepers. I also now firmly believe that all such fish should carry a government health warning!

About four years ago, we bought our previous house, with a small garden. As you can see from the picture, something had to be done. Not being the world's greatest gardener, I decided that I would lay most of it to lawn, with a small fish pond. Sounds harmless enough doesn't it? If only I knew then the slippery road I had taken. A lot of hard work, some turves and a pond liner later, and it didn't look like the same garden.

FIRST BITE

Then I made a fatal mistake (well, I suppose I could try blaming my wife, as she actually picked them). I bought two small Koi. That was it, I was hooked! It was too late to turn back.

We just had to learn more about these beautiful fish, so we started buying books and magazines, scoured the local library for anything remotely connected with fishkeeping or water gardening and read every word avidly. We chased round the local countryside visiting fish shops, garden centres and Koi centres.

The inevitable then happened. The decision was made to build a bigger and better pond.

It was then I remembered several years before speaking to Leo Smith of Orchard Farm, in Outwood, who had mentioned

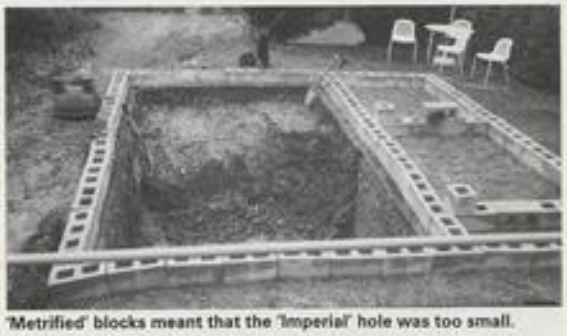
Our first garden. Clearly, something *had* to be done.

The new garden had distinct possibilities . . . plus the railway line just beyond!

First garden — Mark 2 . . . with fish pond — Mark 1.

'Birth' of Koi pool — Mark 2.

Fish pond — Mark 2 . . . Koi pool — Mark 1.



'Metrified' blocks meant that the 'Imperial' hole was too small.

Top left, the answer . . . child labour!

Centre left, the 'metrified' hole near completion. Note the Spirex settlement chamber lying on its side at the far end.

Bottom left, the pond-bottom-packing dance. The Spirex settlement chamber and filter components are all in situ along the side of the pond.

Below, a grateful (?) Koi.

Bottom right, the finished article.

The pool is also enjoyed by the younger members of the family.

breeding Koi. We decided to visit and seek advice. I came away even more hooked, but also with a wealth of sound advice and practical suggestions.

More hard work and the garden was transformed yet again. The end result was a formal pond of 10 x 13ft (c3 x 4m) with an 8 x 4ft (c2.4 x 1.2m) undergravel filter dropping to a 4ft deep section with a bottom drain. Who could ask for more? It was no good, the fish kept growing, both in size and numbers.

THE BUG BITES DEEPER!

There was only one answer. We had to move house!

We found a suitable house and the garden had potential. While the move was being negotiated, I spent many hours designing and re-designing the pond.

This time I was going to have gravity-fed filtration external to the pond, with a Spirex settlement tank. I went with a mountain of drawings to Koi Water Barn in Cherlsfield Village, Orpington, as this was the only place I knew using the Spirex at the time. Also, they were building a new show pond of similar dimensions to the one I wanted to build. Their assistance was cheerfully and willingly given and I received much help and practical support throughout the project.

The plans were eventually completed and priced up, we moved in, and work began.

I had carefully worked out the outline with string and the back-breaking digging was progressing when I decided to buy the concrete blocks I was going to use to create the raised wall around the pond. Catastrophe(!), and all because of the Common Market!

The bricks were no longer 18 x 9in (45 x 22.5cm) but had been 'metrified' and were about 17½ x 8⅞in (43.8 x 20.6cm). This meant that my nice straight clay walls would have to be re-cut. There was only one answer, send my daughter down to do the digging! However, a few minor alterations to the various dimensions and things began to look more hopeful again. Thank goodness I hadn't already ordered the box liners.

'British Rail-sponsored' Koi excursion.

Collecting the Spirex was fun(?). I'm sure passing motorists must have thought I was supplying rockets to the Middle East.

Hard work and insanity eventually pay off though, and, at last, all the major digging was completed. The plumbing went surprisingly well, and with the filter completed, I and a couple of equally insane friends danced up and down on the pond bottom to shape it and make absolutely sure there were no sharp stones, prior to laying old carpet and then the liner.

At last, the time had come to start filling. Was it going to work?

It held water! We were nearly there. But what about the mountain of earth at the bottom of the garden?

There was only one (obvious) answer, of course: re-landscape the bottom of the garden with more turf, and get another pond in, this time a natural one.

POND STATISTICS

For those who are interested in such things:

Total water volume: about 6,500 gallons (29,550 litres).

Total cost: about £2,500.

In very round figures, this breaks down as follows:

Concrete blocks	£250
Pump	£200
UV steriliser	£100
Algarid	£150
Drains and Venturis	£200
Plumbing etc	£250
Spirex	£400
Liners	£500
Chipboard and concrete	£150
Paving stones	£50
Lytag	£150
Bits and pieces	£100

The pond dimensions are 18 x 10 x 5ft — c5.5 x 3.1 x 1.5m (of water), with liner continuing above the water level. The water is gravity-fed by three bottom drains to the Spirex settlement chamber, which I am extremely impressed with as it really does take out all the solids. It then passes through an upflow Lytag filter of 5ft x 7ft x 18in (c1.5 x 2.1. x 45cm) of Lytag being pumped via a ½-horse power external pump through an Algarid and UV clarifier, through two venturis back into the pond. I have a ballcock attached to the top of the Spirex for automatic topping up.

Maintenance is simplicity itself. Apart from using a small net to skim off a few dead leaves or flowers periodically, all I have to do is drain a few gallons from the Spirex daily into the soakaway I incorporated into the design.

The bottom has stayed totally clear; circulating water from the bottom drains seems to make pond vacuuming a thing of the past.

HAPPY HOME

Most importantly, the fish are happy with their home. They are healthy and extremely tame (I think deep water helps). Not only do they 'hand-feed', but when temperatures permit, they have absolutely no objections to a little human company!

In these conditions, a disposable underwater camera can add even more fun to personal Koi keeping (I'm working on this).

THE FUTURE

A pond is fun for all the family. I thought that was meant to apply to paddling pools only — but never mind. Mind you, it comes to something when British Rail arrange fish watching excursions!

The problem is that we are now going to need more ponds for Koi at various stages of development (assuming it warms up enough this year for them to breed again). Where will this addiction ever end? Has anybody got a cure?

Herpetology matters

By Julian Sims

EDITORIAL RESPONSE

I received a very mixed postbag of letters in response to my **Guest Editorial** in the August 1991 edition of *Aquarist & Pondkeeper*. A variety of points were raised by readers and some have subsequently been expanded upon in **Your Questions Answered.**

In addition to the questions I received, **David Marshall** from Pickering, North Yorkshire sent in an article from the Ryedale edition of *The Star*, a "free" local newspaper. The way in which the article was written emphasised how the popular press can trivialise matters relating to herpetology.

The factual basis behind the article, entitled **Slippery Customer,** centred around a gecko which had been accidentally transported in a consignment of ceramic ornaments from China. Three months after departure from the Orient, the reptile had been discovered alive and well when the ornaments were unpacked in a Ryedale shop — halfway around the world.

The November 1990 edition of **Herpetology Matters** discussed the fact that such accidental transportation of 'stowaways' does occur and results in the distribution of species of animals and plants from one part of the world to another.

The article in the Ryedale newspaper graphically described how the reluctant gecko had to be flushed out of the trunk of the ceramic elephant before the ornament could be sold. The reptile was safely collected by staff from the Flamingo Land Zoo (Kirkby Misperton) before the photographer from the paper arrived — hence improvisation and more journalistic licence. The owner of the shop was photographed with a *rubber lizard* "similar in appearance to the one found in the ceramic elephant".

Andrew Simeon from Staines, Middlesex, also wrote in support of herpetology. However, Andrew disagreed with my suggestion that there should be legislation to prevent further importation of the North American Bullfrog *(Rana catesbeiana)*.

Andrew's concern is that such restrictive legislation would set a precedent leading to restrictions on the importation and availability of other species of amphibian and reptile. In fact, just such restrictive legislation is being contemplated to stop the importation of Red-eared Sliders *(Trachemys scripta elegans)* into Britain.

Now, there is a very good case for a total restriction on American Bullfrog importation, since these amphibians are capable of establishing breeding colonies in Britain to the detriment of our native species with which they would compete.

However, the Red-eared Slider is a completely different matter. Due to our comparatively poor climate, embryonic Sliders are unlikely to complete their development in eggs laid out of doors. Low temperatures are also likely to prove fatal to the very young reptiles, even if they did hatch. Therefore, it would be difficult to justify a complete ban on the importation of Red-eared Sliders on 'environmental grounds'.

There is a much better case for carefully constructed legislation to restrict the importation of **hatchling** Red-ears and **juvenile** Sliders below a minimum carapace length. The importation of larger freshwater turtles would have many advantages including:

(i) Larger Sliders do well in captivity, which is not always the case with hatchlings.

(ii) Larger Sliders give a better indication of the size to which these reptiles can grow. Their greater size dictates the space which must be provided in an aquatic vivarium.

(iii) Larger Sliders would be more expensive to buy, owing to the increased rearing costs incurred in the USA. The extra expense would reduce the number of 'impulse purchases' of these delightful little green hatchlings which later become unwanted pets.

I hope that this matter of a proposed ban on the importation of *all* Red-eared Sliders will be given very careful consideration and that false arguments are not given credibility.

I must express a big thank you to all readers who took the trouble to write in response to my guest editorial.

PRODUCT UP-DATE

The Vivarium Temperature Controller (VTC) referred to in the December 1991 edition of **Herpetology Matters** can now be obtained from:

The Vivarium Technology Centre,
1st Floor,
12 Hill Street,
Saffron Walden,
Essex, CB10 1JD.
Tel: 0799 513375.

As the name suggests, the Vivarium Technology Centre also provides a range of heating equipment for vivaria, as well as a variety of live and frozen foods for reptiles and amphibians.

CHINESE DISCOVERY

A new species of freshwater turtle has recently been discovered in two geographically distinct regions of southern China — Fujian Province and Guizhou Province. From these rather disjointed records, it is reasonable to assume that the turtle will also be found in the two intervening provinces of Hunan and Jiangsi.

Spanish Terrapin *(Mauremys leprosa)* — perhaps the best-known relative of the new 'Chinese Discovery', *Mauremys iversoni*.

However, some Chinese turtles, especially the Reeves' Turtle *(Chinemys reevesi)* have been caught and later released out of their natural range as part of Buddhist religious rituals. It is therefore possible that this might have occurred with the new discovery, hence its apparent widespread distribution in isolated colonies.

The newly discovered freshwater turtle belongs to the genus *Mauremys* and has been called *M. iversoni*. Other members of this genus, some of which are very well known and are frequently maintained in captivity, include the Spanish Terrapin, *M. leprosa* (from Spain and North Africa), *M. caspica* (from the eastern Mediterranean countries to Iran), *M. japonica* (from Japan) and *M. mutica* (from China and Taiwan south to Vietnam).

The new species of *Mauremys* most closely resembles *M. mutica* — perhaps not surprisingly, as both are found on the continental mainland of south-east Asia. However, *M. iversoni* has some very distinct characteristics, including an orange tinge to the skin of the limbs and a uniform olive coloration to the top of the head. The unmarked chin and throat are a light lemon-yellow in colour and the jaws are smooth-edged, lacking any serrations.

The colour of the carapace (the top of the shell) is a rich brown. Some individuals have dark speckling or radiating markings on this background.

The basic colour of the plastron (the lower half of the shell) is yellow with varying amounts of black pigmentation in the scutes. In some individuals, this black coloration can form a broad, dark band around the plastron.

There is no marked difference in the shape or coloration of the shell between males and females. For example, males reach a maximum length of about 19cm (7.5in) and females grow a little larger to 19.3cm (7.75in).

M. iversoni lives in slow-moving sections and backwaters of fast-flowing mountain streams. It is found at an altitude of about 500 metres (1,640ft) above sea level.

This newly discovered species of the genus *Mauremys* has been named in honour of the enthusiastic cheloniologist, Dr John B. Iverson. John Iversons' publications include *Herpetological Circular* (number 14) of the Society for the Study of Amphibians and Reptiles (SSAR) entitled *Checklist of the Turtles of the World with English Common Names*. One year later, in 1986, he published *A Checklist with Distribution Maps of the Turtles of the World*. This ring-bound book has already become a standard reference.

OUT AND ABOUT

WAY OUT WEST

By Robert Kirkup

JOHN DAVIES

Peter Penfold of Hambridge Fisheries receiving his richly deserved Furnished Aquarium award from David Sanders, Pontin's (Sand Bay) General Manager.

The Supreme Festival of Fishkeeping made its second appearance at Pontin's Holiday Centre, Sand Bay, Weston-super-Mare, near Bristol, on 8-10 November 1991. The idea for this type of event first took shape about ten years ago with the original concept being to spend a full week at various holiday resorts around the country, rounding off with a three-day tableaux show.

However, it was felt that the exhibitors would be putting too much strain on their fish, not to mention fish left behind at home, so the idea was improved upon by having a long weekend of fishkeeping fun and relaxation while leaving the fish and equipment at home.

STEPHEN SMITH

Jessica Smith (daughter of our 'Coldwater Jotter' Stephen) and friend photographed on the Environ Fish Labelling System stand at Weston.

The resort at Sand Bay had all the usual holiday camp catering and entertainment and sport facilities available to the fishkeepers who stayed there. Around 300 people stayed for the two nights, about 50% of these having already been there last year.

On entering the reception of the Avon Ballroom, you encountered two attractive, tall hexagonal column aquaria from **Aqua Design** which led you into the show proper. As last time, there were a large number of traders present this year, the difference this time round being that they could sell to the public.

An added bonus for the hobbyist was a furnished aquarium competition between the traders. This resulted in 'no-expense-spared set-ups', which caught the imagination of the visitors. The winner was **Hambridge Fisheries** with a fabulous marine cube aquarium. Aquatic magazines were present, as well as fish food manufacturers, plus the **Aquarian Advisory Service** stand manned by **Dr David Ford** and **David Sands** who were kept busy assisting hobbyists, as well as having an Aquarian-produced video continuously playing.

A free draw was also held for a cabinet aquarium set-up donated by **Airport Aquaria Ltd,** the lucky winner being **A. M. Clayton** from Moreton-in-Marsh, in Gloucestershire.

A number of lectures took place on the Saturday and Sunday. **Brent McDonald** gave two talks on Discus and his breeding establishment in Canada. I thought he had a lot of charisma and it was nice to see him spend the full weekend walking round chatting with aquarists. Other lectures included some on Marines presented by **Peter Burgess, Dave Garratt** and **Gordon Kay** (all *A&P* contributors). Fish nutrition and international aquaria were tackled by **Dr David Ford,** while Characins were covered by **Brian Walsh,** Koi by **Tony West** and collecting South American Cichlids and their care in captivity by **W. Heyns from** Holland.

ROBERT KIRKUP

ROBERT KIRKUP

Above, "Here's looking at you, Sid!" Andy Feast's winning *Botia sidthimunki*.

Left, one of the many full-size cichlids offered for sale at the Supreme Weekend of Fishkeeping.

Among the many awards handed out, two were for outstanding contributions to the hobby and were awarded to **Dr David Ford** and **Joe Nethersell,** chairman of the F.B.A.S. (see **News** in the January issue of *A&P*).

David later took the chair for the Aqua-Champ final. He asked 60 questions to the six highest pointed qualifiers in the country. The overall highest pointed qualifier came out on top with a 100% clean sheet. **David Wood** from Northampton A.S. is one of those lucky aquarists not only having an understanding wife (Margaret), but one who also participates fully in the hobby.

Numerous show fish were on display at Weston, consisting of a percentage of 1st, 2nd, 3rd placed fish, plus winners of Best in Show awards at F.B.A.S. open shows. The 47 entries offered a varied selection of quality fish.

The winner for an unbelievable fourth year running, was the 'Brian Adams' of the fish world, a *Botia sidthimunki* (Chain Loach) owned by **Andy Feast** of Mid-Sussex A.S. He has had the fish for 15 years and hopes it is still going in 15 years time!

As well as having the 'onsite' aquarists, the numbers at Weston show were swelled on the Saturday and Sunday as visitors from the south of England called in for a few hours. It was great to see a contingent from the Isle of Wight and Ireland making the ferry crossings and having an enjoyable weekend.

I would, personally, hope that the venue for this Fishkeeping Festival will be moved, maybe to the north-west or east of England, to enable aquarists from the north and east of Britain to sample an informative and relaxing weekend.

JOHN DAVIES

A 'columnar' welcome to the show from Aqua Design.

OUT AND ABOUT

DORKING AQUATIC NURSERIES

By John Dawes

Photographs by the author

Visitors who came to see us at our stand at last year's Hampton Court International Flower Show invariably commented on the attractive pond that we had installed for the occasion.

I say "we", but, in reality, the credit went to **Mike Adams** who designed the pond, and to **Dorking Aquatic Nurseries,** who supplied all the equipment, rocks, fish and, of course, the magnificent plants that gave our display its considerable charm and interest.

Shortly after the Hampton Show, I visited the person 'behind the plants', **Kate Harman,** and spent a delightful day with her, indulging our passion for plants in the extensive grounds of Dorking Aquatic Nurseries. The photographs that accompany this feature were taken on that day. However, since the pond plant season was already well past its peak, I thought it best to delay publication of my write-up to tie in with the resurgence of interest (and growth) as the new season approaches.

In Kate Harman, we are extremely fortunate in having a person who is, quite simply, deeply in love with plants. It was, in fact, this rather than any underlying commercial streak, that led her to establish Dorking Aquatic Nurseries in the late 1980s.

Iris seedlings awaiting the 1992 pond season.

Marsh Marigolds in the making.

Nowhere are her undoubted dedication and enthusiasm more evident than when you accompany her on a stroll around her estate. Again and again you find yourself stopping to peer at isolated individual specimens that have sprung upon here or there as nature has done her bit to create new varieties from the incredible wealth of pollen and ovules that have been placed at her disposal.

Young *Gunnera* plants during their first year.

Some of these one-offs will, no doubt, be available to us in commercial quantities one day. Others will remain, equally undoubtedly, as interesting 'sports' which will never hit the big time but will nevertheless hold a special place in Kate's heart. For me, my visit to this plant haven in Surrey was also very special because I, too, am fascinated by one-off little bits of magic.

Russian Princess — an exciting new *Lobelia* for the coming season.

Having said that, though, you don't build a successful business merely by standing in awe of nature's random lucky breaks. You also need the determination and 'sense' to convert your pet likes into a viable commercial undertaking. And this is precisely what Kate Harman has done.

Dorking Aquatic Nurseries is now one of the leading suppliers of pond plants to aquatic centres, particularly in the south of England. So, while pondkeepers may not be able to buy their plants direct from the nurseries, those in Dorking's catchment area will almost certainly have some of Kate's lovingly cultivated marginals, bog plants, oxygenators, lilies and other pond plants in their collections.

If you get the chance, visit the Hampton Court International Flower Show this coming July (watch out for further announcements in *A & P* over the coming months). Dorking Aquatic Nurseries are bound to be there. So will Kate Harman, of course, bringing with her a wealth of knowledge and her down-to-earth, commonsense approach to pond plant cultivation ... along with (I've no doubt) some rather special 'new' plants as well.

For further details (and trade enquiries), contact **Kate Harman, Dorking Aquatic Nurseries, Tarn Hows, Broad Lane, Newdigate, Surrey, RH5 5AT. Tel: 0306 77223; Fax: 0306 77693.**

***Nymphoides peltata* — the delightful Water Fringe.**

News

Interpet's Weston Water Quality Clinic

Over 100 people visited Interpet's water quality clinic during the recent Supreme Weekend of Fishkeeping, held at Sand Bay, near Weston-super-Mare (8-10 November). The clinic formed part of a promotion by Interpet to raise awareness of the company's recently-launched Easy Test kits.

Around 60 tests were conducted during the two-day event, and the results of some of the samples caused some consternation to Interpet's product development manager **Adrian Exell.**

"The vast majority of visitors were people who were fairly keen and knowledgeable fishkeepers, but we were surprised to find that only very few of the water samples tested were of acceptable quality," Adrian remarked.

He continued: "Happily, few people had nitrite problems, but there were some real horror stories, which highlight the need for constant vigilance in water testing.

"For example, one fishkeeper had ammonia levels in the aquarium so high that his Goldfish were becoming stressed, leading to dropsy, while another hobbyist apparently had no filtration and his aquarium water was almost pure poison!"

In addition to the practical assistance to fishkeepers during the show, the water quality clinic provided the perfect opportunity to demonstrate the ease with which a wide variety of water conditions can be tested.

"Water testing should be considered an essential part of keeping an aquarium or pond, explained Adrian Exell. "The use of tablets provides a quick and extremely accurate means of ensuring that water — and thus, fish — remain healthy."

Seven Interpet Easy Test kits are available individually, as well as a complete kit containing five tests and refill packs. The tests check levels of nitrate, nitrite, ammonia, copper and pH, and incorporate tablets to provide a highly accurate, stable and simple means of monitoring water quality.

Richard Burton, production development scientist for Interpet, checks a sample of aquarium water during Interpet's 'water clinic' at the Supreme Festival of Fishkeeping.

Speedy Success for Tetra's Fishkeeping Club

Only three weeks after its launch, 1,000 members had already joined the **Tetra Club.** Since then, the company have been receiving around 150 applications for membership a day.

"Reaching our one thousandth Tetra Club member in such a short space of time was tremendous news," commented Cliff Nash, Head of Tetra in the UK. "If this interest keeps up, we should easily exceed our target of 10,000 members for the first year."

The Tetra Club was launched after research showed that a much greater number of people would keep fish — both in aquaria and garden ponds — if expert advice was readily available. A large number of people that Tetra talked to were very keen to keep fish but were apprehensive because they didn't know where to go for expert advice. The company also came across many others who had tried to keep fish which subsequently died. This, of course, put them off, but in the majority of cases there was a very simple solution to the problem.

A fishkeeping club that could cater for both novices and experts alike seemed the ideal way to meet this demand, hence the Tetra Club. As well as receiving a regular newsletter, all Tetra Club members have access to a special 'emergency' hotline telephone number that they can ring should they have urgent queries about water quality, stocking a tank, preventing disease or any such matter.

24 year-old **Tracie Beardsley** of Christchurch, Dorset, was the one thousandth person to join the club and enrolled as a 'Tropical' member. "I haven't been keeping fish for very long, so the club seemed an ideal way for me to get useful advice and help me get the most out of my hobby," she said.

As well as Tropical membership, Pond and Children's membership are also available, and, on joining, all members receive a welcome pack. This contains sample products, £20 worth of discount vouchers to attractions and events throughout the country, and an information book covering all aspects of fishkeeping.

The first year's subscription to the Tetra Club is £10 for adults and £6 for children. If you would like to join, send your cheque stating which membership you require to: **Tetra Club, Tetra, Lambert Court, Chestnut Way, Eastleigh, Hants, SO5 3ZQ;** or phone Tetra's **Leaflet Line** on **0703 643339** for further details.

