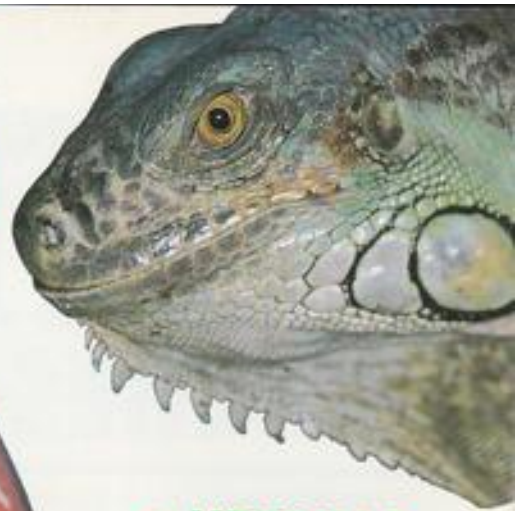


DECEMBER 1993

# A & P

**AQUARIST & PONDKEEPER**

UK: £1.75 US \$4.95



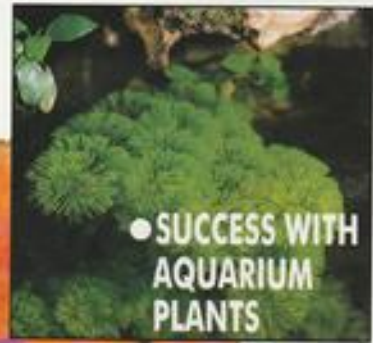
● **KEEPING GREEN IGUANAS**



● **TOP KOI OF '93**



**FREE GIANT TENCH POSTER**



● **SUCCESS WITH AQUARIUM PLANTS**

## MARINES SUPPLEMENT

DAMSELS, ANGELS, NATIVES AND MANY MORE



**PHILIPPINES CYANIDE-FREE FISHING**



**CHRISTMAS GIFT IDEAS**



# Contents



DECEMBER 1993  
VOL. 58 • NO. 9

## Features

**The Inanga:** The amazing story of New Zealand's Mighty Minnow **8**

**Gone with the Water:** A Christmas tale in our occasional Confessions of a Fish Widow **11**

**Nature's Bounty:** Your garden can provide you with free year-round live food for fish and herptiles ... if you know where to look **16**

**Keeping and Breeding Malawi's Blue Dwarf:** Expert advice on this beautiful small African Rift Lake cichlid **20**

**BAF '93:** A special two-page report on this year's successful show and bigger and better Champion of Champions competition **22**

**Blooming Success:** How to get top-quality results with aquarium plants **32**

**The Green Iguana Guide:** Golden rules and top tips on how to keep this impressive giant lizard **77**

## SUPPLEMENT: POPULAR MARINES

See page 37 for full details

**Top Koi of '93:** Some of the world's very best fish of the year in splendid colour **92**

**South African Kurpers and Rockies:** The search for some very special air breathers, and the efforts being made to save them from possible extinction **96**

## Regulars

**Editorial:**  
Christmas Crackers **5**  
News **5**  
Koi Calendar **14**  
Fascinating Fish Facts **19, 25, 70**  
Write Back **19**  
Coldwater Jottings **24**  
Question Time **26**  
Tomorrow's Aquarist **67**

**Out & About:**  
Petworld **68**  
Koi Talk **71**  
Seaview **72**  
Water's Edge **75**  
Frogs & Friends **80**  
What's Your Opinion? **82**  
Trade Talk **90**  
Society World **94**  
Next Month **99**



See page 77



See page 25

**EDITOR** John Dawes. **ART EDITOR** Ian Hunt. **ADVERTISEMENT MANAGER** John Young. **ADVERTISEMENT PRODUCTION** Gwan McNeil. **PUBLISHED BY** Dog World, 9 Tufon Street, Ashford, Kent TN23 1QN. **TELEPHONE: ADVERTISING AND PRODUCTION/CLASSIFIEDS & BUYERS GUIDE** 0233 621877. **FAX NUMBER** 0233 645669. **SUBSCRIPTIONS** £21 per annum post paid. Overseas rates on application. All subscriptions payable in advance to: Aquarist & Pondkeeper, 9 Tufon Street, Ashford, Kent TN23 1QN. **Origination** by Wishpark Ltd/Ashford Composition Ltd. **Printed** by Headley Brothers Ltd, The Invicta Press, both of Ashford, Kent.