Frost Guarantee

Frosts Waterlife, opened in April 1991 at Frosts Garden Centre, Woburn Sands, near Milton Keynes, are pretty confident about the quality of their stock and their methods of fishkeeping. In fact, their confidence is so high that they are introducing a fish guarantee, or quality assurance scheme.

Manager **Richard Inchley** and his staff, two of whom are Sparsholt College 'graduates', look after a large collection of tropical, marine and ornamental coldwater fish, as well as a large selection of dry goods at 550-square-metre Frosts Water life.

They also welcome leading figures from the aquatic world to lecture to customers. The most recent of these was Tetra's **Dr David Pool** who paid them a visit on 7 November and gave a one-hour talk entitled *The Pleasures of Keeping Tropical and Marine Fish* to a large audience, followed by a further 45 minutes of questions and answers.

For further information contact: **Mrs Rosemary Towers, Marketing Manager, Frosts Garden Centre Ltd, Newport Road, Woburn Sands, Milton Keynes, MK17 8UE. Tel: 0908 583511. Fax: 0908 585238.**

Ideal Home Aquatic Update

'Aquarian' and **Underworld Products** have lined up an impressive list of visiting pet fish 'experts' to guest their joint stand in association with **Kingfisheries** Ltd of Beckenham, at the 1992 Ideal Home Exhibition at Earl's Court. Each weekend will feature at least one guest as follows:

March 14-15, **David Sands,** renowned catfish authority;
March 21-22, **Dave Keeley,** specialist in Marine Fish;
March 22, **John Dawes,** *A & P* editor, consultant and author;
March 28, **Dick Mills,** prolific author;
March 29, **Adrian Dempsey,** FBAS speaker;
April 4-5, **Dr David Ford,** world-known 'Aquarian' authority;
April 5, **John Dawes,** *A & P* editor, consultant and author.

Stan Kemp of Kingfisheries Ltd will be on hand every day of the show to answer questions on any aspect of fishkeeping.

Please look out for Stand No 1004 in the new No 2 Hall at Earl's Court. The show is open from 10 am until 8 pm, with late night opening till 10 pm on Thursdays.

The joint fishkeeping stand will feature five fully stocked and decorated display aquariums, illustrating differing aspects of fishkeeping — further details next month.

Euro Open Show For 1992 Festival

A fully European open fish show will form the centrepiece of the 1992 Interpet Supreme Festival of Fishkeeping, to be held at Pontin's Chalet Hotel, Sand Bay, near Weston-super-Mare (**7-8 November 1992**).

Any individual from anywhere in Europe, whether or not a member of a fishkeeping club, will be eligible to enter the show, which will be judged to F.B.A.S. (Federation of British Aquatic Societies) Standards.

The European Open show will be run alongside the F.B.A.S. Supreme Championship, in which the F.B.A.S. Best in Show and championship class winners throughout Britain compete for one of the top fishkeeping accolades.

Mike Clarke, special projects manager for Interpet, who are sponsoring the show in conjunction with the F.B.A.S., comments: "The 1992 show will be the fourth in a series of highly successful annual fishkeeping events with which Interpet has been involved. The venue, Pontin's Chalet Hotel at Sand Bay, has proven to be ideal for exhibitors and visitors alike, who have supported the event beyond expectations. The introduction of a European element will provide a further enhancement of the event's ever-growing reputation."

Interpet will revert to the show's previously successful formula of allowing only books and educational publications for sale, while additional attractions are planned. Already, a number of major exhibitors have pledged their support, while initial bookings are already being received from visitors.

Further exhibitor and visitor information is available by contacting **Mike Clarke** at **Interpet, Tel: 0306 881033.**

'Aquarian' in Spain

Aquarists will, no doubt, have noticed that the latest 'Aquarian' range has been developed to meet the new opportunities in Europe, with most packs now featuring three languages.

In the most recent in a series of European-directed moves, the new hardware products and remedies were launched in Spain at the end of October through Flumen Products of Seville, who have successfully sold the 'Aquarian' Fish Foods for a number of years.

The display of the Spanish range of 'Aquarian' products.

Three presentation evenings took place during the launch aimed at the Flumen salesforce itself and at key retailers in Barcelona and Madrid.

'Aquarian' consultant and regular *A&P* contributor **Dr David Ford** attended the launch with **Nick Pearson,** Thomas's General Export Sales Manager. The programme featured a video presentation of the new range, a slide lecture by David and a question and answer forum (both Nick and David can speak Spanish).

UK Aquarium Builders Land Lucrative Swedish Contract

One of Britain's leading aquarium specialists has landed the design contract for a £2 million aquarium to be built in Sweden.

Dorset-based Sea Life Centre Technical Ltd is to design marine life displays (worth a total of £330,000) and specify life-support and filtration services for an aquarium at Lysekils on the edge of the 18-mile-long Gullmare Fjord.

The new Aquarium will include a variety of specialist displays, including an underwater acrylic tunnel, and Sea Life Technical is the only company this side of the Atlantic which builds such tunnels.

The Swedish aquarium, which is expected to attract 200,000 visitors annually, will provide an educational facility and visitor centre which will focus on marine life in Gullmare Fjord. The Centre will also include a hostel for visiting school parties and is being funded by the local authority in Lysekils, who invited Sea Life Technical to produce the design after delegates visited the Sea Life Centres in Scarborough and Blackpool.

SLC Technical, of Granby Industrial Estate, Weymouth, developed specialist skills and techniques in acrylic moulding and glazing through its work on Sea Life Centres over the past 11 years. The company won a number of major contracts last year, including the construction of 'heavy-duty' display tanks for a marine observatory in Yemen (which we reported on in *A & P*), and an underwater window for the new penguin pool at Edinburgh Zoo.

A second major design contract is expected shortly for another major new aquarium development on the Continent.

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

Pet Show Update

The Pet Show, which will take place from 2-4 May, 1992 at Earls Court in London, and is sponsored by Pedigree Pet Foods, has reportedly already received an enthusiastic response from all areas of the industry. Just six weeks after the initial announcement of the Show, over 30% of the available space had been taken. Leading names such as Petcetra, BP Nutrition, C-Vet and Leander; consumer magazines; charities such as Guide Dogs for the Blind, P.D.S.A. and the Animal Welfare Trust, are all participating.

One of the major features of the exhibition will be the seminar Studio, where a broad range of pet issues, from health and nutrition to grooming and choosing a pet, will take place daily. There will also be a fully equipped Veterinary Clinic which will serve as a visitor information point.

June Barker, Marketing Director of the show organisers Barker Brown, commented "I am delighted with the positive response we have received from the industry. Just about everyone we have spoken to supports the aims of the exhibition and can see the long-term benefit of a London-based show for the public."

For further information contact **Lisa Nelson** or **Arabella Stein, PR Unlimited, 78 Ebury Street, London SW1W 9QD. Tel: 071-730 7174; Fax: 071-730 8426.**

Pennies into Pounds for Interpet Dealers

Over 80 people attended a presentation held in November by pet products manufacturer Interpet to provide ideas on how to increase sales.

"This was the first of a series of seminars to support retailers and has proven hugely successful," remarked Interpet's special projects manager **Mike Clarke.**

During the seminar, entitled *Turn Pennies into Pounds* and held at the Holiday Inn, West Drayton, Middlesex, the benefits of add-on sales were explained, while a video presentation and a talk on turning ideas into profit were also featured.

The next seminar in the series will be held on **20 February** at the Hilton National Hotel at Lockington, East Midlands (adjacent to East Midlands International Airport and junction 24 of the M1). Further information on the seminars is available from **Mike Clarke** at **Interpet, Tel: 0306 881033.**

THE AQUARIUM MARINES REVIEW

Part 5

Cnidaria: Corals and Anemones

Andy Horton continues his discussion of this phylum (large group) with an investigation into the biology of some species suitable for aquaria.

It is the cnida or stinging cells (pronounced 'nida') that distinguish members of the phylum of animals that include the jellyfish and sea anemones from all others. These cnida act as methods of offence, defence and territorial aggression; the armed tentacles containing the cells that sting the unsuspecting items of prey. These prey organisms vary from fish captured in the trailing tentacles of large jelly fish and colonial drifting hydroids, to microscopic plankton captured by relatively innocuous nematocysts in the smaller hydroids and sea fans.

Many of the large jellyfish are capable of raising painful weals and, possibly, even causing fatal wounds to some unfortunate swimmers. All jellyfish should be regarded as potentially dangerous unless positively known to be harmless. The common Moon Jellyfish, *Aurelia aurita*, of cosmopolitan distribution including British shores, lacks a painful sting. Similarly, British sea anemones will feel only slightly tacky to touch, the largest Dahlia Anemones, *Urticina*, more so than the common Beadlets, *Actinia*. A few anemones can harm humans, though; the most dangerous is reported to be the west Australian *Dofleina armata*.

NEMATOCYST TRIGGER MECHANISM

The cnida are microscopic hollow capsules, some called *nematocysts* and others called *spirocysts*. The proteinous toxin (where present) is contained in a spirally-coiled tube. When activated by chemical or tactile stimuli, the tube is everted and an armament of spines penetrates (stings) the organism that has come into contact with the organ. Some nematocysts are adherent.

Spirocysts are located only in the tentacles of some Hexacorallia and, under the microscope, can be seen to lack spines and are not penetrative. Nematocysts can be found in all tissues, especially the tentacles, *aconia*, and *acrorhagi* (beads).

Knowledge of the function of the nematocysts is of importance to the aquarist because success in keeping some of the difficult anemones and corals is often dependent on providing conditions whereby the nematocysts are activated.

MORPHOLOGY

The body plan of all the Cnidaria can be seen most clearly in the sea anemones. There are two primary layers, the *ectoderm* (or ectodermis) on the exterior, and the internal *endoderm* (or gastrodermis), separated by a connecting layer of tissue called the *mesoglea*. There is one large opening, the mouth, that functions both to absorb and expel food. A central nervous system is absent, the sense cells being isolated from each other.

In the jellyfish, the mouth is on the underside of the umbrella-like bell. In anemones, it can be seen clearly at the top, surrounded by the disc and tentacles. The upright part is called the column. On some species, notably the common Beadlet, *Actinia equina*, acrorhagi (blue wart-like pro-

TAXA (GROUPS) OF ANTHOZOA

The most important Anthozoa can be classified as follows:

CLASS	ORDER
Ceriantipatharia	**Ceriantharia** — Anemone-like forms that live in mucus tubers in soft sediments
Octocorallia	**Alcyonacea** — Soft corals, colonial polyps fastened on a fleshy mass. Calcareous spicules
	Gorgonacea — Sea Fans and Sea Whips with a superficially plant-like appearance. Stems of horny gorgonin
	Pennatulacea — Sea Pens, polyps branch from the side of a long slender column, with calcareous skeleton
Hexacorallia (= Zoantharia)	**Actinaria** — Sea Anemones without skeleton
	Corallimorpharia — False coral polyps without skeleton
	Zoanthiniaria — Colonial anemone-type-like corals, but without skeletons
	Scleractinia (= Madreporaria) — True corals with calcareous skeleton.

ANDY NORTON

The Strawberry Beadlet Anemone *(Actinia equina fragacea)* from Southern England can rival the colours of most tropical species.

jections) contain stinging cells which are used in territorial battles. The base is called the pedal disc and is used to adhere to fixed surfaces and to creep slowly over rocks. A few species use the pedal disc for true burrowing, notably *Peachia cylindrica* found in the seas surrounding the British Isles.

The Ceriantharia secrete a 'submerged' mucus tube. In the feeding mode, the tentacles are expanded above the surface of the silt in which these cnidaria are to be found (in all the oceans, and at great depths). New British species, including *Arachnanthus sarsi*, are continually being discovered.

ANDY NORTON

Gem Anemone *(Bunodactis verrucosa)* showing mouth, disc and tentacles. This warm-water west Atlantic species feeds mainly on whole muscles broken off by fierce wave action. The nematocysts have adhesive power, rather than a powerful sting.

In the true, or stony, corals (Scleractinia) the calcium carbonate skeleton that protects the internal anemone-like polyp is secreted by the epidermis. The living coral retracts into the calcium crystal cup, and it is only specialised predators like some species of Butterflyfish that can extract the animal (see **Notes** ⓘ).

FEEDING IN HEXACORALLIA

Prey is captured by stinging tentacles that show a variety of different shapes. The nematocyst capsules also demonstrate variations, even in the same anemone, and spines and strength of toxins vary between species. Combined with adaptations to habitats favoured by the varied species of corals and sea anemones, it is clear that there is no single prey that predominates, although many species prey on just a few items.

The common factor in all species is the sedentary method of capture, the anthozoan moving to, or being only able to live in, locations where food is brought by the tides, currents, or waves.

Sea Anemones can be found in various shapes that give some indication of the method of feeding. Common aquarium species from the family Stoichactidae, like the *Heteractis* (=*Radianthus*) species and those of the genus *Stoichactis* commonly associated with Clownfish, have average type tentacles, and tend to feed on suspended organic matter, with the occasional large piece of dead food. The same is true of the north-east Atlantic Beadlet Anemone, *Actinia equina*, where feeding in aquaria is easy. Of the same family, the Actiidae, the large Dahlia Anemone, *Urticina felina*, an arctic species, has short stubbly tentacles and is known to feed on crabs.

The anemone family Sargartiidae is nearest in feeding habits to most of the true corals, opening readily at night to feed on the zooplankton which swarms in the water during the hours of darkness. Organic material may also be taken, but the trick must be to activate the feeding mechanism.

JACK JACKSON

Cup Coral *(Balanophyllia gemmifera)* with extended polyps feeding at night in the Sudan Red Sea.

The widespread coldwater anemone, the Plumose, *Metridium senile*, is worth mentioning because of its fine filaments of tentacles arranged in concentric circles. In order to feed successfully, the nematocysts that these tentacles possess need to be activated, something that is usually achieved by the presence of live plankton, or larger zooplankton, or newly-hatched brine shrimp. The tentacles have a powerful sting, but in the smaller specimens they are not long enough to wrap themselves around the prey and draw the victim into the mouth. Therefore, in normal circumstances, prey tends to be small. However, the tentacles are also empowered to enlarge themselves into catch-tentacles that are both longer and thicker. In practical aquarist terms, feeding the Plumose Anemone is achieved by activating the feeding inclination, and tricking the animal into taking large pieces of mussel.

Other species of sea anemone have long entangling tentacles like the Snakelocks, *Anemonia viridis* (=*A. sulcata*) of the Mediterranean and south-west Britain, but the sting is not that powerful, and their ability to capture live prey is supplemented by an intake of organic material.

Zooxanthellae

Although usually referred to as an alga, the symbiotic *zooxanthellae* are actually single-celled dinoflagellates, *Gymnodinium microadriaticum*, that spend their life in association with most true corals on the reef, and with numerous species of sea anemone. Some zooxanthellae inhabit the tissues, while

ANDY NORTON

Mixed selection of five species of British sea anemones, in six different colours. Stinging nematocysts in the *acrorhagi* and tentacles ensure even spacing in aquaria, where sufficient attachment rocks should be provided.
Species illustrated:
Sagartiogetoo undatus
***Actinia equina prasina* (Beadlet — green)**
***Sagartia troglodytes* (X 2)**
Anthopleura ballii
***Urticina felina* (Dahlia)**
All these species, plus at least another five, could be found together on a Sussex beach.
These other five are:
***Actinia equina fragacea* (Beadlet — strawberry)**
***Actinia equina mesembryanthemum* (Beadlet — red)**
***Metridium senile* (Plumose)**
***Cereus pedunctulatus* (Daisy)**
***Anemonia viridis* (Snakelocks)**
(I do not accept *Diadumene luciae* as a separate species, accorded recognition from Sussex, and believe that the presence of *Sagartia elegans* on the shore is mistaken identification. I also believe all the *Actinia equina* to be actually the same species).

others inhabit the calcerous skeleton.

There is a temptation to refer to them as parasites making use of the waste products exuded by the corals. However, the corals do not consume their hosts and benefit because they obtain food in the form of glycerol from the 'algae'. In practical terms, it is difficult to keep the zooxanthellae alive on their own, and tropical corals and anemones will often lose their greenish colouring in captivity. Experienced aquarists can, however, keep zooxanthellae alive using metal halide lights and added trace elements.

Failure to keep corals in home aquaria is more likely to be because of insufficient nourishment in the form of zooplankton, or newly-hatched brine shrimp, or a deficiency of calcium in the water to enable the corals to construct their reef-building skeletons. This ability to secrete limestone is greater in warm water; therefore, the few species of temperate water corals do not construct extensive reefs.

The British sea anemone *Anthopleura ballii*, is brown with distinct green lines on the disc, caused by the presence of zooxanthellae. This green disappears quickly in captivity, but three years on, the anemone still thrives.

Acontia and Acrorhagi

Some species of sea anemone, notably the principal species that is commensal with Hermit Crabs, *Calliactis parasitica*, contain filaments of 'acontia' which are emitted through the column wall when disturbed or attacked. These threads contain stinging nematocysts which act as an effective deterrent.

Beadlet Anemones and other species also house nematocysts in 'acrohagi' or beads, which are wart-like projections contained in a ring around the top of the column, and are used in territorial fights with other anemones, including other Beadlets.

REPRODUCTION IN HEXACORALLIA

Anthozoa reproduce in many different ways, with more than one method employed on the coral reef. Every year, over a period of a few nights, the sperm and coloured eggs from innumerable hard and soft corals are simultaneously released in a glorious cloud. Fertilisation occurs in the sea, and the reef waters turn milky with the sexual products of millions of animals. The planulae larvae that result exhibit the obvious radial symmetry of the parents, and spend variable amounts of time in the plankton before settling down to form new colonies (see *The Secret Life of Corals: Part 1* by **Jack Jackson** in the December 1991 issue of *A & P*).

In other species, the eggs are released in bundles, or fertilised when still in the safety of the limestone polyp, with the larvae being released later.

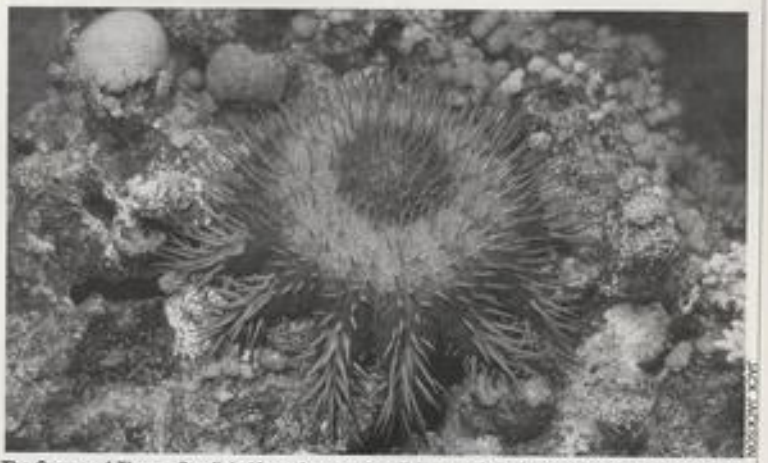
Asexual reproduction also occurs by various means, including colonies breaking into pieces, with each piece subsequently forming a new colony.

In sea anemones, the same variation occurs and this can be observed in aquaria. In British species, sperm and eggs are released by *Anthopleura ballii* and other species, while Plumose Anemones can be observed creeping over a rock, leaving behind small fragments detached from their base. These fragments will later develop into miniature new anemones; the whole process is called basal laceration.

The Snakelocks Anemone reproduces by longitudinal fission, the whole anemone splitting into two equal parts. Other species, like the Daisy Anemone, *Cereus pedunculatus*, are reported to be viviparous (ie) they produce 'live' young, that may have been generated sexually, or by parthenogenesis, and brooded within the parent (see **Notes** (2)). There is a certain amount of controversy about this method of breeding by the Beadlet Anemone, as it is possible that the young anemones (with 12 tentacles) bud off from the adult internally.

Lifespans in Cnidaria are open to debate. The best records are for anemones, some of which have been kept in captivity for over fifty years! Predation occurs by relatively few animals, but the Crown-of-Thorns Starfish, *Acanthaster planci*, is capable of killing large colonies of coral. Many fish also feed exclusively on coral polyps.

Soft Coral *(Xenia* sp) showing retracted and extended (pinnate) eight-armed feeding polyps photographed in the Sudan Red Sea.



The Crown-of-Thorns Starfish *(Acanthaster planci)* is one of the few invertebrates to feed on living corals.

In temperate British waters, sea anemones are preyed upon by the Grey Sea Slug, *Aeolidia papillosa*, which attacks the column, while the Painted Topshell, *Calliostoma zizyphinum*, has been known to kill cup corals and small anemones.

CONCLUSION

Anemones are the easiest Anthozoa to keep in aquaria, and I have explored these animals in more detail than the Jellyfish, which are unsuitable. Some animals superficially resembling jellyfishes, like the Comb-Jellies, belong to a different phylum known as the Ctenophores, and Salps, which are included in the Chordates.

Further Reading

Manual of Marine Invertebrates by Martyn Haywood and Sue Wells (**Salamander**).

For more information and references, please write to **Andy Horton**, specifying interest, c/o *Aquarist and Pondkeeper*.

1 List in seascope, Vol 6 (Fall '89).
2 Reproduction without eggs being fertilised.

Letters

Where have all the Clean Coasts Gone?

My profession as an aquatic consultant (I am a Chartered Biologist and Member of the Institute of Fisheries Management), keeps my attention focused on environmental issues where water is concerned — from chemical waste finding its way into our waterways, to fish-farm effluent pollution of lakes and rivers, raw sewage dumping into the sea, and the general level of filth and rubbish around the British Coast.

The issue of sewage dumping into coastal water, and rubbish levels on the beaches, I find personally very disheartening. Together with my wife and three children, I enjoy visiting our favourite beaches along the Kent and Sussex coastline in all weathers. Summertime, when the sun is out, the children love to play in the sand and sea, while, during the winter months, a walk along the beach at low tide sifting the sand for the odd shell or fossil with the wind and salt spray whistling around your head makes you feel wonderfully alive.

Over recent years, however, our enjoyment of a particular beach in Kent, of which I have fond memories from my own childhood, has been marred by a steady increase in the amount of raw sewage/effluent, of which there is abundant evidence across the entire beach and around the rockpools at low tide. Sadly, last summer (1991) I even felt compelled to prevent my children entering the water, as I felt that they would be paddling in nothing less than toilet flushings! The rockpools, once abundant with the myriad colours of marine life, are now uniformly covered with a layer of brown sludge. There is little evidence of 'abundant life' anymore.

This state of affairs is shameful and, what is worse, is the fact that this situation is to be found repeated up and down the British coastline.

Apart from the damage to the wildlife, there is mounting scientific evidence that human disease-causing organisms thrive in this sort of 'coastal-soup'. Why is so little, if anything, being done on an official level to improve conditions? The official line seems to be that if you can drink a glassful of Southend's seawater and smile for the cameras, then there can't possibly be any risk of disease!