Distributed to the Newstrade by: Seymour International, Press Distributors Ltd, Windsor House, 1270 London Road, Norbury, London, SW16 4DH.

# EDITORIAL

## CHRISTMAS CRACKERS

In a timely press release entitled **It's Crackers to Give Pets for Christmas**, the People's Dispensary for Sick Animals (PDSA) echo the advice which we've been offering year in, year out. Christmas may, indeed, be a time for giving presents to loved ones, but these presents must never jeopardise the lives of other creatures. Therefore, starting somebody off in a chosen hobby by giving him or her a pet from the outset, is not the best way to go about things.

While the suggestions offered by the PDSA refer virtually exclusively to kittens and puppies, the basic principles apply whether you are thinking of giving someone a Guppy or a goat.

The bottom line is that, in the keeping of a pet, we are dealing with a living being whose continued existence is totally outside its control, and totally within ours. It's absolutely vital, therefore, that both givers and receivers of pets are aware of, and accept, a permanent commitment to shoulder the responsibility of caring for that animal for the whole duration of its life. That could be as little as a year (as in the case of some of the 'annual' fishes), or over twenty, as with Goldfish, Koi and other long-lived species of fish, amphibians and reptiles.

Pet lovers can still, of course, enjoy giving pet-associated presents to budding fish, amphibian or reptile keepers at Christmas. Buy a tank and all its accessories, buy a pond, buy a liner, buy a vivarium, buy a book, take out a subscription to A&P, take out a membership of your local society... or a national or international one. Put your mind to it and you'll be surprised at how many useful, desirable and hugely enjoyable presents you can give without having to put any animal's life at risk.

The actual pets themselves can, of course, follow later, once the basic homework has been done, thus ensuring the best possible start for all concerned.

In the case of established hobbyists, the situation is, quite naturally, somewhat different. In these instances, suitable accommodation and expertise are usually already in place, so many of the problems associated with 'first-timers' don't apply. Even so, it is, obviously, wise to be cautious, as succumbing to the temptation to buy that extra fish or salamander can be the very thing that tips the scales towards disaster.

Summing up: don't go crackers at Christmas. Act sensibly and enjoy the full range of delights that a well-planned start to your chosen hobby will bring.

Have a healthy, happy and peaceful Christmas, and join us again next month as we set off on another colourful and eventual A&P year.

John Dawes  
Editor



# NEWS • NEWS • NEWS

## Captive-bred Lion City Dragons

Aquarist and Pondkeeper editor **John Dawes** has been appointed as consultant to help produce a film about the successful breeding of Dragon Fish, *Scleropages formosus*, in Singapore (the Lion City).

The film is being produced by a private-sector breeder, **Ho**

**Kian Huat**, of *m/s Rainbow Aquarium*, with the collaboration of the Aquaculture Branch of the Fisheries Division, **Primary Production Department (PPD)** of Singapore.

*Scleropages formosus* is currently listed under CITES Appendix I, which therefore

forbids trading in the species.

Not only is John involved as a consultant in the film, but he will oversee the filming, as well as write the script and provide the voice-over.

Move over, David Attenborough...!

### The story so far...

**Leslie Cheong**, head of the Aquaculture Branch, explained: "The Dragon Fish is held in awe by fish hobbyists throughout the world, especially those in East

Asia, where the fish is reputed to bring good luck to its owner.

"Of the three varieties (Red, Golden and Green) the Red is the most highly prized, and can fetch in excess of US\$2,500 in the open market. However, hobbyists have difficulty acquiring a Dragon Fish on the open market, because the species has been considered by CITES to be endangered since 1980, and international trading is, thus, banned. However, since 1989, CITES has granted permission to Indonesia to trade in a small number (4,000) of Dragon Fish."

Leslie explained that, when a species is considered endangered, the logical step is to try to breed it. This was, in fact, attempted in Singapore, with some success. The island Republic is the world's leader in trade of ornamental fish and its fish breeders are renowned for breeding Guppies and Discus, so it was not surprising that new populations of Dragon Fish were soon obtained by captive breeding by the time Singapore became a party to CITES in 1986.

Increasing supplies of Dragon Fish are, therefore, not a problem. What is a problem is



**Ho Kian Huat** (2nd from right) and **Leslie Cheong** (2nd from left) with co-workers **Lim Lian Chuan** (left) and **Yeo Siang Hong**: the Dragon Fish captive breeding 'team'.

# NEWS • NEWS • NEWS

convincing CITES to allow trading in such captive-bred stocks. For that, documentation of the breeding cycle and tagging of the fish are necessary and, most importantly, the Second Filial Generation (F<sub>2</sub>) generation progeny must be obtained.

Unfortunately, the fish breeders had not been keeping records, and the First Filial Generation (F<sub>1</sub>s) and F<sub>2</sub>s were sometimes mixed. Therefore, despite an early headstart, Singapore fish breeders were nowhere nearer than when they started to being able to sell their new populations of Dragon Fish.

Consequently, the PPD, a Singapore agency which oversees fish, livestock and agriculture development on the island, joined hands with fish breeders to support them in their efforts.

By August 1992, a breeder had been found who had kept Parent (P) and F<sub>1</sub> Dragon Fish separately, so a large number of F<sub>1</sub> breeders were transferred to the department's field ponds in order to document the production of F<sub>2</sub>s.

**Captive-bred first-generation Red Dragon Fish.**



Second-generation Dragon Fish being tagged for future identification purposes.

STEWART NANCY

The first batch of F<sub>2</sub>s was 'harvested' in January 1992 and, up to October of this year, approximately 600 F<sub>2</sub>s have been obtained. Upon reaching a length of around 15cm, the F<sub>2</sub> fry are — like their parents — tagged with a coded micro-chip implanted into the back muscle.

Concluded Leslie Cheong: "The most important element of the programme is to demonstrate to CITES that the department has a well-planned programme, whereby only the progeny F<sub>2</sub> and beyond (ie: F<sub>3</sub>, F<sub>4</sub>, etc.) which are electronically tagged are sold, and not otherwise. This

way, captive-bred stocks will be self-sustaining, save for the occasional replenishment with wild stocks to minimise in-breeding and genetic drift in the farm population. A certificate of identity will be issued for each fish of F<sub>2</sub> and beyond sold, and by 1994, the department will be ready to make its proposals to CITES for selling Singapore captive-bred Dragon Fish worldwide."

Peter Newman of the Mini-Reef Society has approached several suppliers to raise support for the venture through donations and expertise, and is also organising a fishkeeping event, Lakeside '94, in May, to help raise further funds (see Society World, for further details).

Brian Harris, head keeper of London Zoo Aquarium, is delighted with the offer, and Richard Anson, the zoo's development manager, who is co-ordinating the fundraising for the zoo's 10-year development plans for the future, said: "This is the first approach of its kind for the new aquarium project, and it is fantastic that the zoo has such supporters within the fish world who can help make the exciting plans for the future come alive."

For further information contact Peter Newman. Tel: 0276 23728.