Such was not the case for the 18-year-old son of a friend of ours who developed a degenerative nervous/muscular disease after swimming off the beach in this famous Essex seaside resort about four years ago. I believe his is not the only case, although the authorities would argue until blue in the face that the 'beach and water' were not to blame. Coincidence? How can they be so sure?

Even after the EEC have brought threats and court action to the UK over this and other issues relating to water quality, the situation remains the same. I could go on and on relating personal cases, as well as those I hear about through my profession and those nationally reported (too few, in my opinion).

Each one of you reading this magazine is an aquarist and pondkeeper and, as such, someone who is interested in the aquatic environment. Consider for a moment your own experiences of our coastline over recent years. Perhaps you can also report some aspect of how various beaches up and down the British Isles live up to the image of a 'Cleaner Britain'. I would be very keen to hear from you.

So what can we do? Apart from lobbying MP's and Local Council's about such issues, I would like to write a small piece in a future issue of *A&P* with some ideas and suggestions about how each one of us could contribute in a small, but cumulative, way to really improving our watery environment. Responsibility begins with each person taking care and stopping to think for a moment about their day's actions. Multiply this by the number of readers of *A&P* and that's quite a force to be reckoned with, spanning the whole of the UK. Remember the old saying about how 'a thousand mile journey begins with one step'.

On a personal note, perhaps one day I and my wife will enjoy that same Kent beach and show the wonders of the marine rockpools at low tide to our grandchildren.

Jerzy Gawor,
Aquatic Consultant,
London SE9

JERZY GAWOR

A shot which I took a couple of years ago shows a typical rockpool along the beach mentioned. Even at low tide when you can 'poke-around' gently there is little sign of interesting life. Algae seem to thrive in this area, no doubt due to the collosal level of organic waste. Sadly, though, a recent trip to the same area showed that even the algae were in decline, suffocated by a thick, oily, brown-sludge of . . . !

JERZY GAWOR

This photo taken at a public aquarium was of an exhibit cleverly designed to highlight the problems of harbours and densely populated coastal resorts. This kind of junk, thoughtlessly dumped in our inshore waters is a danger to bathers and boats, as well as to marine life. It's always left for someone else to clear up. I suggest that we should all take responsibility for such 'vandalism' to our coastline and will provide you with some direct ideas for action shortly in *A&P*.

Note from the Editor

I look forward to receiving the "small piece" you refer to in due course. In the meantime, we will be pleased to pass on any correspondence we receive on this important subject from our readers.

John Dawes

I.O.W. 40th Anniversary Plea

In September of this year, we will be celebrating our 40th anniversary. We are planning several events, one of which will be a display of past fishkeeping memorabilia which we hope to stage at our Open Show scheduled for June '92. We also plan to mount the same display in conjunction with the F.B.A.S. at this year's Supreme Weekend of Fishkeeping to be held at

Weston-super-Mare in November.

We are therefore keen to buy or borrow any item of aquatic interest from the past, particularly old equipment — whatever its age or condition. Any photocopies of old publications or advertisements, or any information on, say, the price of fish, etc., from around 40 years ago (or earlier) would also be most welcome.

We sincerely hope that *A&P* readers will be able to help us in our search.

Paul Corbett,
Isle of Wight Aquarists' Society,
The Orchard,
Gatcombe,
Isle of Wight, PO30 3EF
Tel. 0983 721246

Certificate Re-think Urged

Having read the December **News from the Societies** item entitled **Hagen to Reward Conservation,** we were filled with anxiety for the fishkeeping hobby.

Over the last ten years, the society side of our hobby has been in decline: we have lost two Federations and over 200 clubs. It is our opinion that, if clubs take Hagen's proposal of awarding just one Certificate and do away with those for minor places, this will discourage people from showing their fish. It will also discourage newcomers to the show scene and, as a result, clubs will lose out financially. Surely, we should encourage our hobby, not devastate it.

As two of the longest-standing 'show people' over nearly 30 years who have won almost 2,500 Certificates, we feel that if this proposal goes ahead, the direct consequences on the hobby will be severe.

Another point worth noting is that dedicated aquarists put up their fish for showing in the early hours of the morning. Surely, this dedication should be rewarded if the fish in question wins a place, be it 1st, 2nd, 3rd or 4th.

We are among the many fishkeepers who are currently unemployed. We therefore find it expensive to travel to shows. Most people like us also end up returning late on show days. Yet without the 'showmen', there would be no shows.

We therefore feel very strongly that aquarists should be advised of the changes that Hagen's proposals would bring to their hobby.

J. & T. Mayle,
(Two Concerned Aquarists),
Birmingham.

Fair Traders' Guide Required

Recently we had a disaster with a 66in tank, the consequences of which might interest other *A&P* readers. We decided to replace this tank with one measuring 48 x 18 x 15in wide.

We received quotations which varied between £36 and £200, with the usual price quoted falling in the £70 - £100 range.

I appreciate that some manufacturers produce extremely complicated aquaria, and I equally appreciate that a tank from a large manufacturer should be cheaper than a tank from a small manufacturer, but I specifically requested a plain, no-frills tank, so I cannot account for the vast difference in prices for what is, essentially, the same product. I feel most strongly that, both manufacturers and retailers, should adhere to some code of practice as regards pricing structure.

As a very good example of what I say, the difference in prices quoted by a glass supplier and one of the companies of suppliers was almost 100%!

Do retail traders normally operate on such a profit margin? There were similar differences between retail prices for a particular brand of aquarium and the price quoted by the manufacturers themselves.

Perhaps *A&P* readers might verify this situation for themselves. How about a "Fair Traders' Guide"? — since I've been left with the impression that aquarists, and potential newcomers to the hobby, must be getting ripped off by some unscrupulous dealers.

I might add that I bought a tank AND cabinet from Barry James of Everglades Nurseries, Baunton, for about the same price as I was being quoted elsewhere for just a tank!

Please note that I have neither connections, nor an axe to grind with any retailer, and the prices and retailers I refer to are only those I came up with in a single week.

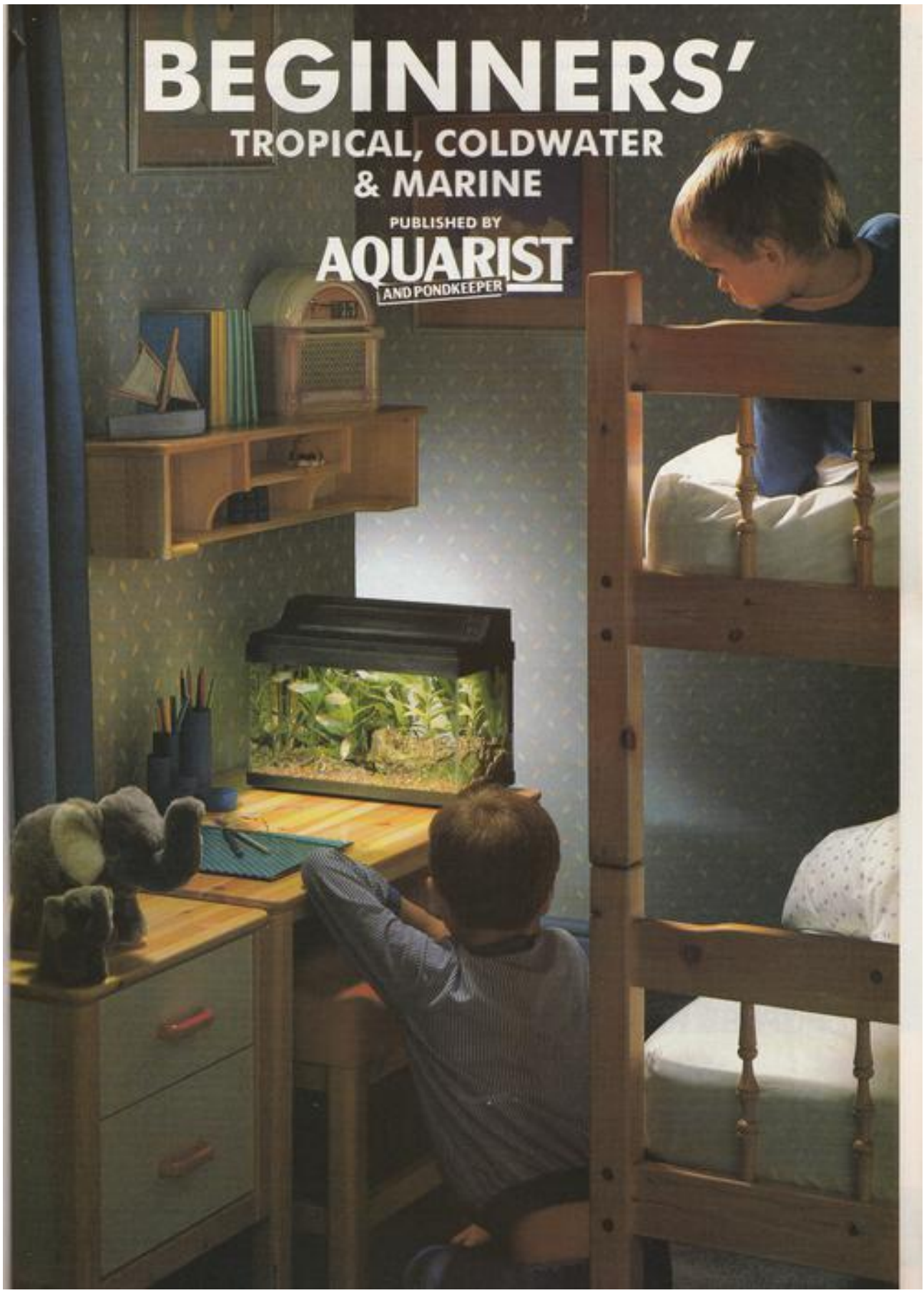
Stephen Broadbent,
Withington.

BEGINNERS'

TROPICAL, COLDWATER & MARINE

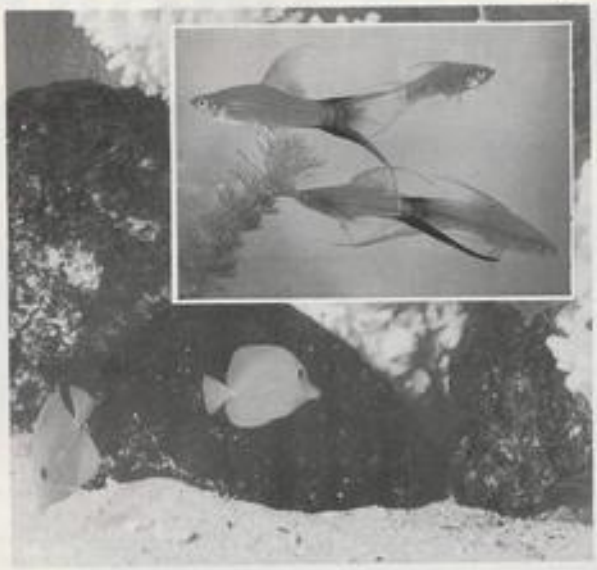
PUBLISHED BY

AQUARIST AND POND KEEPER



BEGINNERS' SUPPLEMENT: (TROPICAL/COLDWATER/MARINE)

AQUARIST AND PONDKEEPER



Cover Photograph: 'Aquarian' Fish Foods

CONTENTS

INTRODUCTION TO FRESHWATER TROPICALS

Dr David Pool of the Tetra Information Centre provides a detailed guide to setting up and maintaining a freshwater tropical aquarium.

A tropical freshwater aquarium is a welcome addition to any room. In it, a wide variety of colourful and interesting fish and plants can be maintained with a minimum of effort and expense. For the newcomer to the hobby of fishkeeping, the prospect of setting up such an aquarium may be a daunting one. However, it need not be. This article provides the basic information required to set up a tropical freshwater aquarium.

Before setting up anything, though, it would be advisable to read one of the books suggested at the end of this article. This will provide invaluable information on the wide range of fish available and on the choice of equipment and decor.

EQUIPMENT REQUIRED

There are many items of equipment available for a new aquarium. The types of fish you intend to keep will, obviously, greatly affect any list you may make, but for a community aquarium (containing a range of fish species) the following items are necessary:

- Aquarium;
- Aquarium Stand;
- Cover;
- Lights;
- Decoration (Stones, Bogwood, etc);
- Gravel;
- Filter;
- Thermometer;
- Plants (live or plastic);
- Aquarium Background;
- Heater/Thermostat;
- Cable Tidy;
- Fish Net(s);
- Gravel Cleaner;
- Tapwater Conditioner;
- Food;
- Plant Fertiliser.

Before considering how we should set up the aquarium, though, it is worth discussing some of these items in more detail.

Selecting an Aquarium

The choice of size and shape of aquarium is largely a personal one, but is influenced by the space available, money, fish you intend to keep, etc.

Swordtails are generally hardy and easy to keep . . . and come in a wide variety of colours and fin configurations.

As a general rule, you should choose the largest aquarium that is suitable for the site you have selected. This is because it is easier to obtain a biological balance between the fish, plants and water in larger tanks, which results in it being simpler to maintain. An aquarium holding 80-100 litres (c 17.6-22 gal) of water, and measuring 90 x 30 x 30cm (36 x 12 x 12in) is an ideal size for someone starting in the world of fishkeeping.

Selecting a Site for the Aquarium

Every room has a suitable site for a new aquarium, but before deciding where to put it, there are several important factors to consider.

Firstly, water is heavy, weighing approximately 1 kg per litre (c 10 lb per Imperial gallon). When you add the weight of the tank and gravel the average weight of the aquarium increases to 1.2 kg per litre (12lb per gallon). An 80 litre (c 17.6 gal) aquarium, for example, will weigh approximately 90 kg (200lb), so be certain that the stand you place it on will be strong enough.

Specially made aquarium stands are available which are ideal for the purpose, but if you intend to place the tank on conventional furniture, ensure that the load-bearing capacity is at least three times the weight of the aquarium.

The aquarium must be sited away from draughts and room heaters as these will cause temperature fluctuations which can adversely affect the fish. It should also be positioned out of the path of direct sunlight which can cause unsightly algal growth and overheating.

Rosy Barbs are active shoalers which are available in a number of varieties.

Two final considerations are accessibility and the availability of an electric socket. An electrical supply is essential for the lighting, heating and filtration, but for safety reasons, you should avoid having long lengths of cables in the room. Accessibility is important once the aquarium is established to enable you easily to conduct the few maintenance procedures which are necessary.

The consideration of these few simple rules will result in an aquarium becoming an integral part of the room.

Lighting

The hood for the aquarium will provide a space for the installation of artificial lighting. This is preferable to sunlight because the intensity and duration can be accurately controlled to enhance plant growth and minimise the growth of algae.

Fluorescent tubes are ideal for most aquaria, particularly if those specifically designed

for aquaria are used. Each tube requires a starter unit, which should be positioned out of view in the aquarium stand or in a nearby cupboard.

The lighting intensity for a particular aquarium is determined by the volume of water present. As a general rule allow 0.5 watts of fluorescent lighting per litre of aquarium water. Therefore, a 100-litre (22 gal) aquarium would require a lighting intensity of 50 watts. The lighting should be left on for between 10-12 hours each day once the aquarium is set up.

It is important, for safety reasons, to ensure that water does not get onto the electrical contacts in the lighting. This can be achieved using a clear condensation tray which should be placed between the water and the lighting, thus completely 'sealing' the aquarium. In many commercially available aquarium hoods, the condensation tray is built in, but they can be purchased separately if necessary.

Heating the Water

Tropical fish require a water temperature of 23-27°C (c 73-80°F), achieved by using an aquarium heater and thermostat. It is important to choose a heater that will generate sufficient heat to maintain the required water temperature. Ensure you buy the correct size of heater (measured in watts) for the size of your aquarium. As a guide, you should allow 1.0 watts per litre of water in an unheated room, and 0.5 watts per litre in a heated room. So, for example, in a 100-litre (22 gal) aquarium, you will need a 100 watt heater in an unheated room and 50 watts in a heated room.

If the heater and thermostat are separate units, they should be positioned as far apart as possible. Heater/thermostat combinations are becoming increasingly popular. They should be placed vertically at the back of the aquarium close to, but not touching, the gravel.

A thermometer is essential for a tropical aquarium so that you can monitor the temperature (on a daily basis) and ensure that it remains within the required limits. Liquid crystal thermometers can be positioned at the front of the aquarium where they can be readily checked.

Filtration

Filtration of the aquarium is advisable to keep the water clear (mechanical filtration) and to remove any pollutants (biological and chemical filtration). Filters work by passing water though a sieve (e.g. foam, floss or gravel) which removes particulate matter, and over a bacteria-covered surface which absorbs chemical pollutants.

There are many types of filters which could be used in aquaria. The most popular are:

Power filter: water is drawn by an electrically driven pump through a canister which is filled with one of a variety of filter media. Depending on their design, power filters may be located either inside or outside the aquarium.

The canisters can be filled with a range of filter media. These should be positioned so that the water passes through the mechanical filter media first, followed by the biological media.

Different sized filters are available. You should select one with a flow rate of about 2-3 times the aquarium volume per hour.

DAVID POOL

Natural plants look good and perform a number of useful tasks in freshwater tropical set-ups.

Undergravel filter: perforated plates are positioned under the gravel and water is sucked from underneath the plates via an uplift tube by an air or electrically driven pump. This causes water to be pulled down through the gravel. An airpump and airstone, or electrically driven powerhead, can be used to power the filter.

Gravel

The gravel bed added to the aquarium acts as a substrate for the plants to grow in and as a filter medium if an undergravel filter is used. The gravel selected should not be too fine (as it will tend to clog with debris), or too coarse (as it will not provide a suitable medium for plant growth). The aquarium gravel sold by most aquarist shops is ideal.

In most situations, it is preferable to choose dark coloured gravel because most fish feel ill at ease when light is reflected from below by lighter materials. When purchasing the gravel, ensure that it does not contain excessive quantities of limestone or shells which would make the water in the aquarium hard and alkaline and therefore unsuitable for many fish species.

For healthy, vigorous plant growth, the gravel should be mixed with a suitable aquarium fertiliser. As a general rule you should aim to have a depth of 5-8cm (c 2-3in) of gravel.

P. PRIVETT

A beautifully planted and well stocked community aquarium.

Decorations

There is a wide variety of decorations suitable for aquarium use and, through their choice and positioning, the fishkeeper can create an endless number of tank displays.

Decorative materials such as rocks, slate and bogwood must be cleaned before adding to the aquarium, using a stiff brush and plenty of running water. Bogwood will generally need to be soaked in water for several days to allow any brown coloured tannins to be released. Materials such as limestone, coral, shells and marble are unsuitable for most aquaria as they will affect the water quality to the detriment of many fish (but not those species that like, or need, hard alkaline water — such as African Rift Lake cichlids).

Setting up your Aquarium

The following steps describe how you should install and set up the equipment in your aquarium.

① Aquarium and Aquarium Materials

Thoroughly wash the aquarium, gravel, rocks and ornaments. Do not use soap or detergents, as they are highly toxic to fish. To wash the gravel, put it into a plastic bucket and add water. The gravel should be stirred and then drained. Continue until the water stays clear after stirring and is free of debris. It is easier to wash the gravel in small quantities, rather than do it all at once.

② Undergravel Filter (if used)

If an undergravel filter is to be used, place it on the bottom of the aquarium and cover it with 5-8cm (c 2-3in) of washed gravel. Be careful not to pour gravel into the filter stems. Slope the gravel towards the front so that any debris will accumulate here and is easier to remove. To keep gravel and filter plates apart, a gravel tidy may be used.

③ Adding Equipment and Non-Living Decorations

Position the equipment towards the back of the aquarium, where it can be hidden from view using the decorations and plants. Heater/thermostats and foam filters, or the pipes from external filters, should be attached to the glass using the suction caps provided. The wires from the

electrical appliances (heater/thermostat, pump and light) should be connected to a 'cable tidy' to reduce the numbers of unsightly wires. Internal filters should be filled with filter materials before placing in the back corner of the aquarium.

Connect the tubing from the airpump to any outlets located inside the aquarium (e.g. undergravel filters and airstones).

The airpump should be positioned above the level of the water, or non-return valves inserted in the airline, so that water does not flow back into the pump when it is switched off.

Bogwood and rocks can be used to form terraces in the gravel, or as separate features.

Attach the aquarium background to the back glass using sellotape.

④ Adding the Water

Fill the aquarium approximately half full using water that is about 24°C (75°F). Pour the water onto a plate or polythene sheet to avoid disturbing the gravel. Tapwater should be conditioned to remove toxic chlorine and chloramine, as well as any metals.

⑤ Plants

If using live plants, rinse them in water at approximately 24°C (75°F) to remove any snails and unwanted pests. Remember to keep the plants moist at all times to prevent damage.

TETRA

Platies make ideal fish for a new aquarium, being hardy and easy to keep.

The plants should be positioned to hide any equipment and provide a pleasing background for the fish. Plant carefully and avoid excessively bending the roots. Ready-potted plants are worth their added expense, as they are already established.

⑥ Add Remaining Water and Start Equipment

Fill the aquarium to near the top in the same way as before. Leave some air space between the water and cover to allow for gas exchange. The aquarium cover and lighting should be added at this stage. As with other electrical equipment, connect the wires to a 'cable tidy'.

Once fitted, all of the equipment may be switched on and left running for 24 hours. Do not switch on the heater until it is fully submerged. External filters may need pri-

PLANT CARE TABLE

NAME	EASE OF KEEPING	LIGHTING	POSITION
Aponogeton crispus (Wavy Edged Sword)	Moderate	Bright	Back of tank
Bacopa caroliniana (Red Bacopa)	Easy	Bright	Middle and Back
Cabomba	Easy if given very bright light	Very bright	Middle and Back
Ceratopteris thalictroides (Indian Fern)	Easy	Bright	Middle, Back or Floating
Echinodorus major (Ruffled Amazon Sword)	Easy	Bright	Back
Echinodorus tenellus (Pygmy Chain Sword)	Easy	Bright	Front
Hygrophila polysperma (Water Star)	Easy	Bright	Middle and Back
Vallisneria sp (Tape Grass; Vallis)	Easy	Bright	Middle
Cryptocoryne affinis	Easy	Moderate	Middle

TETRA

Do not mix Angelfish with small tetras or fry.

ming. To do this, gently suck on the end of the outlet tube from the filter until water starts to fill the canister.

⑦ Alterations

Check the water temperature after 24 hours and ensure that the equipment is working. Any alterations should now be made.

The water in new aquaria often becomes cloudy for 1-2 days. This is caused by harmless bacteria and will disappear naturally. Now is a good time to measure the pH and hardness of the aquarium water. This will give you an indication of which fish will be most suitable for your aquarium.

SUITABLE PLANTS FOR THE AQUARIUM

The addition of plants to the aquarium greatly enhances its overall appearance, as well as performing a number of vital tasks. Healthy-growing plants will remove nutrients from the water, so reducing or even eliminating algae problems. They also remove nitrates (the end result of the decomposition of fish waste), thus improving water conditions for the fish; they also provide areas of retreat and shade for the fish.

The range of freshwater plants is very wide, but not all will be suitable for an aquarium.

Aquarium plants originate from throughout the tropical areas of the world and, not surprisingly, require different conditions in terms of water temperature, acidity or alkalinity and light intensity. Your local dealer will be able to advise you of the ones that are best suited to your aquarium and water conditions in the area.

When first setting up an aquarium you would be well advised to select hardy and relatively inexpensive types. The guide to aquatic plants in the accompanying Table will give you some idea of the more suitable species.

Make sure that the plants in your aquarium have sufficient light and space to grow. Before planting, it is advisable to trim back the root tips to encourage them to grow. Any decaying or torn leaves should also be removed.

Plants require a good supply of nutrients if they are to thrive. This can be provided in the form of a fertiliser such as Tetra Florapride, which should be added every 2-3 weeks.

INTRODUCING THE FISH

Once the aquarium has been set up for 2-3 days (preferably, one week) you can add your first fish. This is an area where you should seek advice from your dealer and from suitable aquarium books.

There are about 500 varieties of tropical fish that are commonly stocked by dealers nowadays. Not all of these can be kept together, so it is important that you obtain some information on their requirements, tolerance of other species, maximum size, etc.

You should only keep fish together if they have more or less the same requirements in terms of water conditions, light, space and food. The Table provides a quick guide on these matters, but should not be your only source of reference.

The first fish to add to your aquarium should be relatively hardy species, such as barbs or swordtails (5 or 6 fish in a 100-litre [22 gal] aquarium is suitable). These fish will help the aquarium through its characteristic maturation period.

Buying Healthy Fish

When buying your fish, it is important to select healthy specimens. Clues to the health of the fish can be gleaned from their appearance and behaviour within the dealer's aquaria. Avoid fish that:

— have obvious parasites, such as white spots, cottonwool-like fungus or a slimy skin;
— have ragged fins;
— are in aquaria containing dead or diseased fish;
— are lying on the bottom of the aquarium, or gasping at the water surface;
— have trouble swimming, or are 'flicking' against underwater objects.

The fish will be packed by your dealer into a sealed polythene bag containing about one-third water and two-thirds air or oxygen. When transporting them home, the bag should be placed in a darkened container and not be subjected to any sudden temperature changes or jolts.

TETRA

The bright coloration, hardy nature and ease with which they breed make Guppies everyone's favourite.

Once home, the bag containing the fish should be floated in the aquarium for about 20 minutes, during which time the water in the bag will gradually warm up to the temperature in the aquarium. When the fish have calmed down, remove a small amount of water from the bag and replace it with an equal volume of aquarium water. By repeating this 2-3 times over a 10-15 minute period, you will slowly adjust the water to the conditions in the aquarium. The bag can now be slowly inverted and the fish released into their new home. The fish will settle down more quickly if you leave the aquarium lights off for, at least, 1-2 hours.

These fish should be left for a minimum of one week before any others are introduced. Assuming all is well, over the next 6-8 weeks, the stocking level may be slowly increased to the maximum level.

The maximum stocking level of an aquarium is largely influenced by the surface area of the water through which gas exchange can occur. The accepted rule is 2.5cm (1in) of fish length excluding tail fins for every 77cm^2 (12 square inches) of water surface area. Take care not to overstock or increase the stocking level too quickly, as this can lead to problems with water pollution and disease.

Quarantine

When adding new fish, it is wise to quarantine them for 2-3 weeks in a separate aquarium before introducing them to your

TETRA

Cherry Barbs are a peaceful and timid but hardy species which are ideal for a community tank.

MAINTENANCE TABLE

DAILY	MONTHLY	OCCASIONALLY
Check water temperature	Measure pH, ammonia, nitrite and water hardness with Test Kits	Check electrical connections
Turn lights on/off	Remove algae from glass and decorations	Thin plants
Feed fish	Carry out a partial water change, including removal of any debris*	Renew fluorescent tubes
Check fish behaviour	Clean and refurbish filter	
Check filter/air pumps		

*Partial water changes involve changing 20-25% of the water and removing any accumulated organic debris. This can be undertaken very effectively using a HydroClean Gravel Cleaner which will remove debris from the gravel without clouding the water. The aquarium should be refilled using fresh tapwater conditioned to remove chlorine, and brought to the correct temperature using a little boiling water from a kettle. Regular partial water changes and tank maintenance ensure healthy fish and plants, and will improve growth rates, breeding success and disease resistance.

main tank. The quarantine tank need not be an elaborate affair and can consist of a small aquarium with a cover, fitted with a heater and foam filter.

By placing the fish into quarantine, you will be able to observe and, if necessary, treat them to prevent any diseases getting into your already-established aquarium.

Not everybody has a quarantine aquarium, particularly when first starting in the hobby. In this case, to minimise the risks of introducing disease along with new fish, you should add a general disease remedy to the aquarium when the fish are introduced. The remedy will kill any external parasites, thus preventing your existing fish from being infected, while curing the new fish.

NEW TANK SYNDROME

The first 4-6 weeks after setting up a new aquarium are often the most troublesome for the new aquarist due, largely, to a process known as the 'New Tank Syndrome'. This process occurs as the bacteria in the aquarium, and particularly the filter, increase in numbers and begin to decompose.

When the aquarium is first set up, it is a sterile environment, with very few of the helpful bacteria which can decompose waste products, uneaten food, etc. As the bacteria population increases (i.e. the aquarium matures), there is a characteristic rise and fall in the concentration of ammonia and nitrite in the water. This process may take 3-5 weeks to complete and can result in toxic levels of these pollutants.

In most freshwater aquaria, where the pH of the water is below 8.0, the ammonia is not too toxic to the fish and it is only the nitrite which will pose real problems. However, if your tapwater is more alkaline, both ammonia and nitrite can be toxic to the fish.

To ensure that dangerous levels of these chemicals do not occur, it is advisable to test the water every 2-3 days using a Nitrite Test Kit (and an Ammonia Test Kit if the water is alkaline).

These test kits are very easy to use and will allow you to follow the gradual rise in the pollutant levels within your aquarium. When the pollutant concentration reaches a dangerous level (i.e. 0.1 mg ammonia or 0.3 mg nitrite per litre of water) one-third of the water should be changed for fresh tapwater. This should be continued until the pollutant levels fall to a value very close to 0. Thereafter, the tests should be conducted at 2-weekly intervals.

When conducting the water change, you should aim to remove any excess debris that has accumulated in the aquarium gravel.

FEEDING YOUR FISH

The fish in your aquarium are reliant upon you to provide them with a nutritionally balanced diet. This can easily be provided by using a good-quality flaked food.

Feed the fish 2-3 times a day on as much food as they will eat in 1-2 minutes. Take care not to overfeed, as any uneaten food could pollute the water. If you introduce bottom-feeding fish, they can be given a tablet, or granular food, which will quickly sink to the bottom.

There is a wide range of specialist colour-enhancing and vegetable foods available from aquatic shops which can be used to satisfy the specialist diet of any unusual fish you keep in the aquarium. Such foods can also be fed less frequently as a treat food.

TANK MAINTENANCE

Regular tank maintenance is the secret of successful fishkeeping. The tasks can be grouped into those which are performed daily, monthly, or on an occasional basis (once or twice a year). The accompanying Table summarises the tasks which should be undertaken.

SOME FISH FOR A COMMUNITY AQUARIUM

FISH	SIZE	NUMBERS TO KEEP	COMMENTS
Platy *(Xiphophorus maculatus)*	1.6in (4cm)	2+	Livebearer. Very hardy and easy to keep.
Swordtail *(Xiphophorus hellerl)*	4in (10cm)	2+	Livebearer. Very hardy and easy to keep.
Guppy *(Poecilia reticulata)*	2in (5cm)	2+	Livebearer. Very hardy and easy to keep.
Neon Tetra *(Paracheirodon innesi)*	1.6in (4cm)	4+	Easy to keep. Do not keep with larger fish.
Rosy Barb *(Barbus conchonius)*	4in (10cm)	4+	Very hardy species. Lives in mid-water.
Cherry Barb *(Barbus nitteya)*	2in (5cm)	4+	Timid but hardy species. Do not keep with aggressive fish.
Harlequin *(Rasbora heteromorpha)*	2in (5cm)	4+	Peaceful fish, ideal in company with tetras.
White Cloud Mountain Minnow *(Tanichthys albonubes)*	1.6in (4cm)	4+	Peaceful and active fish. Can tolerate low temperatures.
Zebra Danio *(Brachydanio rerio)*	2.4in (6cm)	4+	A very active shoaling fish. Stays near the surface.
Red Tailed Black Shark *(Labeo bicolor)*	4.7in (12cm)	1	Territorial. Will not harm small fish. Chases larger species and its own kind.
Angelfish *(Pterophyllum scalare)*	6in (15cm)	2+	Do not keep with small fish. Hardy and easy to keep.
Dwarf Gourami *(Colisa lalia)*	2in (5cm)	2	Keep in slow-flowing, well-planted tank. Very peaceful.

FURTHER INFORMATION

Further information on maintaining a healthy aquarium and on the fish and plants that you can keep is available in the following publications.

Tropical Aquarium Fish — Comprehensive Edition, by Dr C Andrews and H Baensch, published by **Tetra.**

The Salamander Encyclopaedia of the Tropical Aquarium, by D Mills, published by **Salamander.**

Baensch Aquarium Atlas, by H Baensch and R Riehl, published by **Baensch Books.**

Starting a Coldwater Aquarium

Stephen Smith provides a personal introduction to the coldwater hobby.

Some of the greatest challenges and some of the most beautiful rewards in aquatics are provided by coldwater fishkeeping. It is probable that most aquarists commenced their involvement with the pleasurable pursuit of fishkeeping by the acquisition of a jar of sticklebacks from a local brook, or even by winning a tiny goldfish at a fairground stall.

STEPHEN SMITH

Many coldwater fishkeepers prefer to keep their fish in completely bare tanks, to assist in tank maintenance. This display tank (photographed at Aquarama '89 in Singapore) contains more fish than would be recommended for a permanent set-up, which would be more-than-adequately stocked with just three of these splendid Orandas.

However, all too often, the fate of these unfortunate acquisitions is a short lifespan, either confined to a jam jar or suffocated in a goldfish bowl. The disappointment which this brings to the new hobbyist leads to no further progression on what could otherwise turn out to be a lifelong pastime. How pleasurable the pursuit of fishkeeping could be with the application of a little common sense, and a little more patience.

I recall witnessing a couple leaving a major Koi retailer, proudly displaying a large polythene bag which contained two reasonably sized Koi. I was, to put it mildly, disturbed to hear one half of the couple remark: "Well, now that we have got these things, I suppose we'd better think about building a pond(!)".

Now, who would ever think of buying a rabbit or guinea pig without first considering its hutch? Or a budgerigar without first preparing its cage?

Strangely, to the uninitiated, the acquisition of the fish seems to precede any thoughts of its welfare. Consequently, again, disappointment is all too often the result, and again, the rewards of a most enjoyable hobby are lost.

There really are no secrets to keeping coldwater fish, whether in the aquarium or the garden pond. For the purposes of this feature, I'd like to look at coldwater fish in the aquarium. Although the outdoor pond is the most natural place for the coldwater hobby, keeping a coldwater aquarium presents its own set of challenges and, providing these challenges are adequately met, will provide a lifetime of enjoyment — both for ourselves and, of course, our fish.

STEPHEN SMITH

The Chinese Bitterling is a most spectacular and colourful coldwater species, which is gaining in popularity.

JOHN DAWES

Young Koi can be kept in an indoor aquarium but are better suited to a pond environment with lots of swimming space where they can develop to their full potential.

STEPHEN SMITH

One of my favourites among the wide variety of species from which the coldwater aquarist can choose is the colourful Red Shiner, a North American Cyprinid which favours plenty of swimming space and well-

GETTING STARTED

So, just how easy is it to get started with a coldwater aquarium? The key is: keep it simple. Setting up an aquarium is a relatively inexpensive matter these days, and running a coldwater aquarium must be one of the cheapest forms of enjoying any pet.

Firstly, I would say, forget the goldfish bowl. Yes, it was OK when you acquired your first fairground prize, but it really provides most inadequate quarters in which successfully to appreciate the hobby. Bowls are 'easy to mismanage' and when this happens, they become, like any mismanaged aquarium, torture chambers.

The Tank

Your first tank should be no smaller than 24in long by 12in wide and no fewer than 12in deep (60 x 30 x 30cm). All-glass tanks are universally available and are very inexpensive. In my opinion, it is cheaper to buy a ready-made tank than to build one yourself. Alternatively, should you wish to purchase a second-hand tank, do ensure that there are no cracks, chips, or broken aquarium sealant, and that the glass has not become brittle with age.

Your tank should be placed on a sheet of expanded polystyrene on a sturdy base: purpose-built stands, and even cabinets to match your living-room furniture, are available. Site your aquarium set-up away from draughts and bright sunlight. One of the biggest problems for the aquarist is the growth of algae, which thrive on bright light; while one of the secrets (and challenges!) of successful coldwater fishkeeping is keeping water temperatures stable.

A true aquarist would keep his or her aquarium resplendent with gravel, rocks, and luxuriant plants, as well, of course, as the fish. Many of the popular species of coldwater fish, however, are rather partial to plants as food, and even the most hardy plantings will soon be stripped by ravenous goldfish or small Koi, for example.

If plants are favoured, then it is perfectly acceptable to furnish your aquarium with plastic plants, which can be extremely realistic.

Many serious coldwater fishkeepers are more interested in keeping and rearing fine quality fish than keeping true 'aquaria', and therefore, find it far more practical to keep the tank completely bare, as this helps to

STEPHEN SMITH

Have a pond in your living-room! This most attractive aquarium incorporates planters around the tank to provide an elegant corner setting. A printed aquarium background, pea-gravel on the base, and an internal power filter are used to produce an ideal environment for this red-and-white Lionhead.

installed by means of an aquarium junction box. This last item I consider to be a necessity — especially when you consider that you may well wish to install an air pump and, possibly, a heater-stat at a later date (when rearing fry, for instance).

With the addition of a cover-glass or condensation tray to protect the lighting, and to keep dust off the aquarium water, you now have a set-up which can be easily maintained and will provide a healthy environment for a pair of Fancy Goldfish or any other coldwater aquarium species.

STOCKING AND CHOOSING FISH

A word of warning here: this may be the exciting bit, but do slow down! OK, so you are entitled to let your imagination run riot with thoughts of exotic goldfish, expensive Koi and other species with which you are going to stock your aquarium. But there are limits, and these apply as much to your new aquatic quarters (and to your pocket) as your imagination!

So, if you are going to keep it really simple, you can keep the tank completely bare, containing only water and fish. With appropriate lighting, this can look extremely effective, if a little 'hi-tech'.

Water Management

As with any aspect of successful fishkeeping, effective water management is essential to ensure healthy fish. Get into the habit of maintaining your aquarium on a regular basis (say, every Saturday morning: the sacrifice of losing your lie-in will be well worthwhile!). The trick is to enjoy your hobby, and you really want to be sitting back and enjoying your fish, rather than constantly working on your aquarium.

Regular water changes (approximately 25% every week) are an important part of your coldwater aquarium management regime, and the inclusion of a filter is also an important element in ensuring that water conditions remain fairly stable.

My favourite filter system for coldwater fish sounds more complicated than it really is: a reverse-flow undergravel filter using an external power filter.

Quite simply, this comprises a power filter containing filter floss, ceramic medium, and activated charcoal, which sits beneath the aquarium and draws water from the tank, through the filter and returns the filtered water back into the aquarium down the uplift of an underground filter (which consists of a filter plate under approximately 2in — 5cm — of pea gravel).

Maintenance of such a system is simplicity itself, consisting of a partial water change every week or so, while the filter medium and gravel bed is washed every four to six months. The rest of the time I can enjoy the fish!

An effective alternative is to use an internal power filter, which is sited in one corner of the aquarium (use two if the aquarium is 4ft — 120cm — or more in length).

WILLIAM J HOMES

Golden Orfe are only suitable for most aquaria until they start to put on some real-size, at which point they should be transferred to a pond.

Traditionally, internal power filters have produced a jet so strong, in my opinion, that the tank inhabitants (particularly Fancy Goldfish) have become bowled over by the force, but the use of a spray bar will considerably reduce this effect, as will a deflector and a flow adjuster.

Ensure that your tank is set level and that the base is on a sound floor — I have heard of some disastrous incidents of aquarium systems falling through the bedroom floor (it's not funny — water is extremely heavy and can cause extreme damage to furnishings).

Accessories

The only additional accessories which you will need are a hood and lighting unit. I would recommend Gro-lux type flourescent tubes, as these bring out the colours of the fish (they are the type which greengrocers use to make their fruit and vegetables look more attractive).

Once the initial outlay has been invested, these are inexpensive to run, and their effectiveness can be enhanced by the use of reflectors. The lighting can be hidden within the hood by means of clips provided with the starter unit, and the wiring neatly

One of the main ingredients for successful fishkeeping is to use commonsense, and this applies equally to the number of fish you can successfully keep in any individual aquarium.

Let's follow that other favourite golden rule: *keep it simple*. Forget, for now, those complicated formulae. I stick to my own 'rule of thumb', which is to allow no more than one reasonably-sized coldwater fish per square foot (900 sq cm) of surface area.

In other words, if you want to keep two dozen Fancy Goldfish in your two-foot tank, forget it! Far better to have a limited number of healthy specimens, which will thrive, grow, and appear glorious in their well-maintained quarters, than to become disappointed with several poorly-looking specimens suffering from high concentrations of ammonia and other toxins as a result of overcrowding.

Acquiring and Introducing Fish

Acquiring your fish involves similar patience and commonsense. Never, ever, bring home specimens of coarse fish from an

Top left, the golden form of the Fathead Minnow is becoming very popular among coldwater enthusiasts. Top right, Pumpinseeds are tough and pretty, but should not be kept with small and delicate species. Bottom left, the Paradise Fish is traditionally regarded as a tropical fish but does well in coldwater aquaria. Bottom right, a great little shoaler — the peaceful, but active, White Cloud Mountain Minnow.

SOME COLDWATER SPECIES FOR THE INDOOR AQUARIUM

While it may be possible, with care and patience, to keep virtually any species of fish within an aquarium, it is advisable for the beginner to 'keep it simple'. Being over-ambitious is one of the main causes of losing interest in the hobby, while inadequate care will cause distress to the fish. Start simply and develop your experience gradually; the rewards will be far more enjoyable.

Fancy Goldfish

Without doubt, the goldfish is the world's most popular pet. It must certainly be the hardiest, and will tolerate your early mistakes fairly well. The myriad Fancy Goldfish varieties are perfectly designed for the coldwater aquarium and, once you have kept any selected variety, you may never want to keep anything else!

Koi

Small Koi can be kept happily in an indoor aquarium, and are as hardy as the goldfish. However, their fast growth-rate makes them far more suited to the pond environment.

Bitterling

These are beautiful fish, and their breeding habits (the female lays her eggs within a freshwater mussel) are fascinating. A recently-introduced variety from China is also gaining in popularity.

Golden Orfe

Again, the Orfe is more suited to the pond environment but, if you wish to keep a few small Orfe in your aquarium, do install a cover glass to ensure that they don't jump out!

Sunfish

Several types of Sunfish are available, and are becoming more popular as coldwater fishkeepers seek new alternatives. They originate mainly in North America, and my favourite is the Pumpkinseed Sunfish, but treat your fish to a lot of tender loving care.

Red Shiner

A favourite native of North America, which displays some vivid coloration. This species thrives in well-oxygenated water but do give it plenty of space.

Paradise Fish

Here's a 'tropical' fish which will withstand low temperatures and makes a most attractive aquarium specimen, especially if placed in a warm room.

Stickleback

If you didn't begin fishkeeping with a goldfish, chances are that the stickleback formed part of your schooldays. The breeding ritual of the stickleback is most fascinating and provides vivid coloration in the male. Again, do ensure that the aquarium water is well-oxygenated and kept in good condition.

Fathead Minnow

Another North American import that is becoming very popular is the golden form of this small attractive shoaler which is also known as the Rosy Red Minnow.

White Cloud Mountain Minnow

This small colourful shoaling fish is both hardy and peaceful and is an excellent subject for a coldwater aquarium.

The What, Why and How of Marines

Dr David Ford of the Aquarian Advisory Service introduces a useful three-pronged approach to setting up tropical marine aquaria.
Photographs by the author

Never start a seawater aquarium until you are familiar with the fundamentals of the husbandry of marines. You can get a Goldfish as a gift or sudden whim and it will *probably* swim around a goldfish bowl for the next 20 years. However, most coral fish are condemned to death if placed in a new aquarium. The basic reason is that the Goldfish doesn't drink the water it is swimming in, whereas marine fish have to drink their seawater, continuously and copiously. Therefore, any pollution is taken into the fish ... including its own excreta.

'What' includes the four parameters of seawater fishkeeping: pH, SG, Nitrite and temperature. It is essential to know what these are and why they are important.

'Why' is the osmotic effect, the big difference between freshwater and marine animals.

'How' includes the five essential pieces of equipment to monitor and control the four parameters.

THE 'WHAT' OF MARINES

① pH

pH is a mathematical term (actually it is shorthand for $-\log_{10}[H^+]$) and is a clever formula devised by a chemist called Sörensen to describe the acidity or alkalinity of solutions in numerical terms. The consequence of the formula is that neutral water is pH 7, with increasing acidity as the pH goes down (pH 6, pH 5, pH 3, etc) or increasing alkalinity (i.e. decreasing 'acidity') as the pH goes up (pH 8, pH 9, pH 10, etc). The full range goes from pH 1 to 14 and can be in decimals too (pH 7.2, pH 6.8, etc).

Being logarithmic, each step is actually 10 times the value of the previous one. Therefore, a pH change of 2 is actually 100 times more acid or alkaline, a pH change of 3 is 1,000 times more acid of alkaline. So, apparently small changes in pH may feel dramatically different to the fish and create stress. Because of this, pH changes must be carried out slowly.

The sea is so vast that it is chemically very stable, with practically no pH change year on year. The pH of average natural seawater is 8.3 and a freshly prepared commercial seasalt mix will give this value. With time, the pH of the marine aquarium will fall because the biofiltration process (see later) releases protons (H^+) that are the 'H' in pH.

The formula means that the more protons present, the lower the pH, so the value measured by a pH kit will show that pH 8.3 becomes 8.2, 8.1, 8. Below 8, marine fish become very stressed since this never occurs in their natural home.

Regular partial water changes will restore the pH value, but in emergency, adding sodium bicarbonate (predissolved and added slowly over a few days) will raise the pH.

② Specific Gravity

Specific Gravity (SG) is a measure of density or salinity of the seawater. Pure fresh water is taken as the standard with a value of 1. Seawater is denser (thicker or heavier), the reason being that it is 96.4% water and 3.6% dissolved salt. Therefore, anything floating in seawater displaces less volume (the Archimedes principle). To check the density of aquarium water a plastic or glass 'hydrometer' is used and the SG is measured from a scale based on the 1 value in pure water.

Damsels make good, hardy first fish, although they can become aggressive.

Seawater has an SG (also called density or salinity) of 1.023. Some seas are different; the Red Sea, for example, is 1.028, but around Sri Lanka, the SG is 1.022. Brackish waters are much lower and variable; an SG of 1.018 is often used by hobbyists.