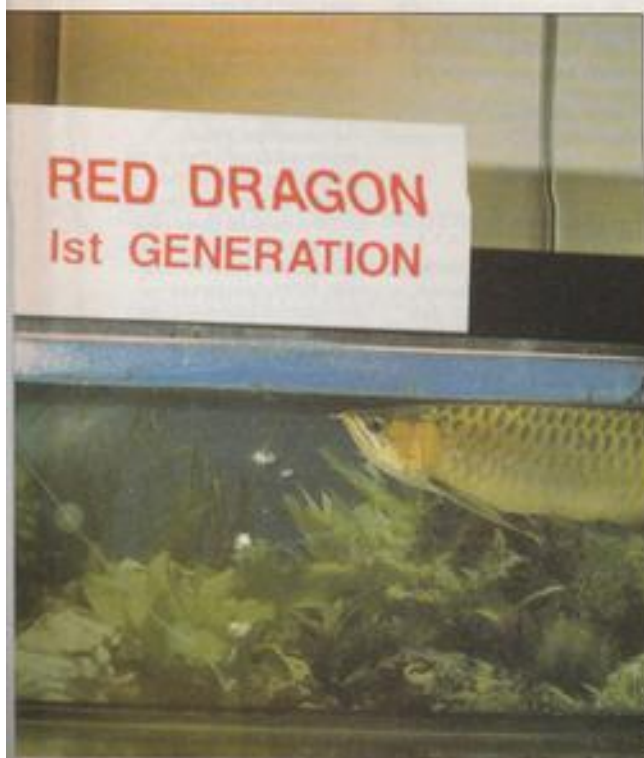
## Cichlid availability service

We have been asked to point out that, in a News Desk item in the September 1993 issue of *Aquarist and Pondkeeper* regarding a Cichlid Availability Service, it could be inferred that this service is run, in part, by Jeff Challands.

Jeff informs us that he is in no way associated with the service. We apologise to him for any inconvenience which we may have caused him.

## Aquarists' support for aquarium

Inspired by a feature in the July '93 issue of *Aquarist and Pondkeeper* about London Zoo's £3m aquarium refurbishment programme, the Mini-Reef Society has proposed to set up a reef tank within the aquarium.



STEWART NANCY





Portrait of the amazing Inanga.



Combined mini-shoal consisting of three Smelt (*Retropinna retropinna*) in the foreground, a single Inanga (identifiable by its smaller eyes and — not discernible in this photograph — lack of adipose [second dorsal] fin). These two species are often found together in the wild.

# The Inanga:

## NEW ZEALAND'S MIGHTY MINNOW

David Cooper of Aquatic Plants Unlimited in Otahuhu, introduces a truly amazing little fish that could soon make a big splash.

Photographs by the author.

Let me introduce you to the Inanga (*Galaxias maculatus*), a minnow from New Zealand that might just be the perfect aquarium fish. This species might not be the most colourful fish on earth, but its basic brown colour, overlaid with a greenish sheen and etched by a pattern of darker markings (which is never the same on any two fish), certainly put it into the 'attractive' category.

Add in the facts that it is tolerant of a wide, and I mean wide, range of water conditions, is always active, will eat anything (and I mean anything!) and has a fascinating natural history, and you must begin to understand my enthusiasm.

Native to New Zealand, the Inanga is also found in Australia, Lord Howe Island, Chile, Argentina, Tierra del Fuego and the Falkland Islands. This distribution makes it one

of the most geographically widespread freshwater fishes on Earth. The various populations are virtually indistinguishable and this, too, is of great interest.

The name Inanga is the Maori name for these fish and derives from the greenish sheen which resembles that of greenstone (jade), which is also called Inanga.

### Multi-named fish

On the scientific front, this fish has had no fewer than 19 Latin names! Now, however, it is widely accepted as *Galaxias maculatus* and is unlikely to be referred to by any other name in modern literature.

Adult Inanga mostly occur in shoals in open, gently flowing or still water. They are found in a variety of habitats. Clear water or tannin-stained swamps; cold water to warm water (4-30°C — 39-86°F); high pH or low pH; open waters and forest-covered waters; tidal estuaries and pure freshwater upstream habitats; all are favoured by the Inanga.

It does not seem to be a very aggressive upstream migrant and minor waterfalls, or even swift rapids, will prevent its upstream movement but, other than this, the Inanga will occupy any habitat it can reach.

### AMAZING APPETITE

All manner of food is utilised in nature, and this seems to vary according to what is available in the particular habitat at the time. This includes chironomid larvae, caddis larvae, mayfly larvae, shrimps, worms, snails, ants, moths, Wetas (NZ/Australian insects related to crickets), grasshoppers, millepedes, beetles, spiders and earthworms.

In the aquarium, this extends to include all the prepared foods including flake, oshart, grated mussel, various livefoods and



The Giant Kokopu (*Galaxias argenteus*) — this is an adult — forms part of the 'Inanga-type' of Whitebait during its juvenile stage.

## INANGA FACT FILE

**Common Name:** Inanga  
**Scientific Name:** *Galaxias maculatus*  
**Range:** New Zealand, Australia, Lord Howe Island, Chile, Argentina, Tierra del Fuego, Falkland Islands  
**Size:** 10-12cm (4-4.7in) — exceptionally, up to 17cm (6.7in)  
**Temperature:** 4-30°C (39-86°F)  
**pH:** Not significant  
**Diet:** Eats virtually anything that is edible  
**Breeding:** Amazing!