Coral fish will tolerate a range of SG values from 1.021 (or lower) to 1.024 — but why should it have to? Keep the SG constant for happy fish. Experience has shown the ideal is 1.022 measured at 75°F (24°C). Since temperature affects density, it also alters the SG value. At 80°F (27°C) the value will be 1.021 but these differences are not great enough to be a problem.

Do use an aquarium hydrometer for all your measurements, not a chemical one. Laboratory hydrometers are calibrated at 15°C (59°F) which will give a very different reading at 80°F (27°C).

Evaporation loss will raise the SG because

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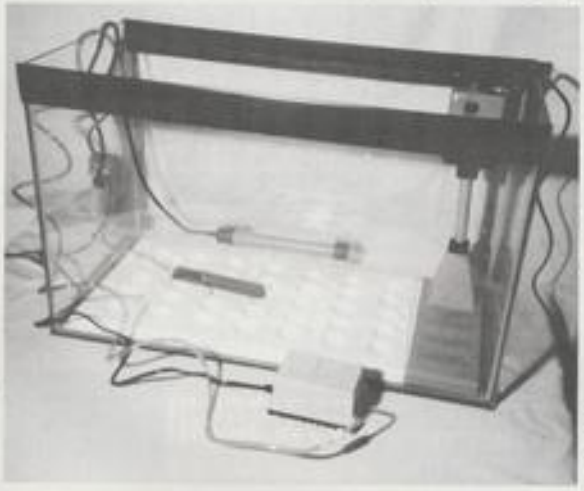


Basic equipment (minus hood and lights) for first aquarium.

Continued from page 61

only pure water is lost, leaving the salts behind. Replace such losses with freshwater only; tapwater is satisfactory for the beginner's tank.

③ Nitrites

Nitrite is a chemical that forms from the excreta of the fish. This is not the solid excreta (faeces) which is not harmful (in fact, some fish can recycle such excreta to get more nutrient from their food). It is the soluble excreta, equivalent to our urine, that is polluting.

The digestive processes of fish are similar to ours but they produce much more ammonia in their excreted water than urea. This ammonia is poisonous, much more so in marine conditions than in freshwater.

At the neutral or acid pH of most freshwaters, the ammonia dissolves giving an ion called 'ammonium' (NH_4^+) that is much less damaging than the dissolved ammonia (NH_3). In alkaline water, however (and seawater is very alkaline), little ammonium is formed and the ammonia burns the fish's gills and eyes. This is why cloudy eye, even blindness, is often seen in marine aquarium fish. The gill irritation leads to mucus formation, reducing oxygen uptake, with many consequences, such as stress diseases.

In the mature aquarium there are nitrifying bacteria that will convert the ammonia into an ion called nitrite (NO_2^-) which is, unfortunately, equally poisonous ... but easier to measure. The ideal value is zero, which means zero ammonia, too, in any mature system.

The method of removing the ammonia and nitrite is to convert them to nitrate (NO_3^-) which is safe for most coral fish at tens, even hundreds of parts per million for some species. The nitrate level needs to be low for many inverts, but these are not recommended for the beginner.

The nitrifying bacteria that convert ammonia to nitrite are called *Nitrosomonas* and these swim around all fresh and sea waters. The bacteria that convert the nitrite into safer nitrate are called *Nicrobacter* and they live, mostly, on surfaces. They form the slime that can be felt on equipment and decorations from old established aquaria.

The bacteria use oxygen from the water for the nitrifying process, so passing water rich in oxygen over solid surfaces is the secret of success. This is done in the biofilter.

A biofilter is a traditional filter such as an undergravel, internal power, external power or box type, that includes a filter material with as large a surface area as possible for the nitrifying bacteria to grow on. The bigger the filter the better. Whatever its design, it must be capable of absorbing all the excreta from the fish so there is never a trace of nitrite. It must also run continuously. Turning a filter off can lead to a 'nitrite crisis' within hours and will result in the death of valuable fish.

④ Temperature

Temperature is important because the most common fish for the marine aquarium are coral fishes. These originate in the tropics where the coral seas are not only warm, but are also at a very stable temperature at a given water depth. This is 80°F (27°C), cooler at depth and hotter in rockpools. It is recommended that beginners keep their tank at this temperature too. Some books advocate 75-78°F (24-26°C) because more oxygen is dissolved at cooler temperatures. However, the beginner should never crowd the marine tank so that the oxygen level becomes important.

Use a good heater-thermostat, but always have a spare (even if a cheap one) in case of problems. Check the temperature constantly — the external digital type of thermometer is the cheapest, as well as being reliable and accurate. Use the correct wattage heater, as well: 100 watts for the 2ft (60cm) tank, 200 watts for the 3ft (90cm) tank and 300 watts for the 4ft (120cm) tank.

The biofilter operates best at elevated temperatures too, so if a trickle or external box filter is used, the heater-thermostat can be usefully installed in that filter.

A Cleaner Wrasse makes a very interesting (and useful) addition to a marine aquarium.

THE 'WHY' FACTOR

Do not just accept that the above parameters are important. If you know why they are necessary, you can accept that short cuts or ignorance will lead to disaster for the fish.

The reason why the chemical and physical properties of the seawater are so important is 400 million years old! Fish were around as long ago as the Devonian (400 million years). It is called the 'Age of Fishes', there were so many species in that ancient ocean.

Those fish were in perfect osmotic balance with their surrounding water. Osmosis is the system whereby water flows across a membrane (in this case, the fish's skin) equalising the dissolved salts each side of that membrane in the process. The Devonian fish had body fluids at about 2% salt level, the same as the seawater, so osmosis did not occur.

As years went by, the sea became more salty; now it is over 3%, but the fish remained fixed at 2% because the life processes did (or could) not adjust. As a result, reverse osmosis now occurs in the modern seawater fish, causing dehydration. To compensate for this, a sea fish drinks its water continuously, extracting the salts and replacing the lost water in its cells. This includes its excreta too; the deadly ammonia and nitrite.

Freshwater fish, however, have normal osmosis, with the pure water being absorbed and excreted continuously. These fish do not drink, so that Goldfish can swim in a murky goldfish bowl and sometimes survive for 20 years. A coral fish would be dead within the hour in such pollution!

THE 'HOW' OF MARINE AQUARIA

There are six essentials for maintaining the seawater aquarium — the tank, lighting, the filter, the heater, aeration and maintenance.

① The Tank

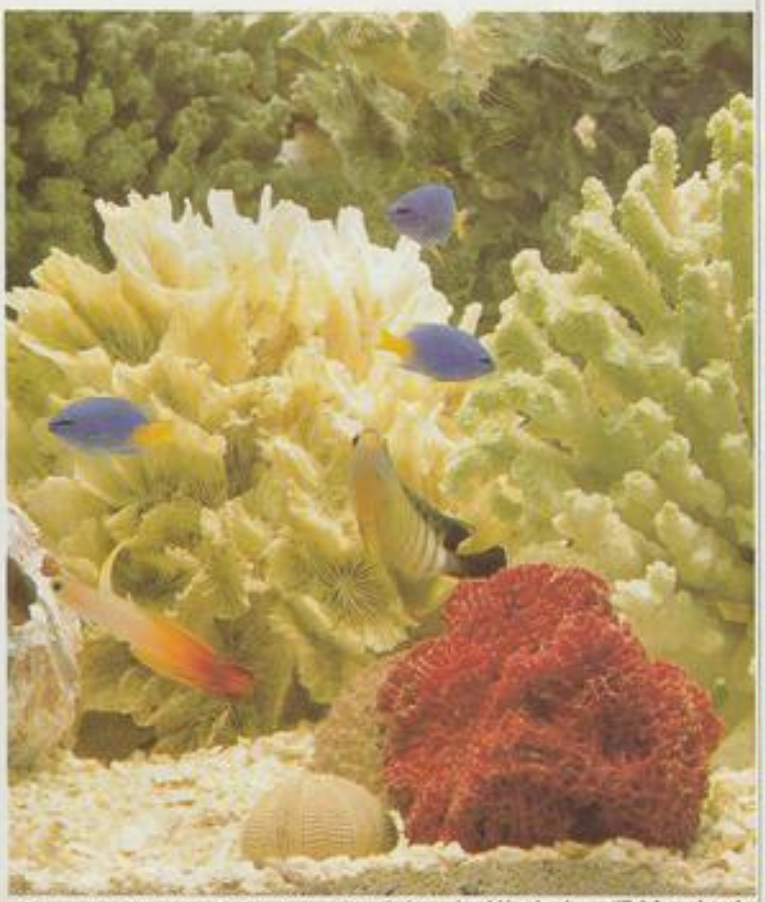
The tank must be as large as possible; small volumes of seawater pollute too quickly. The beginner should choose at least a 2-foot (usually 24 x 12 x 12in — 60 x 30 x 30cm) or 60cm tank, but a 3-foot or 4-foot (90 or 120cm) is far better. It must be an all-glass type with plastic or wood lid. Metal-framed tanks, and especially metal hoods, may be acceptable for freshwater fish, but seawater dissolves metals rapidly and even small traces can be lethal to coral fish (see **'Why'**).

The tank must be covered because dust and room pollution (cigarette fumes can kill fish) is harmful. Some species may also jump out. Evaporation loss is reduced by having a condensation tray between the hood and the lights. This also presents a barrier between the salty water and the electrics for the lights. Saltwater tends to creep along surfaces, leaving crusts of salt that can cause problems, so shut everything into the glass tank by means of a good fitting tray.

② Lighting

Lighting is your choice. With many inverts (aquarist jargon for the invertebrates, such as anemones and live corals, it is essential and has to be very bright, but with a beginner's all-fish tank, it can be diffuse, even coloured.

Despite its popularity and good looks, the Clown Trigger is not a suitable fish for beginners.



If "invertebrates" are used in the beginner's tank these should be dead or artificial corals only.

Do use a timer, however, since the tropical day is a constant 12 hours sun, 12 hours dark which needs to be reproduced. Switching lights on and off for your convenience stresses the fish — it gives them the equivalent of our jet-lag.

③ Filtration

The filter is the most important life-support system for the marine aquarium, where the water must be biofiltered continuously. There are many systems on the market, from expensive pre-fitted units, to DIY trickle filters. Your money, your choice.

The simplest and least expensive (yet very efficient) unit is the powered undergravel filter. This uses the base of the aquarium as the biofilter. This can be gravel or coral sand, according to choice. Coral sand looks more natural and has a buffering capacity on the pH, but is more expensive.

The "Powder Blue" *(Acanthurus leucosternon)* is not an ideal beginner's fish.

The simple bubble-up type of undergravel (called u/g by aquarists) is cheap and useful in the freshwater set-up, but powered u/g is recommended for the coral fish tank; the enhanced water flow better emulates the ebb and flow of the coral seas. There are several systems on the market; the one shown is the new 'Aquarian' system which comes as an interchangeable kit, very useful for upgrading at a later date, with perhaps reverse flow u/g or additional internal filtering in more crowded aquaria.

④ Heating

The heater is usually a heater and thermostat combined. The cheaper models employ bimetal strips for a 'break-and-make' circuit to control the temperature. This is

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satisfactory for the freshwater community tank but the exact temperature needed for marines ideally needs the absolute control of the modern microcircuit (microchip technology). There are increasing numbers of such heaterstats on the market.

⑤ Aeration

Aeration is essential for two reasons, perhaps three. The two are that the biofilter needs well-oxygenated water to convert the nitrite, and the fish need oxygen levels that are found on the reefs, where the coral seawater is saturated in oxygen as the waves cascade over these reefs. The third is that it is decorative. The seawater scene is brought to life by the stream of tiny bubbles that form in the dense seawater. Each picks up the overhead light and looks very pretty where coloured lighting is used.

Always fit an anti-siphon valve to the airline because seawater will siphon very readily down the tubing and damage the airpump, let alone the carpet and furniture.

⑥ Maintenance

Maintenance is more necessary with the marine tank than any other — always to avoid a nitrite crisis. Maintain the filter system so that it functions continuously, do not wait for it to stop before investigation! Check the temperature regularly and, at least weekly, monitor the pH, nitrite and SG.

Choose good coral fish that are bright and active. Be guided by a good book or aquarium shop on species; they must be compatible, or you will set up an underwater jungle!

Have suitable decoration; if you object to bleached coral on conservation grounds, there are good imitation corals available. Coral fish need somewhere to hide. Remember that 99% of these fish are wild-caught and so need to be in a 'home-from-home' environment to be happy.

Beginners should not invest in inverts, at least, not without a lot of preparation. If there are disease problems many fish remedies are based on copper salts which cannot be used in invert tanks. Although a popular marine fish, beginners should also avoid the Anemonefish (various Clowns) unless they can be provided with an anemone. Beware also of Lionfish (venomous — to us — and predatory), Butterflyfish and Angels (generally too delicate), Batfish and Groupers (grow too big) and some Triggers (Undulate and Queens can be vicious).

That still leaves a wide choice of suitable community fish such as Damsels (they may turn nasty with age, though!). Despite their obvious attraction do not attempt to keep Seahorses at first; these require special aquariums and methods of feeding.

Your local aquarium society will have experienced marinists, so ask at the aquarium shop when and where they meet. There is also a national society, the **International Marine Aquarists Association,** formerly the British Marine Aquarists Association, write for details to **PO Box 34, Loughborough, LE11 0WU (SAE please).**

STOCKING RULE

Marine aquarist Graham Cox's golden rule remains the best one for beginners:
First 6 months: Add fish to a maximum of 1in length (excludes tail) per 4 gallons (2.5cm/18 litres).
Second 6 months: Slowly increase to 1in per 2 gallons (2.5cm/9 litres).

Angel fish are not recommended for beginners.

READING LIST

A Guide to the Care of Tropical Marine Fish is available free from the Aquarian Advisory Service, PO Box 67, Elland, W Yorks, HX5 0SJ.
A Fishkeeper's Guide to Marine Fishes by Dick Mills, **Salamander Books** (1985) ISBN 0 86101 159 7, available at most pet and aquarium shops in the Interpet Books series.
See the TFH catalogue '800 Titles' from **TFH Publications,** PO Box 15, Waterlooville, PO7 6BQ.

BEGINNERS' MARINE FISH

Longnose Hawkfish (*Oxycirrhites typus*)
Neon Goby (*Gobiosoma oceanops*) (has a short life — 12-18 months)
Spanish Hogfish (*Bodianus rufus*)
Cleaner Wrasse (*Labroides dimidiatus*) (cleans other fish of ectoparasites)
Yellowtail Damsel (e.g. *Chrysiptera hemicyanea*) (best in shoals)
Green Chromis (*Chromis caerulea*) (best in shoals)
Blue Chromis (*Chromis cyanea*) (ditto)
Humbug (*Dascyllus aruanus*) (hardy, best in ones)
Domino Damsel (*Dascyllus trimaculatus*) (ditto)
Electric Blue (*Pomacentrus coeruleus*) (shoals when young)

The Yellow Tang *(Zebrasoma flavescens)*, can be a good choice for the beginner's tank, provided adequate preparations have been carried out.

EQUIPMENT OVERVIEW

BY DICK MILLS

During the planning of this **Beginners' Supplement,** it occurred to us that, while each and every separate 'chapter' on a specific aspect of fishkeeping may well feature items of equipment, there may be little room for more than a brief look at them, certainly not enough for any expanded thoughts on their use and overall suitability. This appendix has been devised to 'fill in' some of the gaps.

Heating

O.K., so coldwater fishkeepers switch off here and move on to the next heading! Seriously, though, this is the only section that is not common to all aspects of fishkeeping in general terms, though some form of heating might be used in coldwater fishkeeping in order to raise fry more quickly or more efficiently during winter months.

UNO PRODUCTS

Heaters and thermostats are available to suit every conceivable need. Here, combined and separate units are illustrated.

At first glance, heating seems a simple matter of just putting a combined heater/stat in the tank, switching on and leaving it. In reality, there isn't much more to it but, to the beginner, just what does a thermostat do? What's the latest in style? Can I vary the options? . . . and so on.

The majority of aquariums are heated by a device placed in the tank, usually a heating coil housed in a glass/aluminium/polycarbonate water tight 'test-tube affair'. Again, most have the temperature controlling device (the thermostat) also housed in the same tube (this takes up less of the fishes' swimming space and is only one piece of equipment to 'hide' among the tank's furnishing).

The differences between the various brand names generally come down to how the thermostat actually works; long-established types have electro-magnetic actions using bimetallic strips, but increasing numbers now use micro-chip circuitry.

External separate thermostats are also popular and the micro-chip types have the advantage that they do not have to be immediately next to the tank (nor in actual contact with it) to operate successfully; temperature is measured through a sensor at the end of a thin cable either hung in the water (as in the case of **Aquarian's** latest) or incorporated in the heater unit itself.

'State of the art' units are fully-programmable, with 'low' and 'high' alarms fitted, also having provision for the fitting of additional standby heating units to provide safety back-up systems. Separate outside thermostats are particularly useful when employing other forms of heating, such as under-tank heating mats or undergravel cable heaters.

The **Eheim** range of power filters includes models with built-in heaters, but these are only suitable for freshwater use. A most recent development in heating is found in the **Bio-Plast** system where warm water is piped through the gravel to assist plant growth.

All heaters are safe, providing they are used with caution and in complete accordance with the manufacturers' instructions. In large tanks, using two heating units (one at each end) will spread the heat more quickly, as well as one acting as a safety standby for the other in the event of a malfunction.

NEVER OPERATE A HEATER OR HEATER/STAT UNIT UNLESS IT IS COMPLETELY COVERED BY WATER AND ALWAYS SWITCH OFF THE POWER BEFORE PLACING THE HANDS IN THE AQUARIUM OR MAKING ANY TEMPERATURE ADJUSTMENTS.

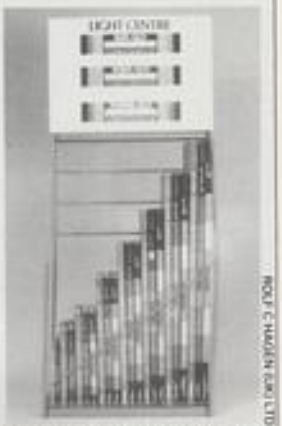
Lighting

Lighting is necessary for several reasons, the aquarist's need to see the fish being almost a minor one on the list of importance. Light stimulates activity within the tank and encourages and sustains plant growth. In marine systems, where proper plant growth is limited to cultures of what are technically-speaking macro-algae, light is needed in amounts more than just 'fish-viewing' levels in order to maintain their life and those of invertebrates.

Aquarium lighting is now more inclined to be by fluorescent tube than by tungsten light bulbs. Tungsten light bulbs have several drawbacks: they run hot, are inefficient and are usually short-lived in the overheated aquarium hood. Tubes run much cooler, cost less to run and also last longer; they are available in various 'colours': warm-white, north-light, daylight, sunlight etc, as well as offering high-power versions and those specially configured (light spectrum-wise) to grow plants.

The new clip-on, light-enhancing reflectors will also make more of their light available down in the tank, again helping plants to flourish even more. Actinic tubes provide the necessary wavelengths for marine algae and invertebrates.

For deeper-than-standard tanks, the use of high-powered bulbs will be necessary — these are the metal halide, mercury-vapour type of lamps, usually found hanging over superb marine displays. Obviously, these lamps are used without an aquarium hood, but must still be guarded against water splashes. All require rather heavy starting gear, but the latest types have this accommodated within the ceiling rose, rather than in the lamp housing itself.



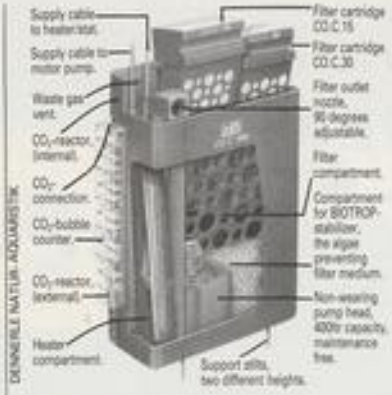
ROLF C HAGEN (UK) LTD

Fluorescent tubes represent the most popular form of aquarium lighting nowadays.

We should not leave lighting without stating a couple of rules: you will need about twice as much light for good plant growth as opposed to just fish-watching, one-tube illumination; you will need double this light amount again for good marine algae and invertebrate growths. Finally, you will need a crystal-clear cover-glass and well-filtered water to make full use of all the light at your disposal.

Filtration

It is not surprising that newcomers get confused about filtration, with all the different types of filter on the market.



Double-canister filters allow for sophisticated water quality management.

However, just remember that the basic purpose is to remove unwanted materials from the aquarium water — it's how it's done that gets you confused!

Filter media (in this case filter floss) and water 'conditioners' and filter carbon will aid filtration, while tonic salts and peat will help create specific water conditions.

'Unwanted material' can be anything from the visible detritus on the aquarium floor, to invisible, toxic compounds such as ammonia. Either can be dealt with successfully by aquarium filters, but in somewhat different ways.

Visible materials can be strained out **mechanically** in filter floss or foams. Invisible dissolved waste products (urine etc) may need removing **chemically** by means of activated carbon which adsorbs them onto the surface area of the carbon (medications are removed by carbon too, so turn off carbon-equipped filters when treating sick fish). Toxic wastes, such as ammonia, are only removed by ammonia-absorbing compounds (in freshwater aquaria only) or **biological** filtration systems in which bacteria do the job for you. Frequent partial water changes will also keep waste levels down by simple dilution.

Turning to the filters themselves, the most popular are power filters, where a small electric pump drives the water flow through the filter medium; these filters can be sited either in the tank or outside (depending on the model chosen). Outside filters are generally easier to maintain; because you can see them more easily, you can see when they need cleaning! Another good indicator of a dirty filter is when the water flow obviously diminishes; the new **Aquarian** power filter has an "I need cleaning" indicator.

The thermofilter will heat the water at the same time as it filters it. (Only for freshwater use).

However, inside filters come with some good features too: directional water flows, variable flow rates, extra aeration venturi systems etc. Whatever the size of tank, select the right size of filter for it; most manufacturers are now quoting tank/filter sizes on their product publicity and packaging to assist you.

Powerheads can be attached to undergravel filter airlifts and will increase the through-flow rate. This particular model has a scale that gives a direct read-out of the flow rate.

'Hang-on' powered external box filters are also popular; they are easy to start and easy to maintain. The only problem you may have is that they get in the way of the hood, or won't always fit over the width of the glass internal 'shelves' of your tank — check dimensions before you part with your cash.

Although most aquarists think of biological filtration as operating literally 'undergravel', most canister-type filters also work biologically to a certain degree; this degree can be made almost 100% by using ceramic pieces or open-pored sintered glass rings as the filter medium.

High water flow rates are not everything, and to achieve complete water purification a slower trickle filter is also needed. This can work aerobically (well-oxygenated), say 'above-tank' as in the **'Bio-Filta'** system (see *A & P*, December 1991) to convert ammonia-based compounds to nitrite and nitrate, and then anaerobically (no oxygen) to convert nitrates back to atmospheric nitrogen.

Maybe some beginners are also confused as to what a power head does. This is not a filter but merely, if you like, the motorised bit of one; it's simply a water pump which can be fitted on to the uplift tube of a normally air-operated undergravel system.