Typical Inanga habitat in New Zealand.

even bread (which seems to be a particular favourite!). In fact, I don't think I've found anything they won't eat. The only problem seems to be getting enough of it!

## UNLIKELY BREEDING

The reproduction of the Inanga is extremely interesting and deserves description in some detail. As its juveniles constitute the vast majority of the NZ Whitebait catch, and as this delicacy has considerable commercial and culinary value to New Zealanders, the Inanga has been subjected to much scientific research and so its breeding habits, unlikely as they may sound, can be reported in considerable detail and with reasonable authority.

Inanga mature throughout the summer months, reaching a size of around 100-200mm (4-4.7in), although fish up to 170mm (6.7in) have been found. Spawning occurs mostly in autumn, although occasional spawnings are known to occur from spring through to winter.

## Lunar spawning

When mature, the adults gather in large shoals and migrate downstream to the river estuaries. These migrations coincide with the full and new moons and, as a result, also with the very high tides that occur during these phases of the moon.

How the fish know the phases of the moon and, thus, the imminent spring tides, is a complete mystery. Nevertheless, it is a well documented phenomenon and its occurrence is without doubt. This pre-spawning migration is one of the very few well authenticated cases of a lunar rhythm in a non-marine aquatic animal.

The spawning itself takes place at high tide among the rushes and grasses that are only inundated at these times of spring tide. The areas used for this purpose are further specialised in that they are usually limited to the zone close to the upstream limit of the saltwater penetration. In fact, these areas can often be identified by the presence of certain plants that tolerate this occasional inundation with brackish water.

The eggs are laid among these plants and the milt is released in a mass orgy of

spawning. The milt of the males can be so profuse that it may stain the surrounding waters milky white. This led to the early settlers sometimes referring to Inanga as "Cowfish".

Upon the receding of the tide, the fertilised eggs are stranded among the rushes and debris which serve to keep them from desiccating.

The spent adults usually die, although there are some reports of them migrating back upstream. In any case, a small percentage will survive for another year, and an even smaller percentage will survive until three years of age. This is undoubtedly a survival mechanism that protects the species against natural disasters, etc, and is not unknown in other annual fishes.

## Inundated hatch

The eggs develop during the next two weeks until the next spring tide, when they are inundated again and hatch. This period can be extended for up to six weeks, and hatching may also be triggered by heavy storms. Experiments have shown that eggs will develop and hatch equally well in damp grasses, freshwater, saltwater or any combination of these. Temperature also plays its part, and development may take anything from 10-30 days.

Upon inundation, the eggs hatch very quickly (c 10 minutes) and the larvae, which are only 7-8mm (c 0.3in) long, are washed out to sea by the receding tide. The period of time spent at sea, where they feed on the zooplankton and develop into Whitebait, is the subject of considerable debate. However, it seems reasonable to conclude that about six months are spent in the marine environment.

Shoal of Inanga Whitebait.



In the early spring (predominantly) the juvenile Inanga (along with four other species of Galaxiids) move inshore and begin to migrate into freshwater. At this stage, they are referred to as Whitebait and are approximately 50-60mm (2-2.4in) long, slender and transparent.

The factors that influence this migration are many and varied and, once again, the subject of some debate. Nevertheless the urge to migrate into freshwater is strong and Whitebait may be found in huge 'runs' in the major rivers, in tiny trickles that meander across beaches, and in everything in between.

## Cyclic delicacy

At this point in their life cycle they are regarded as a delicacy by all manner of creatures. Marine fishes such as the Kahawai (a common NZ/Australian fish that is known to enter estuaries and even swim up into almost freshwater), brackish flounders, etc, freshwater trout and native fish, sea birds and, of course, man, all prey upon the Whitebait.

Those that survive, and it sometimes seems miraculous that any do, proceed upstream to seek out the adult habitat and so complete the lifecycle.

To this list of 'predators' must now be added a number of NZ aquarists. Raising Whitebait has become a popular and rewarding activity in recent years, and more and more fishkeepers are discovering the joy of keeping NZ native fish, of which the Inanga is undoubtedly the most numerous component.