Talking of which, the bacteria in an undergravel filter system don't care in the least which way the water flows past them (reverse-flow systems are just that: the water flows up through the gravel instead of down). One benefit of this is that: as an external power filter is used to drive the water through, then the water is already filtered before it gets to the gravel. Therefore, the gravel stays cleaner longer. (Oh, you do use a gravel washer regularly to stop it from clogging up, don't you?)

Simplicity, coupled with efficiency, are the hallmarks of most foam filters.

Airpumps

Often the unsung pieces of equipment, the airpump supplies a very useful service. Where would our filters, airstones and, (alright then!) our sunken treasure chests and divers be without them? They need protecting if they are to continue giving good service.

Did you realise that airpumps have a filter fitted to

them? It's that little piece of felt usually fitted under the base — do rinse it through from time to time. Not only will it then keep the air clean as it is pumped into the tank, but an unclogged air filter will also help to keep the pump's performance up to scratch too.

The pump also needs protection against water damage; this will occur if water siphons out of the tank (during a power cut, or a mischievously switched-off socket) down to an airpump sited well below tank level. Guard against this eventuality by fitting a non-return valve in the airline near to the pump or, alternatively, site the pump well above the tank's water level line.

If you have a noisy pump, stand it on some foam; don't be tempted to put it in a foam-lined box since the pump needs ventilation to keep cool; it also needs easy access to a supply of air. Read the maker's instructions about regulating the airflow; some pumps don't mind being restricted by airtube clamps, but others prefer to have their excess air bled off (by an extra valve on the group of gang valves, for example) so as not to cause damage by too much back pressure.

Other (not quite so obvious) necessities

In addition to the mandatory pieces of aquarium equipment there are a number of 'extras'

PHOTOPET

Growing awareness of the hazards of an over-abundance of nitrates in the water has led to the development of several test kits, including this easy-to-use, accurate one.

that are becoming increasingly regarded as 'standards', much more so than they were a few years ago.

Marine hobbyists should bear in mind yet another piece of equipment — the **Hydrometer** — to make sure that the artificial seawater is mixed to the correct Specific Gravity (measured at the tank's operating temperature).

ROLF C. HAGEN (UK) LTD

For marine aquarists, the hydrometer is an essential piece of aquarium equipment. This particular model makes simultaneous specific gravity and temperature readings possible.

Opinions may be divided as to the implementation of a **Protein Skimmer** right from the outset, but this can always be added when a little more practical marine fishkeeping experience has been gained. (The same remarks apply to the use of **Ozonisers** and **UV Lamps**).

Most beginners, either as a matter of convenience, or before they learn any better, will want to use ordinary tapwater for their fishes. Whether for freshwater or marine aquarium usage, tapwater should be treated as a matter of course to get rid of chloramines, heavy metals and any other pollutants that may be in the water as supplied by the local water company.

There are a number of suitable *aquarium-specific* additives available from your dealer for this very purpose. This brings in consideration just how far the beginner ought to become involved with **Test Kits**; obviously not everyone taking up fishkeeping is going to have degree qualifications in water chemistry!

While most people appreciate that the fishes coming from differing locations may well require (or be used to) differing water conditions, not too many newcomers follow up this line of thought by understanding just how these conditions can be measured, and maintained, in the aquarium. Luckily, the basic parameters are few in number — **Hardness, pH** (acidity or alkalinity), **Nitrite** and **Nitrate.**

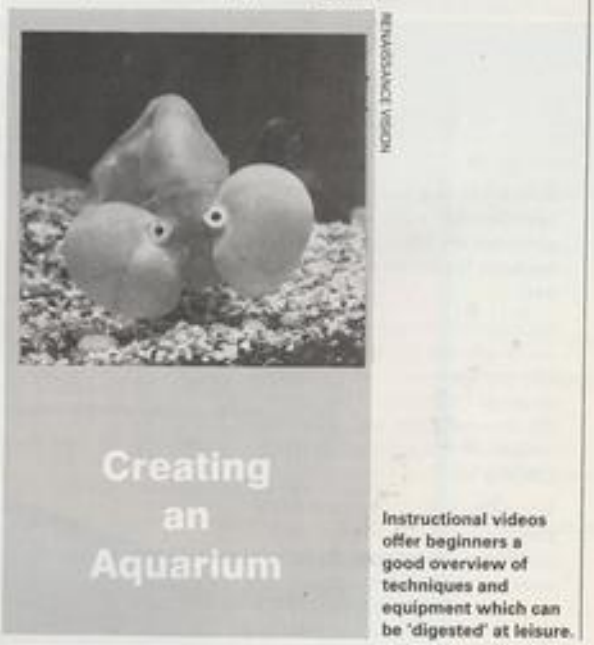
Of these, the last two are probably the least understood and yet should be the first, accounting (as they do) for many premature deaths in the life of any newly set-up aquarium — the so-called 'new tank syndrome'.

Explained briefly, the levels of nitrite and nitrate indicate the 'matureness' and efficiency of the aquarium's filtration system (especially where biological systems are used) and its ability to cope with otherwise toxic waste compounds. To get the systems up and running in a short space of time is only possible with the use of special maturing additives, otherwise it takes several weeks, or months, to reach peak performance unassisted. Because of this slow build-up, the tank's full quota of livestock should equally be slow in its build-up, so that the filtration system can keep pace with the increased amount of waste products from any new additions.

Hardness and pH measurements are easy to perform but emphasis should be placed on making any necessary (?) adjustments over a fairly long period of time, in order to avoid subjecting the fishes to disease-inducing stress. As a rough guide, if your local dealer can maintain fishes in a healthy condition, so can you, using the same water supply; 'importing' fish from other different water-quality areas around the country might present problems, but not if you take the trouble to understand what's involved in acclimatising the new fish well before you buy them.

Although the **remedies** for disease are equally easy to obtain (and to use), providing you take preventive measures right from the start, you shouldn't need to resort to them very often.

Finally, information is always your best weapon and investing in a good reference **book** will repay dividends over the years to come (there are one or two very good **videos** around as well). The basic information will hardly ever change, but bear in mind that any such changes and developments, as and when they occur, will be reported in the *A & P*, a very handy, and regular method of keeping up to date, aquatically-speaking.



REMBRANDT VISION

Instructional videos offer beginners a good overview of techniques and equipment which can be 'digested' at leisure.

Koi Calendar

By David Twigg

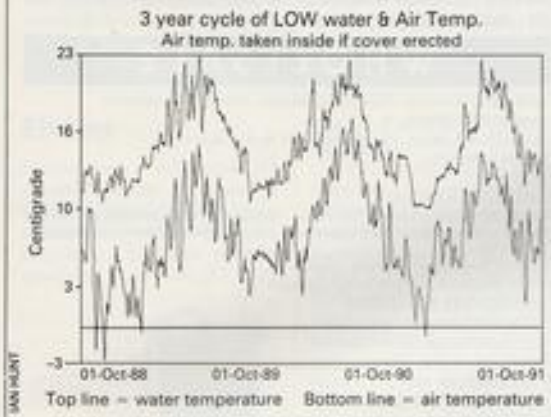
JOBS FOR THE MONTH

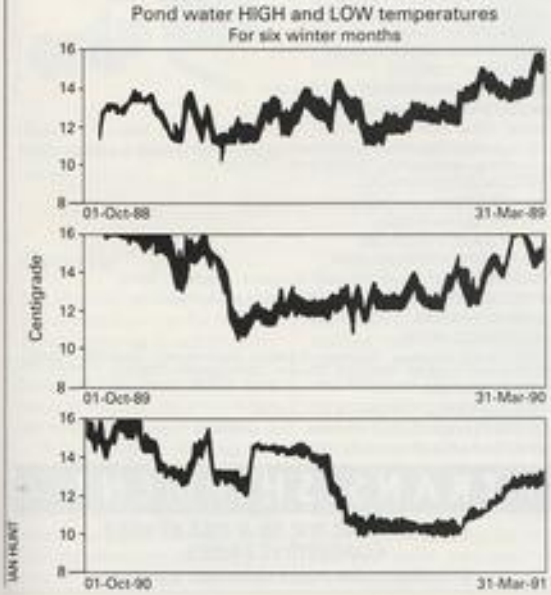
The coldest month of the year (statistically anyway) is with us. I have heated my pool for the last three years and, at this time of the calendar, am mentally tortured over the perennial problem of whether or not to give my fish a winter.

WINTER ABSTINENCE

Until now, I have always come down in favour of a period without food, but have always been wary of turning off the heat. So, next question is at what temperature to let the water bottom out. As you can see from the accompanying graphs I have tried very hard, within a limited budget, to have a controlled fall of temperature to bottom at 50°F (10°C) during February. This, then, is the time of rest and relaxation for my Koi, a chance to graze on the remaining blanket weed, and burn off any excess body fat caused by my feeding regime.

Hardfeeding my fish under the protection of my pond cover which makes Koi keeping an all-year-round pleasure.





Are you considering purchase of one or more 'small' fish at this time? A fish purchased this month will probably have had a couple of months (check this point with your dealer) in quarantine and adequate time to settle down after the long stressful trip from Japan . . . or wherever. If you have adequately sized indoor facilities with established filtration and, possibly (indeed, preferably), heated water, you will give them a headstart in growth and health before putting them into the outside pond later in the year.

Talking of new fish has turned my mind to possible treatment of same.

MEDICINE CHEST

Assuming that there are no 'internal' or 'systemic' problems to deal with, you should only need to be looking at topical treatment of 'bumps and bruises'. Have you looked in your treatment box recently? Is it well stocked with a variety of medicines, cleaning agents and the like? We all have our favourite treatments which work for us most of the time. It is, however, advisable to have other treatments to hand, should the old favourite fail us.

A quick look through my medicine chest shows the following items: cotton buds, tweezers, MS222, TCP, Mercurichrome, Malachite Green, Marinol Blue, Orabase, Friar's Balsam and surgical gloves. The gloves are not only very useful for preventing stains on hands when using malachite green and mercurichrome, but as both substances are toxic and can have nasty consequences if not handled correctly, the gloves become a necessity.

You will have noticed that I do not carry a stock of formalin in my kit. This is because formalin 'goes off' and becomes toxic to fish. This stage is generally described as the point at which crystals are seen to form in the bottle. I prefer not to put my fish at risk and purchase only the required amount of fresh formalin from my chemist that is required for the task in hand. I therefore have no excess chemical to store and, consequently, eliminate the chance of having a problem on my hands.

HANDLING METHODS

The method used in handling your fish is, of course, also very important. It is very much easier to handle, as well as treat your fish, if it is anaesthetised. If you are not familiar with this technique, please get the assistance of a vet or fellow Koi keeper who is experienced at this procedure. If you don't have a friend locally, or are not in a club, then may I suggest that you look at the diary of events later in this column and select a contact to ring? I am sure he or she will willingly give you all the help you require. If they can't help, they will put you in touch with someone who can.

A well practised technique in lieu of anaesthesia is the use of a wet towel laid over the head of the Koi. As this covers the eyes, the fish should quieten down sufficiently to allow application of the necessary medication.

As you are aware, Koi are very strong fish and do tend to thrash their tails about, so maybe my preparation may be useful to you in minimising any possible damage while out of water. I have a piece of upholstery foam about 24 × 15 × 2in (60 × 38 × 5 cm) thick which I lay on my table. I place a

thoroughly wetted (with pond water) towel over the foam. The fish is placed on this towel and then the far corners are pulled over the head and tail of the fish. Light pressure with the palm of the hand may then be used to control the fish while treatment is applied. Maybe a hand from one's spouse might be useful here in order to speed the process, thus occasioning minimum stress to your pet.

DIARY DATES

I have received notification of some of the show dates for this year so if you are one of those people who believe in forward planning here are some dates for your diary:

6/7 June — Yorkshire Section, BKKS, Open Show.
5 July — Lower Thames-side Section, BKKS, Open Show.
11/12 July — Northern Section BKKS, Open Show.
26 July — Essex Section, BKKS, Open Show.
5/6 Sept — Mid-Somerset Section BKKS, Closed Show.

WHAT'S ON IN FEBRUARY

3 — Kennet Valley Section BKKS. Monthly meeting. Contact Bob Thompson on 0734 713640.
6 — Middlesex & Surrey Borders Section BKKS. Monthly meeting at Hampton Football Club. Contact Alan Harington on 0932 845608.
9 — Mid-Somerset Section BKKS. Guest speaker is **Andrew Richards** of Brit Koi on his *Japanese Experience* at West Monkton Village Hall, Near Taunton. Contact Alan Purnell on 0458 72132.
10 — Northants Section BKKS. Monthly meeting. Contact Keith or Jenny on 0604 765856.
12 — South Hants Section BKKS. Monthly meeting at the Denmead Church Hall, Hambledon Road, Denmead, Hants, commencing 8pm. Contact Tony Price on 0705 261085.
12 — Merseyside Section BKKS. Monthly meeting at the Hare & Hounds, Maghull. Contact Phil Adamson on 051 220 2970 or Tom Hickman on 051 426 3673.
13 — East Pennine Section BKKS. Monthly meeting at The Phoenix, Platts Common, Barnsley (5 mins from M1 J6). Contact Dennis Godfrey on 0532 795134.
15 — Northern Section BKKS. Guest speaker is **Paul Stacey** of Japanese Water Gardens. Subject is *Diseases and Treatments*. St James Hall, Pendleton. Contact Tony McCann on 061 794 1958.
16 — Scottish Section BKKS. First meeting of 1992 will be held in Tillicoultry (by Stirling). Contact Archie Dick on 0786 832073. Anyone interested in Koi will be welcome.
19 — Mid-Staffs Section BKKS. Monthly meeting at RNA Club, Elmore Green Road, Bloxwich, at 8pm. Contact Joan Rutter on 0534 876699.
19 — Crouch Valley Section BKKS. Monthly meeting at Laindon, Basildon. AGM. Contact Allan Ward on 0268 543600.
19 — Yorkshire Koi Society. Monthly meeting at the Penguin Hotel, Wetherby (200 yards off A1), commencing 2.30pm. Contact Mrs Rita Thompson on 0484 851433 (B) or 0484 850422 (H).
20 — Wirral & District Section BKKS. Monthly meeting at the Lord Leverhulme Sports & Social Club at 8pm. Contact Jean Moffat on 051 678 1769.

OPEN INVITATION

I hope my monthly column of events, reports and topical items is proving useful in helping you to arrange your calendar. Although I do my best to contact as many people as possible, it may be that you don't see your society or section meeting or shows etc, mentioned here. If so, please contact me, or your club secretary, as soon as possible. This request also applies to dealers with special events, auctions, etc. My thanks to those who have already responded.

All Koi keepers are welcomed to the events mentioned in this calendar (an entry fee may be payable). Further details can be obtained from the contact telephone number quoted alongside the diary entry.

PRODUCT ROUND-UP

BY DICK MILLS

P & L Supplies

The battle against intruders around the pond continues, and the latest line of defence (pardon the pun!) takes the form of the PROTECTA-FENCE from **P & L SUPPLIES**.

It consists of a battery-powered energiser, earth stake and sufficient white polywire, insulators and stakes to make a two-line electrified 100m (c330 ft) fence. This can be erected around the pond (or any other 'no-go' area) to deter animals from intruding. The 'shock' experienced by the animals is not in any way lethal, and it seems to deter the animal even from jumping over the fence, as it doesn't quite know how high the shock might be distributed.

The wire itself forms no physical danger to animals; it won't cut or trap them, and is attractive in appearance for the domestic user. Obviously, a shorter, four-line fence can be constructed with the basic kit, but a 200m (c660 ft) extension kit is also available. This contains only wire, stakes and insulators, as the original battery powered energiser is capable of powering over 1,000 metres (c3,300 ft) of wire.

Full details from: **P & L SUPPLIES, Unit D1, The Seedbed Centre, Wyncolls Road, Severalls Park, Colchester, Essex CO4 4HT (Tel: 0206 844000 Ext D1).**

Camlab

One problem when using test kits is the difficulty of getting an exact match when comparing colours of the test sample against those on the provided chart. QUANTOFIX TEST STICKS, from **CAMLAB**, overcome this problem by having four colour zones which can be compared alongside fields of matching size on the chart.

To take their most useful range (for aquarists anyway), the pH-FIX INDICATOR STICKS are easy to use ('dip and read'), accurate and won't contaminate the sample. They are available in no less than 12 different versions covering wide, mid and narrow ranges. Three likely to be of most use to fishkeepers are MN/921 20 (pH 4.5-10.00), MN/921 50 (pH 6.0-7.7) and MN/921 60 (pH 7.5-9.5). Each box contains 100 sticks and costs £4.35.

Details from: **CAMLAB LTD, Nuffield Road, Cambridge CB4 1TH (Tel: 0223 424222; Fax: 0223 420856).**

CAMLAB

Camlab's Test Sticks are accurate and easy to use.

Eheim

Synonymous with quality aquarium filters for decades, **EHEIM** have turned their attention to pond filtration in a BIG way. They have released details of their first EXTERNAL POND FILTER SYSTEM.

JOHN ALLAN AQUARIUMS LTD

Eheim's latest: the powerful 3480 external power filter, plus pump.

Unlike their already renowned 'in-pond' filter/fountain kits, the new system (code No 3480) does its 'dirty-business' outside the pond. Water is pumped up to the large filter medium container (18 litres — c 4 gal — in size) by the powerful submerged 3180 pump (5,200 l/hour, 4·2 metre head — 1,144 gal/hr, 13·8 ft). The filter 'jug' has been designed in such a way that the through-flow of water guarantees a high decomposition of harmful matter in accordance with the trickling effect associated with an extremely long retention period.

Hose connections are 1 in (c2·5 cm) diameter (suction side) and 0.75 in (1·9cm) diameter (pressure side). The robust fibre-glass reinforced plastic pump body is fitted with a leaf-deflector to further protect the integrated coarse filter sponge which, in itself, is easily removed for cleaning.

Two other high-power pond pumps complete the range, and their capabilities fall either side of the pump described above — 4,300 l/hour (c 945 gal/hr) and 10,000 l/hour (c 2,200 gal/hr). All three are ideal for powerful waterfalls, cascades and external filter systems and carry a full 2-year warranty.

Full details from **JOHN ALLAN AQUARIUMS LTD., Eastern Way Industrial Estate, Bury St Edmunds, Suffolk IP32 7AB (Tel: 0284 755051).**

Cyprio

Burning the candle at both ends has always been bad for you but now, according to safety codes abroad, so is burning one's UV lamps — at least that's one interpretation of events as accounted to us by **CYPRIO.**

Any company looking for successful overseas sales figures must soon be able to prove that their products are *proven safe* before being offered for sale. Having already produced a successful product on the home front, namely their UV WATER CLARIFIERS, Cyprio felt that obtaining approvals for overseas would be nothing more than a formality. However, not so, said the Dutch and Germans. The problem lay in potential hazards encountered when changing a lamp — the normal double-ended contact tubes were unacceptable.

Fortunately, thanks to close co-operation between Cyprio and Philips Lighting, the problem was easily overcome: the new Philips TUV PL-S 9 watt long-life lamp features a single-end electrical contact and built-in starter. Together with a safety switch which isolates the lamp when the hood is removed for lamp replacement, this new design forms the basis for all Cyprio's UV systems and they are now sure of guaranteeing their safety records in Europe and the USA with these products.

Additionally, the new lamp offers several advantages over its double-ended predecessors: simpler electrics and more compact design mean lower costs; high UV light output means the 9 watt unit will treat 2,000 gallons (9000 litres), compared to 1,000-1,500 (4,500-6,800 litres) for current 8 watt units, and so on upwards. The lamp itself produces more than three times more light per unit length than a conventional 8 watt double-ended lamp and maintains its high-level output far longer — probably 2·5 times more UV light than a conventional near-equivalent at the time of that lamp's replacement.

Cyprio's filters feature 40mm (1·6 in) diameter inlet and outlets to minimise 'head loss', and special stepped hosetails permit use of 40 (1·6 in), 32 (1·26 in), 25 (c 1 in) or 20mm (0·8 in) diameter hoses or solvent-weld metric pipework. The now enlarged in size square-shaped, contact chamber increases turbulence and, thus, contact time.

All models have simple attachment facilities to suit other Cyprio filters, as well as those from other manufacturers. A full 12-month guarantee is given for the complete unit, as well as Cyprio's Clearwater Guarantee (when combined with the appropriate Cyprio external pond filter). Should you enlarge your pond, upgrade kits (Lamp-add and Tandem Conversion) are available so that your existing UV units are not automatically made redundant.

Cyprio have been appointed main agents for the full range of Philips germicidal UV lamps which includes, both the new single-ended types and conventional double-ended longlife lamps.

Full details from: **CYPRIO LTD, Eastgate Mews, 131 Eastgate, Deeping St James, Peterborough PE6 8RB (Tel: 0778 344503; Fax: 0738 348093).**

CYPRIO LTD

Cyprio's new, bigger, filter chambers: square-shaped in section to maximise turbulence and contact time.

Juwel Aquarium

The new range of AQUARIUMS, FILTERS ACCESSORIES was launched at last year's BAF in Manchester by **JUWEL AQUARIUMS** (as reported in **Product Round-up**, *A&P*, December 1991).

The aquarium/cabinet range includes three rectangular standard tanks (31, 40 and 48 in — c78, 101 and 120 cm), two rectangular tanks with angled front corners (40 and 48 in), two corner units, again with angled front corners (approx 38 and 47 in — c96 and 119 cm) and a 20in (c50cm) cube. Each aquarium features a hood with both front and rear lift-up flaps; movable lamp fittings, with optional extra clip-on tube-reflectors; built-in filter (see below) and both internal and external tank backgrounds.

The filters (each tank has its own suitably-sized model) are rather special too. They are two-phase bio-filters, with separate sections for mechanical/chemical filtration and biological filtration. The pump has vari-speed facilities to allow suitable circulation to be created, depending on type of fish kept — gentle for planted tanks, fast for mucky cichlids!

Sited in the corner of the tank, the black filter unit becomes almost invisible, and its presence in the actual water means that there are no flow losses due to friction as found in otherwise external systems requiring length supply/return hoses. With meagre electricity consumption (8-20 watts) the filters can deliver between 0-1560 litres/hr (0-343 gal/hr) depending on model.

JUWEL AQUARIUM

Juwel's two-phase filtration principle.

Full details from: **RUTO, 278 Wigan Lane, Wigan, Lancashire WN1 2RN (Tel: 0942 821114; Fax 0942 836396).**

Rocon Electronics

Apart from accuracy and reliability, another advantage of using modern micro-chip controlled thermostats is that these external types do not need to be anywhere near the aquarium in order to operate properly.

People often wonder if you can use these thermostats with the now-commonly-available combined heater/stat units. Yes, you can, as long as you set the built-in thermostat on the heater/stat unit to a temperature higher than that set on the external thermostat. (Without casting aspersions, if you think about it, this is a neat way of safeguarding against overheating should the external unit ever malfunction — not that they ever do, you understand!).

The **ROCON** range is not limited to a single 'state of the art', model but includes four very practical variations — you're not right in at the hi-tech deep end, so to speak.