## Landlocked


There are known landlocked populations of Inanga and also Dwarf Inanga (*Galaxias gracilis*), which are isolated in only seven lakes. Thus, it would seem that the marine phase is not an obligatory one that would present a challenge to the fish breeder.

Inanga have been bred in captivity using hormones and raised to maturity. There have also been tank spawnings, but to the best of my knowledge, they have not been bred and raised 'naturally' in captivity.

## INANGA EXPORTS

As I write, plans are afoot to export a number of NZ native fish, including the Inanga, to Europe and the UK. I urge you to seek out these fish at your local retailer and can assure you that any effort or expense involved will be richly rewarded by these delightful and trouble-free fish.

Inanga, and any other species of NZ native fish, will undoubtedly enrich the coldwater side of the hobby and, as they have the added advantage of tolerating a wide range of temperatures, there is no reason why you couldn't add a few to a tropical tank as well.

See what I mean? They really are the 'perfect' aquarium fish. 

# CONFESSIONS OF A FISH WIDOW

## Gone with the Water

Marilyn Apps recalls memories of a 'smashing' Christmas . . . and Bedford.

**S**o what do you buy a man who has everything for Christmas — except the largest fish tank in the world? Quite easy, really. You buy him four pairs of purple and green socks, six Paisley handkerchiefs, a pair of pink and red Rudolph the Rednose Reindeer boxer shorts . . . and the largest fish tank you can find!

The next question to ask is . . . where do you hide this monstrosity (the tank, not the boxer shorts!) while waiting for Father Christmas to deliver it down the chimney — or through the central heating pipes in our case.

Well, last year, the tank was duly delivered six days before Christmas and hidden out in the garage among all the other fish tanks. These are mainly broken tanks waiting to be mended, or utilised into other useful fishy artefacts — or just waiting really until I get fed up with not being able to get the car into the garage, and give them to the dustman.

### Cat games

So the tank had arrived and was busy hanging about waiting for some fairly large wrapping paper to drop by and curl round it, when the cat decided that spring had arrived and did some pretty fancy curling up of her own. A lesson to be learned here is that fish tanks are made of glass and therefore should not be: (a) left balanced on a wobbly table, and (b) left where the cat can play catch-me-if-you-can with an exceptionally ugly Tom Cat.

It's strange. I've always been told that large fish tanks are really quite difficult to break . . . I bet it gave the insurance company quite a laugh though. Cause of breakage — Amorous Cats!

Well, actually, they laughed so hard that they refused to pay out. Apparently, we were only covered for water damage caused by burst tanks. Not for the tanks themselves. Well, that being the case . . .

But that comes later. First, get your replacement fish tank. Five days before Christmas. Weekend in between. Fish shop full up with orders until well into the New Year. Scream! Have a brainstorm. Have a brainwave!

Barry from the Fish Club!

Yes, of course, he'd got a fish tank I could have. No, he didn't want any money for it. It just needed collecting. So I hired a van and nipped off up to Gravesend to collect the tank.

Barry greeted me at the door — with one trouser leg rolled up to the knee! Unfortunately — this was not the secret ceremonial attire of the Ancient Order of Fishkeepers — Barry had broken his leg.

"It's in the basement," he said, pointing towards a grimy cellar door beneath the house. "Sorry I can't help you with it, I'm off Christmas shopping!" He shut the door fast.

"And I'm definitely off Christmas shopping!" I thought bitterly, as I cautiously pushed open the cellar door.

I stepped over the threshold and the door creaked slowly shut behind me.

The sight that met my eyes set my heart racing. It was like stepping into Father Christmas' Grotto!

The walls of the cellar glistened and glittered with fairy lights strung around every tank. But there were no rare or exotic fish here. No collectibles. No showables.

Barry's basement was resplendent with Neons in flashing blue and red coats. Tiger Barbs weaving exotic reels to the silent singing of the Pearl Gouramis. Male Guppies quivering their splendid tails in erotic passions at totally unimpressed and unimpressive female Guppies. Platies, Danios, Catfish, Cardinal Tetras. I knew all the names. Recognised all the fish.