The GENIE micro electronic thermostat is a very compact basic unit with only one control knob and an indicator lamp (in truth, what more could one want?). Three wires emerge from the smart blue and white casing — the white goes to the mains supply and the grey to the heater, while the remaining black cable has the temperature sensor which is simply dangled in the tank. Turning the control knob increases/decreases the temperature as required, which is measured by an in-tank thermometer. The Genie can handle loads up to 300 watts and works well with the ULTRATHERM undertank heater pads.

Moving up the scale, the PROTEMP TC1 and TC2 controllers provide slightly more temperature accuracy by means of proportional temperature control. Here again, the unit is neatly produced, larger than the previous model, with the wiring instructions remaining the same, so you don't need to 'retrain' due to an upgrading! The indicator lamp serves a multi-purpose role, however: when it's 'on', the temperature is low (i.e. needing heat); when it's 'off', the temperature is higher than that set (i.e. no heat needed). The lamp flashes when the correct temperature has been reached and the unit is functioning in full proportional mode. The differences between TC1 and TC2 models is their load handling capabilities — TC1 up to 600 watts, TC2 up to 1,200 watts.

The DIGI-STAT (handling capacity up to 600 watts) offers yet more facilities, the immediately obvious ones being a liquid-crystal display, two buttons and the indicator lamp. However, the workings are very sophisticated: either °F or °C can be displayed, and the SET BUTTON can be disabled if required. Normally, the Display shows current water temperature, but pushing the DISPLAY button reveals the temperature originally selected by the setting control. To change the setting, the Display button is held down while pressing the Set Button until the chosen temperature is indicated. In non-aquatic situations, such as boiler or valve control, rapid control is not needed and so the Digi-Stat has a 'slow mode' where the temperature is sampled every 10 seconds (instead of every second) and the on/off timing occurs over a minute (instead of over a second).

Additionally, the unit can be used in a cooling mode, i.e. switching occurs when high temperatures are passed, as opposed to heating where switching occurs when low temperatures are reached. The function-changes require repositioning of various linkages within the unit's body, but the supplied instructions make it all very straightforward.

Rocon's policy of marketing models at various 'affordable' levels makes good sense, for while we'd all like to use Rolls-Royces, there is always the cost to be taken into consideration, and there's little point in pricing oneself out of the market right from the outset.

Full details from: **ROCON ELECTRONICS, 5a Penyrorsedd Industrial Estate, Llangefni, Anglesey, Gwynedd LL77 7JA (Tel: 0248 750134).**

Reflections By David Sands

MERCURY MADNESS

I read in a recent issue of *The New Scientist* that people who live by the rivers of the Amazon Basin and eat fish for "breakfast, dinner and tea" are being poisoned. Mercury, dumped higher up river by goldminers, is contaminating the water and therefore the fish that Amazon villagers eat. With the World Health Organisation offering a safe limit of 50 micrograms, one victim was recorded to have 1158 micrograms of mercury per litre of urine!

A team of researchers from the Imperial College, London, found that people living near the Tocantins were also affected by excessive mercury levels.

Many gold miners, who use mercury to bind minute particles of gold which makes it easier to extract from the mud, are based on the Tapajos river in the Amazon (home to many fine fish species, not least *Corydoras ornatus*), but more can be found in the Madeira region and near the Venezuelan border. I saw many gold dredging barges on the Potaro River (a tributary of the massive Essiquibo River) in Guyana during my fishing expedition a few years ago, and it would appear that this method of gold panning is now widespread in South America.

According to *The New Scientist* report, there are about a million miners in Brazil, with 80% in the Amazon region at 2000 sites.

If mercury poisons people, what does it do to the fishes we enjoy keeping so much? There must surely be an adverse effect on all fauna and flora of the rivers polluted by it. Perhaps by keeping Amazonian species in their aquarium, fishkeepers are saving tropical fishes from possible mercury poisoning. . . .

I hope to travel to the Amazon, or to be more specific to the upper Rio Negro, this year (or early next year) as part of my doctorate studies. I will be testing water for temperature, pH and hardness, rather than mercury!

Everyone who has an interest in the Amazon must speculate on how long Nature will take to collapse under the weight of all the pressure placed on it by mankind. One of the reasons why I have been drawn to South America is because of its incredible diversity of plants and animals. Sometimes I feel that future generations may not be able to see this incredible continent before the increasing destruction goes too far.

It is hard to see how gold dredging will ever be restricted, or the methods changed. There are thousand upon thousands of tributaries in South America and they would be impossible to police. Even if governments made the use of mercury illegal, or researchers came up with a better/safer method of identifying gold dust from river mud, how would the miners be located and monitored?

In the meantime, fishes have to overcome dam building, river diversions, capture during migration, food reduction, (deforestation affects fishes too) and water pollution. Perhaps an aquarium is the safest place to swim in after all!

DAVID SANDS

Gold dredging in the Potaro River.

FISH FRIENDS

One of the best parts of fishkeeping is making friends with people who share the same hobby. Over recent years I have had the pleasure to discuss aquaristic ideas, studies and joys with a handful of good aquarists.

One of the main reasons why I encourage newcomers to our hobby is that I remember my humble beginnings when there seemed to be far more questions than answers. Without fishkeeping it is doubtful that I would have ever taken up photography (this has given me tremendous pleasure over the last fifteen years) or wanted to know more about geology, chemistry, biology and geography, to name but a few subjects. Recently, I had to delve deeply into statistics, a subject that made me ill at school, and one that I thought I had left well behind me twenty five years ago!

I began to think . . . If only I had been as interested in fishes then, I honestly believe some of the musty subjects at school would have come alive. It is so much easier to study something when there is self motivation. Perhaps fish club secretaries should encourage younger members to 'take their hobby to school', although I suspect many budding fishkeepers already ask biology teachers more than they want to teach!

While I always found aquarist clubs a bit restricting when it came to exercising 'flair and colour' (chairman, secretary, memberships, meeting dates, raffles etc) I admire a well run society. I worry, on the other hand, that club funds in the bank should not be there and are better used for members, rather than earning interest and helping banks.

A well run society can stimulate the hobby to newcomers and should also be able to foster good discussions among its more knowledgeable members. I wonder if clubs have thought-provoking topics on the meeting night agenda?

Examples might be:

Why keep fishes?

The beneficial effects of fishkeeping.

Experimental fishkeeping.

Why did David Sands' Grass Tank fail?

I would love to hear from club secretaries who fight the deadly curse of finding top class speakers every meeting by lighting up the meeting topics.

Coldwater jottings

By Stephen J. Smith

FRY UP!

Already, information will be arriving over the next few months from coldwater fishkeepers throughout the UK (and further afield) about the first spawnings of 1992.

And with this information comes the perennial question: "What should I do?"

Whether the spawnings are from goldfish or Koi (more likely at this time of the year), or any other coldwater species, the three most important factors for early success are space, food and consistent warmth.

"Cleanliness is next to Godliness" is a phrase which is etched into my fishkeeping instincts, so a three-or four-foot tank (90-120cm), sterilised using potassium permanganate solution and thoroughly rinsed before being refilled with clean water and left to stand for a few days (to equalise temperatures and allow chlorine to dissipate), constitutes ideal hatching quarters.

The spawn should, preferably, be transferred to such prepared quarters, but isn't it the way of things that your best pair of Orandas, or whatever, have spawned in the show tank in the living room, and you don't know where to turn next for space?

Therefore, you have a choice of removing the spawn, together with any plants, gravel, or rocks to which it has become attached, or leaving the spawn in the show tank and removing the parents which, if left with the spawn, will sooner or later devour the whole lot.

The major problems of removing the parent fish from the show tank are:

a) you may have nowhere else to keep them;

b) if power filtration is used, the filter will also eventually devour newly-hatched fry; and

c) a show tank of incubating eggs or developing fry is hardly the ornamental centrepiece of the living room which you promised your 'better half' when you set up the aquarium in the first place!

You may be surprised that many fish breeders immediately discard as much as 50% of eggs before they even start (especially when space is at a premium), so don't worry if you find it difficult to remove all of the spawn.

Gentle heat provided by a thermostatically-controlled submersible heater set to around 70-75°F (21-24°C) will ensure that the eggs that are going to hatch will do so in about four days (don't worry if some turn 'fluffy' — these are likely to be infertile eggs which have become fungussed and can be removed once the remainder have hatched).

A constant supply of food is really most important for any growing animal, and just as much so for fry. For the first two days or so, the newly-hatched fry will feed from their own yolk sac, but will be ravenous as soon as they become free-swimming. Proprietary liquid fry food is tailor-made for this purpose, and feeding with this should be followed up with ample supplies of brine shrimp nauplii just as soon as the babies' mouths are big enough to take it.

The ratio of mouth size to food size is especially important in the development of fry. They need as much protein as they can obtain, so move up to the next 'grade' of food as soon as possible, until the fish are consuming the largest *Daphnia*. Thus, *Daphnia* itself, finely-graded, should replace brine shrimp as soon as it can be taken easily, and the grade size of *Daphnia* increased in stages.

You will probably find that the growth rate of some fish soon starts to outstrip that of others. This is the time when the fish themselves need to be graded for size, while they also need to be regularly sorted and any with deformities culled (I return culled fry to the pond with the parents, where, somehow, they seem to disappear according to the laws of nature).

The object of rearing fish is not to raise the maximum quantity, but to achieve the best quality. So, as the fish develop and the space available diminishes in ratio, culling becomes more and more important. The result should be half-a-dozen (at the most) good-size quality offspring of which you can be proud. Have a good season!

Next month: **Producing Newly-hatched Brine Shrimp.**

I would like to hear from you with your coldwater fry queries and opinions, as well as any methods of developing coldwater fry which have worked for you. Please write to me **c/o The Editor, Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN.**

REFERENCE BOOKS

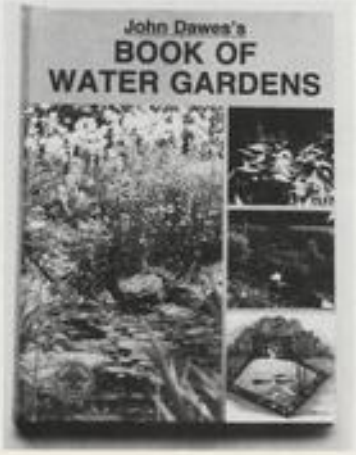
A vast number of books have become available for the coldwater aquarist over recent years, and these provide a valuable source of information for both experienced aquarists and those embarking upon the hobby.

Of course, no mention can be made of reference works without acknowledgement of the fine range of **Beginner's Guide Supplements** which appear regularly in *Aquarist & Pondkeeper*, as well as the occasional features on specific aspects of coldwater fishkeeping.

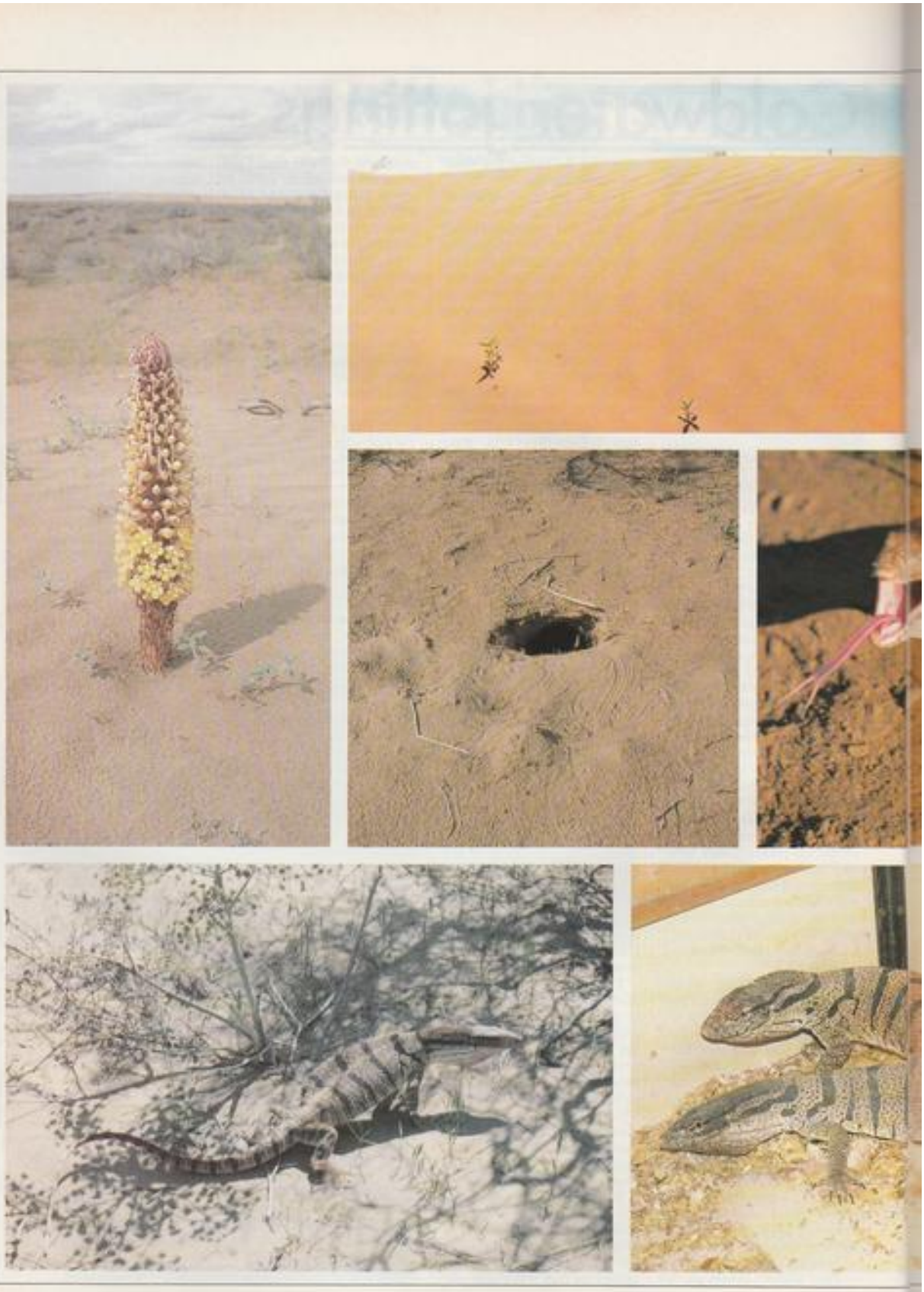
One of the favourite works for goldfish keepers is Frank Orme's evergreen, *Fancy Goldfish Culture* (**Saiga Publishing**, ISBN: 0 904558 63 0)while the following represents just a small selection of further books which might prove useful:

Goldfish Guide, Matsui and Axelrod (**TFH Publications, Inc.** ISBN: 0 904558 63 0); *Goldfish and Koi in Your Home*, Axelrod and Vorderwinkler (**TFH Publications, Inc**, ISBN: 0 86622 605 2); *Keeping Goldfish*, Dick Mills (**Blandford.** ISBN: 0 7137 1693 2); *The Art of Koi Keeping*, Peter Cole (**Blandford**, ISBN: 0 7137 21413); *The Interpet Encyclopaedia of Koi* (**Salamander**, ISBN: 0 86101 405 7); *Understanding Koi*, M George and D Hulse (**M I George**, no ISBN available); *The Interpet Encyclopaedia of Water Gardening*, James Allison (**Salamander**, ISBN 0 86101 5592); *John Dawes's Book of Water Gardens*, J Dawes (**TFH Publications, Inc.** ISBN: 0 86622 662 1); **Video:** *Creating an Aquarium*, John Dawes, (**Renaissance Vision/Pisces Aquaculture (Tewin) Ltd/John Dawes).**

By the way, just to set the record straight, please note that the ISBN reference for James Allison's *Interpet Encyclopaedia of Water Gardening* was incorrectly quoted in my review in **Coldwater Jottings** (November, 1991). The correct number is: ISBN 0 86101 5592.



John Dawes's Book of Water Gardens: a practical and comprehensive guide to all aspects of pondkeeping.



CENTRAL ASIA

REPTILES OF THE KARA-KUM

Part 2

The Caspian Monitor

Daniel Bennett goes in search of an elusive monitor . . . and gets lost in the process.

Photographs by the author

Far left, not all is desolation, though. Some of the flowering plants are really spectacular.

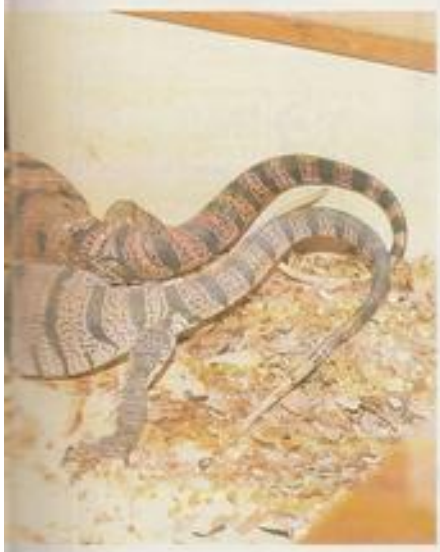
Left, the Kara-Kum can be a desolate place where you can easily get lost. I did!

Centre, clearly, an inhabited burrow . . . but where is its occupant?

Middle right, a very indignant Caspian Monitor!

Bottom left, the pattern of the Caspian Monitor helps it blend in with the shadows.

Bottom right, Caspian Monitors at Moscow Zoo. Animals from different habitats show different colours. The redder specimen is from a clay desert.



The Caspian Monitor is one of the rarest monitor lizards in the world. Because it is so rare, it is protected in the USSR, and all trade in this species is banned under international law. Almost all of the information published on its ecology is in Russian, and, as a result, it is poorly known elsewhere in the world.

The lack of information, combined with its scarcity, made it of particular interest to me, and for several years I had been besieging the Soviet Union with request for more information about the ecology of this rare and remarkable reptile.

In September 1989 I finally came face to face with some of my correspondents from the Moscow Zoo Department of Herpetology and the Soviet Union of Nature Conservation at the First World Congress of Herpetology in Canterbury. They invited me to visit the USSR to find out for myself how the Caspian Monitor spends its life. My visas and permits were issued promptly and, in spring 1990, I found myself in the Repetek Desert Reserve in the State of Turkmenistan to spend five weeks studying this magnificent lizard.

WIDESPREAD MONITOR

Varanus griseus is perhaps the most widespread extant (living) monitor lizard. It is found from northwestern Africa through all deserts, as far as western India. Within this range, three subspecies are recognised: *V. griseus griseus* from Africa, the Middle East and Iraq, *V. griseus koniecznyi* from eastern Afghanistan through Pakistan to India, and *V. griseus caspius* from eastern Iran, western Afghanistan and the adjacent part of the USSR.

The Caspian Monitor is distinctive because it grows to a larger size than its relatives and has a tail which is compressed rather than round in cross section. Compressed tails are found in all monitor lizards that spend long periods of time in the water, enabling them to use the tail as a rudder when swimming. It is of no use to a desert animal, and so, presumably, it is a relic from long ago when this monitor lived in a wetter environment.

OVERAMBITIOUS AIMS

I planned to take measurements and temperatures from as many specimens of the Caspian Monitor as possible, and to make observations on their diet, themoregulatory behaviour and habitat preferences. In addition, I hoped to be able to follow the monitors to determine how far they travel in their search for food.

My goals were overambitious, however, and, in the event, I was fortunate to see a specimen at all. Every morning I would walk through the desert looking for footprints and examining burrows. The Caspian Monitor can run at up to 12.5 miles (20km) per hour over short distances and wastes no time in its effort to get away from people. In addition, its wary disposition and cryptic coloration made it unlikely that I would be able to make any direct observations of the animals.

Luckily, the frequent rain and soft sand of the Kara-Kum made following spoor very easy, because almost every night the rain would wash away all the old tail and foot prints. *Varanus griseus caspius* is easy to track in this way because it is by far the largest lizard in this part of Asia. Adults can grow as long as 5 feet (150cm) from the snout to the tip of the tail and weigh over 11lb (5kg). The impression left by its feet and tail are very distinctive when it is walking, but when disturbed, it runs so quickly that only sporadic depressions in the sand are left behind.

FRUSTRATING VIGIL

In the first two weeks I found evidence of two monitor lizards in the flat areas between the sand dunes. In both cases the marks were at the entrances of burrows. They seemed to indicate that the lizards had come out of the burrows and sprawled on the sand (leaving perfect impressions of claws and belly scales) before retreating underground again. In neither case had they wandered more than 6 feet (c.2 metres) from the burrows; in fact, the larger animal had rested with only its

head and the first third of its body outside.

I selected one of the burrows and spent the next five days waiting for the lizard to emerge. To my despair, it remained underground. The impression of its belly scales appeared just inside the burrow on several occasions, so although it was definitely at home, it had no inclination to leave.

This was not the sort of behaviour I had expected from a gregarious, carnivorous lizard. However, it was very early in the year, temperatures were not very high and there was frequent rainfall. As stated in the previous article, the Kara-Kum desert gets very cold in the winter and extremely hot in the summer. The Caspian Monitor does not emerge from hibernation as early as its smaller cousins, because its greater bulk requires more heat to get it started. Perhaps these lizards were only just beginning to emerge from their winter retreats.

With this in mind, we opened the second burrow. Digging with our hands, we were able to reveal a shaft 3 feet (c.1 metre) deep and at least 6 feet (c.2 metres) long. The lizard was even further inside so we abandoned the excavation and returned to camp. I wondered whether I would see any monitors on this trip, apart from the residents at Moscow Zoo.

SUCCESS . . . OF SORTS

That evening I was presented with a large cotton sack that hissed and heaved like a soul in torment. I opened it with great apprehension, half expecting to find an angry Levantine Viper inside. To my delight, it contained a young adult Caspian Monitor, caught while it lay outside its burrow less than a kilometre from where we had been digging. This lizard measured 35.5 inches (90cm) in total, but weighed only 20 ounces (630 grammes). It was healthy but its stomach was clearly empty.

I kept it for four days in the hope that it would produce some evidence of its last meal, but to no avail. This monitor was released close to where it had been caught. Because it had been subjected to so much stress, I decided it would be pointless to follow it. This was to be the only Monitor Lizard I saw in Kara-Kum.

LOST IN THE DESERT

I continued to search the desert every day, and travelled over 110 miles (175km) of asphalt road in the hope of finding a monitor attracted by the hot surface, but with no success. One morning I woke up early and set off through the desert determined to find this elusive animal. I had soon come to feel at home in this beautiful desert and spent several hours wandering happily from one of nature's miracles to another.

As the temperature rose, I took shade under a large Saxaul Bush and watched a handsome woodpecker fetching food for its extraordinarily noisy chicks. I wondered why every predator for miles around wasn't attracted by the clamourous chatter, and promptly fell asleep. When I woke up, the sun was overhead, so I decided to go back for some breakfast. I stood up and looked around to check my bearings, and it was several minutes before I was able to admit to myself that I didn't know what direction to go in. Before we had even arrived in Repetek, Victor Makeyev, of the Soviet Institute of Nature Conservation, had expressed surprise that I hadn't brought a compass.

"I don't need one Victor, I'm from the Pennines".

He was not impressed. "If you get lost, when we find you, you will be . . . (consulted the dictionary) . . . mummified".

I had taken no notice of this warning, and now it was time to regret it. As I walked around in large circles, hoping to pick up my footprints and follow them home, I began to consider seriously the prospect of mummification. Perhaps I would lie undiscovered in the desert for millenia before being unearthed and deposited in a museum! This was quite an amusing thought at first, but after an hour of concentric wandering, I was more lost than before, if that is possible, and I began to panic.

Two directions seemed likely, but unfortunately they lay opposite to each other. I set off in a straight line, hoping for the best. As I walked, I realised why the term 'desert' was so apt. If I was walking in the wrong direction I would not meet with humanity for many hundred of miles.

For us, the deserts are desolate, inhospitable wastelands; their adeptness at deterring human settlers has resulted in them remaining the most undamaged regions of the earth. Mankind will only venture into such areas if the pickings are very rich indeed. Oil and gold are bait for many; for me, it had been an evil-tempered reptile.

It was with inexpressible joy that I finally reached the railway track, and followed it for 2 miles (3km) back to Repetek. I had been lost for less than four hours, but I have never ventured anywhere without a compass since!

FINAL THOUGHTS

The day before we left for Moscow, I found the track of a large (over 3 feet — c.1m) Monitor Lizard. It had travelled over the crests of the sand dunes, going directly from one bush to another. After I had followed it for almost a kilometre, the trail suddenly stopped. Perhaps the lizard had seen me and decided to make itself scarce.

Of course, such slight observations as these prove nothing in themselves, but they seem to indicate that the Caspian Monitor does not wake up from hibernation and launch itself into a frenzy of feeding and mating. The fact that no faecal remains were found anywhere seems to indicate that the monitors do not begin to feed immediately, probably for the same reason.

Speed of digestion is dependent on temperature, so a meal eaten on a warm day would putrefy in the stomach if the following days were cooler. Emergence is perhaps more gradual, and the serious commitment of leaving the safety of a deep, warm burrow is not taken until the spring is well underway.

ACKNOWLEDGEMENTS

I am very grateful to Moscow Zoo, Victor Makeyev and Anatoli Bojanski of the Soviet Institute of Nature Conservation, Suchan Veyisov of Repetek Reserve, and Ron Marlow of Las Vegas, Nevada, for making this trip possible and for many acts of kindness.

"It's nothing serious Mr Thornton, but you'll have to give up fishkeeping for a while . . ."

Channa orientalis — the Smooth-breasted Snakehead — so-called because of its lack of pelvic fins. *C. orientalis* is also more colourful than *C. gachua*.

Underside of *C. gachua* showing the small pelvic fins.

SNAKEHEADS Part 2

Thoughts on Snakehead Classification — *Channa gachua* and *C. orientalis*

Stephen Clark explores some of the problems regarding the identity of these two relatively small species.

Photographs, unless otherwise indicated, by Kevin Webb

There has been a great deal of confusion arising from the scientific relationship of some species of the family Channidae, more commonly known as Snakeheads, in particular, the study of the relationship between *Channa orientalis* and *Channa gachua*. For the more advanced hobbyist and field researcher alike, this study not only presents a challenge regarding the review of old ichthyological data, but it also has far-reaching implications regarding the understanding of evolutionary trends.

BACKGROUND

Physical differences

To grasp some knowledge of species differences, one can read the research of icthyologists who have tackled the subject in the past, such as Myers and Shapovalov who, in 1931, complied a significant taxonomical reclassification, and discussed in detail the differences between *Ophicephalus* and *Channa*, finally rejecting the former as a generic synonym. Their work was based on a comparison of *C. gachua* (*with* pelvic fins) and *C. orientalis* (*without* pelvic fins).

The authors, following the strict rules of Zoological Nomenclature, united the genera and included the three African species, boldly affirming that *Ophicephalus* be merged into the single genus, *Channa*. Concluding that *C. orientalis* may be regarded as a "series of anomalous specimens" when compared to the similar *C. gachua*, they, strangely — after an excellent discussion on the basis of the species merging — were hesitant to synonymise them (as did Deraniyagala in 1929), listing the fish separately.

Sunder Lal Hora (1921) researched several Indian freshwater fishes without pelvic fins from streams and rivers and

Mouthbrooding Brown Snakehead male.

Portrait of *C. gachua*, the Brown Snakehead. The pelvic fins are hidden by the rock.

found that, in all cases, no injury or accident had caused the fin to be absent. In all genera, absence of the pelvic girdle or degeneration of the muscles (apart from *Channa*) were apparent, and this was tentatively linked to congenital injury in the embryonic stage. But in *Channa* (referring to *C. burmanica* and *C. aniarica*) the character of absence of an appendage for the insertion of pelvic fins, had become permanent.

Breeding behaviour

One can also include the important character of breeding behaviour in the comparison. In an account of *Channa gachua*, a respected Indian author, Mookerjee (et al. 1950) stated that it did not build a compact nest at the surface of the water (like other Channidae). It scooped out a small hole in the mud, not far from the edge of a pond or river bank, in shallow water, instead.

Spawning normally started in the morning and continued throughout the day, and between 1500–2000 golden yellow eggs (1.5mm) were laid and orally transferred into the hatchery by the parent fish. An oil globule constituted a quarter of the egg, and this effectively faced the fry downward. Hatching took about 17 hours and, by the 19th day, with a size of 5mm (an advanced growth rate in nature would be 10mm) the yolk sac is spent. Food during the 35–105mm stage consisted of small insect larvae, *Daphnia* and *Cyclops*.

PERSONAL EXPERIENCES

Channa gachua

In my own observations, six handfuls of fresh virgin (non-chemical) peat were added to a 90×45×15cm (36×18×6in) all-glass aquarium, along with tapwater. After three weeks I knew that these quarters would be well conditioned for the Snakeheads' introduction. No heater or filters were added; my bungalow's central heating realised a water temperature of 64°F (17.7°C).

The *C. gachua* taken from the locality of Vijawada, India, at a size of 15cm (6in) had elongate dirty brown and grey speckled bodies, with the typical flat 'snaky' head. My identification was based on the presence, on the underside of the belly, of pelvic (ventral) fins. No apparent sexual differences could be seen and, without any suitable literature to consult, I took a calculated risk and two of the smaller Snakeheads were initiated into one of my artificial biotopes and heavily fed with white maggots.

Many aquarists would now gasp at my suicidal attempt to foul the water and create ideal conditions for an 'in-tank' culture of rotifers. I was gambling that if the fish were indeed a pair, the presence of food for their fry and a partial water change to simulate the onset of the rainy season would do the trick.

Three weeks later it paid off. I did not observe the spawning, and even if I could have had, the swirling particles of peat in the water would have obscured my view. But I did notice the extended mouth of the slightly larger-sized male and the beautiful shiny streak of aquamarine painted on his chin. The female, although subdued, did not seem to be damaged by the spawning, so I left them alone, but still fed the occasional maggot for her.

Ten days later, a swarm of only 60–80 young fry approximately 5mm long were continuously swimming up and down in one corner of the tank, their white bellies bulging full of rotifers and with father constantly guarding and lunging for me if I went too near to the aquarium.

The male soon started feeding again and so, half the fry were transferred to a rearing tank, the rest left to be observed if either or both parents had any cannibalistic tendencies. Feeding was stopped for a week and still all the fry swam around browsing on their cultured food. Finally, after a month, and at a size of 10mm (0.4in), the remaining fry were transferred and started feeding on powdered flake food. One week later, the pair spawned again, this time with an extended brood of between 100 to 120.

Channa orientalis

Channa orientalis also incubates its eggs orally according to Roth (1985) who conditioned his pair on beast heart and small fish. Each day, the colouring of the fish became more intense, a beautiful steel blue replacing the dirty yellow body, and the margins of the fins becoming more colourful.

A large area of gravel was removed in the corner of the fish tank and, after spawning, the male's throat was distended with eggs. Some 10 days later, 80–100 fry, approximately 3mm long, emerged from the mouth. They browsed on the algae on the side of the tank and, in two weeks, had doubled in size. The male still guarded the young at an age of 8 weeks.

FINAL THOUGHTS

The biotopes of *Channa orientalis* in Sri Lanka are mainly small streams, in many cases next to the stillwater ponds inhabited by *Channa gachua*. My own conflicting breeding accounts of *C. gachua* compared with Mookerjee (1950) creates further mystery regarding the 'pelvic-finned' Snakehead, perhaps pointing to changing

environments as an explanation to the differing breeding habits observed.

So, until further research is done by ichthyologists, the names of these two fish will remain the same. Classification according to 'colour variations' (see Table) may simplify the confusion at the present, when identifying fish, but one must, at all times, remember that it does not matter how many times a name might change ... the fish always remains the same!

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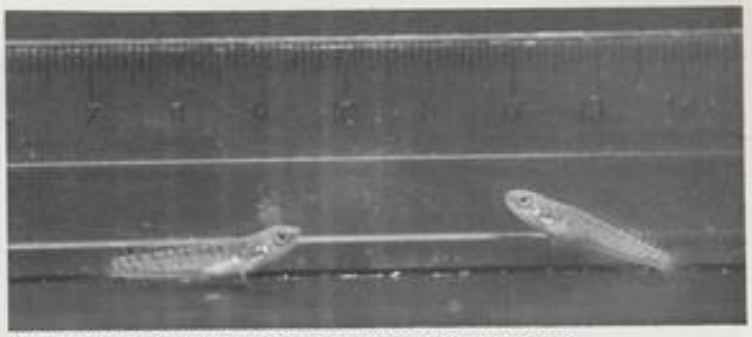

Two 8-week-old *C. gachua* fry at approximately 20mm (0.8in) in length.

TABLE OF COLOUR VARIATIONS OF *C. gachua* and *C. orientalis*

Name	Variant (or country)	Differences from norm
C. orientalis	'Sri Lanka'	12-15cm (4.7-6in) long, pelvic fins *absent*, endemic to Island of Sri Lanka.
C. gachua	'Kelaarti'	Over 15cm (6in) long, *with* pelvic fins; slightly deeper body than mainland species, longer caudal and pectoral fin. Sri Lankan variant.
C. gachua	'China'	Length 12-15cm (4.7-6in), body brownish olive. Fins yellowish tipped, caudal and dorsal displaying minute white spots.
C. gachua	'Bengal'	Whole of body is the colour of orange peel, with some irregular stains of a redder hue on sides of head, pectoral and caudal fins.
C. gachua	'Thailand'	Dorsal has a bright red margin, the forepart of the belly is greenish white and posterior purplish-white.
C. gachua	'Thailand Koh Chang'	Specimens from Koh Chang (Gulf of Siam) have a deep black body.

News from the societies

Hounslow and District Aquarists Society

Thirty one members and three visitors attended the 42nd Annual General Meeting of the Hounslow and District Aquarists Society held on 20 November 1991 at St. Stephens Church Hall, Parkside Road, Hounslow.

On completion of reports by the retiring committee, the following members were elected to serve on the 1991/92 committee: Chairman — R. Allum; Secretary — R Nelhams; Treasurer — K Marriott; Show Secretary — T Butler; Trophy Secretary — K King; Librarian — P Anderson; Social Secretary — Mrs D Marriott; Newsletter Editor — A Constantine; Public Relations Officer — Mrs R Brewer; Floor Members — P Caira; E Sheppard.

Visitors are always welcome at the society's meetings held at 8 pm on alternate Wednesdays at St. Stephens Church Hall, Parkside Road, Hounslow.

All enquiries should be addressed to the secretary: Mr R Nelhams, 35 Exeford Avenue, Ashford, Middx., TW15 2EF. Tel: Ashford 259880.

Diary dates

Burley-in-Wharfedale Aquarist Society

The 1992 Burley-in-Wharfedale Open Show will take place on **1 March** at Collingham Village Memorial Hall, Collingham, Nr Wetherby. Booking in: 11.30 am onwards; Judging and Auction: 1.00 pm start.

For further details, ring 0943 862 643.

Catfish Association of Great Britain (Northern Area Group)

The CAGB (Northern Area Group) are holding an Auction on **23 February.** Venue: Boys Brigade HQ, Bryn Road, Bryn, Nr. Wigan. Start: 2.00 pm. Booking in: 1.00 — 2.00 pm.

The Annual Convention will be held on **Sunday 22 March** at the "Mill at the Pier", Wigan Pier, Wigan, Lancs, starting at 11.00 am. The speakers are: **Dr Gordon McGregor Reid** on *The Catfishes and Waters of the Korup Rainforest, West Africa,* and **Mike** and **Gina Sandford** who will be presenting one of their excellent audio-visual 'experiences'.

Other attractions include: a display of catfish, a 'silent' auction, a raffle and trade stands. Full details from R. Thompson, 13 Grange Avenue, Kitt Green, Orrell, WN5 0DF. Tel: 0942 224059; or Trevor Morris, 102 Cale Lane, New Springs, Wigan, WN2 1MB. Tel: 0942 42386.

ITEMS FOR THIS PAGE SHOULD BE SUBMITTED AT LEAST 8 WEEKS PRIOR TO PUBLICATION OF THE RELEVANT ISSUE OF *A&P*

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.

PLANTS

YEAR-ROUND APONOGETONS

I have recently seen Aponogeton *'corms' on sale. How do I go about cultivating these plants all the year round?*

Aponogeton tubers come from two principal sources:

The cheaper ones come from Sri Lanka and these are harvested from the dried up mud of ponds during the dry season. They can then be stored for up to two years before being added to water again. The tubers are formed by the plant during the rainy season and act as storehouses of starch and other nutrients. This ensures the survival of the plant during the dry season and gives them a headstart on other species which have to start again from seed when the rains return.

To keep your tubers from year to year, the plants must be adequately nourished in order to build up a surplus supply of starches, etc, in the tuber. When, after about 9 months' growth in aquaria, the leaves become smaller and depauperated, it is time for them to be rested.

Remove them from the aquarium and store them in a container of damp sand at about 60°F (15.5°C) for about three months. After this, they can be returned to the aquarium again.

Dearer *Aponogeton* tubers are collected in Madagascar and Mauritius. Most of these species must be regarded as annuals as they are difficult to keep going. One exception is *A. ulvaceus* which can be treated in exactly the same way as the Sri Lankan species.

FLORA DUTCAL

***Aponogeton madagascariensis* (the Lace Plant) does not require a 'resting' period.**

KOI

REIN TIPS

I am building a new Koi pool and am interested in using REIN fibres. I would therefore be very grateful for any advice you can give me.

I'm enclosing a leaflet about REIN fibres which tells all, but I will emphasise just a couple of points.

You will require what is known as 'soft' or building sand, sharp sand being quite unsuitable. It is not necessary, or indeed recommended, to include any additives in the mix, as this is already waterproof once drying has taken place. In fact, it is recommended that the pool be filled with water on the day following completion, as cement sets better under water.

The mix should have the consistency of cream cheese; you will be delighted at how easy it is to apply.

The fibres should be weighed out exactly as the instructions tell you, and the mix should be 2 to 1 sand/cement, avoiding an over-wet mix. In hot weather, too-fast drying should be avoided, either by spraying, or covering. Of course, a mixer is essential to obtain good results.

The finished pool should be painted with something like Aquaseal 40 or Aquasol to prevent the alkaline effect which results from the high cement content. Before painting, all surface fibres must be removed with a blowtorch, otherwise they stand up and are very sharp.

OVER-WINTERING KOI

Although my Koi have been left in my pond this winter, I'm thinking of bringing them in next year because my pond is not very deep.

I have never felt it either necessary or advisable to bring Koi into the house during winter, as Koi are, after all, coldwater fish. If anything, such changes of environment can cause stress.

Provided that your pond does not freeze solidly, your Koi should come to no harm. If necessary, a simple cover over the pool, or even a small pool heater, should ensure that freezing will not occur.

LOTUS

Koi should be fine in an outdoor pond, as long as it doesn't freeze solid. For extra protection, use a pool heater.

What's your opinion?

Billy Whiteside, BA, ACP

NEWS OF READERS SOUGHT

When I decided to take a rest from **W.Y.O.?** several years ago I decided to keep a few of the unused letters I had left over from the last edition. Looking at the letters now makes me wonder what became of the aquarists who wrote to me at that time — around January 1986.

Those who wrote to me included **Mr B. Curtis**, of Newmarket, Suffolk; **Andrew Grant**, of Dunfermline, Fife; **Jonathan Woodhouse**, of Maidenhead; **Ron Wright**, secretary of the Anabantoid Association of Great Britain, whose home was at Colchester; and **Mr T. A. Jones**, who lived at Warrington, Cheshire.

If any of you still read my regular page in *Aquarist & Pondkeeper*, please drop me another line. Also if any other readers know about any of the aquarists named, I should be pleased to hear from them.

HUMANE DISPOSAL

How do you put down, i.e. kill, an ailing fish relatively painlessly? Some years ago I posed this question in **W.Y.O.?** and controversy raged for months. I ask the question again because **Dr Neville Carrington**, of Interpet Ltd., recently sent me a copy of *The Interpet Manual of Fish Health*, a 208-page book written by Dr Carrington, **Adrian Exell**, and **Dr Chris Andrews** — formerly in charge of The Aquarium at London Zoo, and now based at the National Aquarium at Baltimore, near Washington, in U.S.A.

Both Neville and Adrian kindly autographed the book for me. Published by Salamander Books Ltd., and distributed by Interpet Ltd. of Dorking, the very well-illustrated book covers almost everything an aquarist could want to know about fishes in sickness and in health.

When one of my Angelfish developed pop-eye recently I referred to page 144 of the book and learned quite a bit about the condition. The section concluded by saying that if treatment did not effect an improvement and the fish appeared to be showing signs of distress, it should be painlessly destroyed. The book suggests that a vet could provide fish anaesthetics, such as benzocaine and quinaldine, and that a strong solution will cause the diseased fish to go unconscious and subsequently die.

A thoroughly good book which I highly recommend.

The other suggestions are decapitation with a sharp knife or scissors in the case of small fish, or stunning — using a sharp blow from a metal or wooden rod — followed by decapitation for larger fish. In the past, the coward's way out was often to flush the ailing fish down the toilet; but the book points out how this could spread diseases to other fish — and it's certainly not a kind way to dispose of a sick creature.

I can thoroughly recommend *The Interpet Manual of Fish Health*. The three authors are keen aquarists, as well as scientists, and having paid a visit to the Interpet factory some years ago, I can assure you that what Dr Carrington and his team don't know about fishes is probably not worth knowing!

OUT & ABOUTING

Mr I. Carter does not give his Christian name, but his address is 111 Kilncroft, Brookvale, Runcorn, Cheshire WA7 6BH, and I suspect he may be a teenage reader. He makes a suggestion to *A&P*. "My idea is that I wish to visit the aquatic retail outlets about the Midlands and North West, and possibly North Wales as well. On these visits I would really love to write an article about the outlets and send it on to you for your **W.Y.O.?** column. The idea is that readers in the North West area can get an impression of the best places for their interests.

"**John Dawes**, our Editor, does this, but seems to stay in the South. I would dearly love to cover the North West and maybe encourage someone in the North East and Scotland to do the same.

"One day I hope to be an authority on tropical aquaria — and where else to start but with the best, *A&P!* Please let me know what you think and what John Dawes' thoughts are. I would be grateful for the chance of doing articles on outlets and would be overjoyed if they were incorporated in **Out & About** from time to time. I thank you for taking the little time you have to spare to deal with my letter — and keep up the excellent work in **W.Y.O.?**"

You're a bit of a flatterer, Master Carter! However, I think I was still a teenager when I had my first article published in *A&P*; and I just may have come up with the very first article and the title for **Out & About**. I'd be happy to include the occasional piece from you in **W.Y.O.?** — as long as it's just a letter of one or two sides.

I can't speak for our Editor — but I do know that when I told him that as a youngster I wanted to write for *A&P*, he told me that when he was a youngster he wanted to be the magazine's Editor! So, we both got our wishes granted.

I'm sure that if you sent him a good enough article for **Out & About**, it would have as good a chance of being published as the work of other contributors. No doubt our Ed. will add a few words in brackets after I end this paragraph. John certainly likes to encourage new writers — especially young ones! (*I fully endorse Billy's comments.* **Ed**).

FISH HEALTH FREAK

Joanne Beel is 15 years old and lives at 50 Cross Street, Spalding, Lincs. She writes: "I am a fish freak who loves cichlids, Pecos and Piranha. In the October '91 issue you asked about favourite aquarium books. Mine is *A Popular Guide to Tropical Aquarium Fishes*, compiled by Dick Mills from bits of all the books in the Salamander *Fishkeepers' Guide* series. I also like the *Complete Book of Tropical Fish* by Keith Segar. I especially like this book for its section on diseases.

"Fish diseases fascinate me and I hope to work in this area when I leave school. My school friends think I'm weird because I spent two weeks of work experience with a fish health consultant. I have read *A&P* for four years and really like the magazine."

I wonder who the fish health consultant was. A local vet, now sadly passed away, used to refer the occasional fishy problem to me. Sadly, the serious effects of the algae killer I used in my Angel tank still continue to show with further deaths of individual Angels.

The fish look perfectly healthy visually but loiter near, or at, the surface of the water, breathing heavily. They do not eat and, after some days or a couple of weeks, just die. I suspect that the chemicals in the algicide affected the respiratory system of the fish, or their immune system.

I recently gave a friend some Wardley Allclear Aquarium Algicide Tablets that I bought some years ago and forgot I had. The package made no claims about *not* damaging fish or higher plant life. It *did* claim to control many common algae and prevent their reappearance if used as directed. The friend reported that his algae problem had been solved and that his fish and other plants seemed

quite happy. My own findings were identical some years ago.

FISH DON'T READ BOOKS

Sometimes I think we may lose the fun in fish keeping if we stand too far back and let the scientists take over. I'm very impressed by vast fish-houses packed with tanks containing thousands of fry kept in spotless water in all-glass tanks containing nothing but a filter and a few chemicals; but, to be honest, I'm even more impressed by the ordinary aquarist, who may live down your street, and who may show you a tank of young fish (s)he has raised. When you mention that the books state that the species is difficult to breed, these aquarists look surprised and tell you they've been breeding them for years.

Some years ago I visited such a gentleman with a beautiful marine tank. His eyesight was not the best and when I expressed astonishment that a particular pair of marines was spawning, he produced a large magnifying glass, peered in and said, "Oh, is that what they're doing? They do that quite often." According to the books it should not have been happening at all.

Occasionally, young aquarists are surprised when their fishes do one thing and the books say the opposite. I make the point that the fish have not read the books and some of them may well not behave as authors say they should. If *your* method works, it's a good way for you and your fishes.

Do any of your fishes and plants behave in a manner that differs from what the books suggest? If so, please drop me a few lines. Perhaps you consider some of the information given in the books to be wrong. Care to cite a few examples and send them to me, please?

CALIFORNIA *vs* SOUTH ANTRIM

I recently returned home after a photographic trip along the coast of southern California. I was most encouraged to realise that the romantic beaches such as Venice, Malibu, Santa Monica and Long Beach, together with their surrounding scenery, come a poor second to those of the North Antrim Coast around the Giant's Causeway.

If you can't afford California, try County Antrim. If it only had the Californian weather and sunshine.... I hope to publish details of my fishy trips along the coast of California and illustrate them with colour photographs in future articles.

Look mate! Your £5.00 per annum windscreen insurance doesn't cover me fitting a tinted B.M.W. unit in your so-called Austin-cum-bmw-fronted Aquarium Special!