These were the bread-and-butter fish that common folk kept. Not for the likes of Barry Brown, president of The Fishkeeping Club of the South-east.

I felt a little blackmail coming on.

But first, locate your fish tank, lift it off its stand, lift it up the steps, lift it into the back of a Transit van. Not a hope! Surprise presents, like cold turkey, were off the menu this Christmas.

### Shades of Bedford

I went home and fetched my husband and, together, we grappled the Ghost of Christmas present into the Transit and home. Strangely, my husband was delighted with his non-surprise present.

"I'll set up a brackish tank," he bubbled excitedly. "We'll have Mollies for Christmas!"

"I think there'll be more meat on a turkey," I said.

"No! You remember? Black Mollies. Like we had in Bedford."

I remembered. And my heart sank. Rhett Butler. Scarlett O'Hara. And Mammy. Some of our first-ever fish. Rhett was a magnificent, sleek, black Sailfin Molly from the waters of the Deep South. Scarlett was his woman. And poor Mammy. Tatty finned and harassed, she idolised the debonair Rhett Butler. But it was Scarlett that was chosen to have Rhett's fry, the poor stunted, sickly Baby Butler.

The trouble was that my husband was new to fishkeeping and hadn't realised that Mollies were brackish water fish. He kept them in his community tank with the Guppies and Platies — and a shark.



Baby Butler disappeared into the weeds the week before Christmas — and only a Red-finned Black Shark licking his lips came out. Mammy got White Spot and, with no hospital tank, died on Christmas Eve. And Rhett. The magnificent Rhett died on Christmas Day, floating up-side down in a jam jar suspended in the tank as a temporary hospital ward.

You could almost hear him murmuring, "Quite frankly my dear, I don't give a damn!" to the distraught Scarlett as she flounced round the outside of the jam jar.

Scarlett only survived Rhett and Mammy and Baby by a week or two.

## Oversized 'surprise'

My husband set up his new brackish water tank on Christmas Eve, ready for the fishy January sales to start on Boxing Day.

Probably, in retrospect, I was a little over-hasty, nay over-reactive, in respect of the 'surprise' Christmas tank. But I didn't like that tank. From the moment it entered my hallway and lurked by the dining room doors, I didn't like that tank. It was furtive. Nipping at your ankles and barking at your shins as you squeezed past it from one room to the other.

You see, the Barry's Bargain Basement Christmas present was six feet long and, no matter where it was put, it was always totally in the way.

The final straw came when my husband,



resplendent in pink and red Rudolph the Rednose Reindeer boxer shorts and Father Christmas hat, declared over the remains of the turkey that he was going to "cut a hole in the dining room wall and 'set' the tank into it so that it could be viewed from both sides!" We'd just decorated the dining room. And the hall. And I certainly wasn't having fish fighting and fornicating over my Sunday lunch, thank you very much.

My husband set off on Boxing Day for the January fish sales. I set off on plan B.

**First.** Take your nephews, aged four and six, and send them into the hall to play 'quietly' by themselves.

**Second.** Give your nephews the baseball bats that their parents had banned them from using in the house.

**Third.** Say you can't find a soft ball for them to play with — will this old cricket ball do instead?

**Fourth.** Sit back, calmly sipping a glass of sherry — and wait for the tinkle of breaking glass.

Surprisingly, it took two hits with the cricket ball and a bash with the baseball bat before the glass shattered. Which only goes to prove how strong cats must be in the throes of passion!

So, my husband's plans for a tank of Mollies had 'Gone with the Water', so to speak. He was sad, but not inconsolable when I told him that we would have enough left over from the insurance money on the damaged carpets to buy him a marine set-up.

As long as he kept it in the basement. It took him long time to realise that we lived in a bungalow!

ADP



## LYNWOOD FISH HOUSE

315/321 HOOK RISE SOUTH, TOLWORTH, SURREY

Telephone: 081 - 391 2613

We have been one of Europe's most professional shops for ten years, not two, and totally endorse Tropic Marin Salt



Why start at the bottom of the fishkeeping ladder when you could start at the top with LYNWOODS

More species of fish under one roof than most public aquaria.



Opening Hours: Mon-Sun 10 a.m.-6 p.m.

OPEN IMMEDIATELY AFTER BOXING DAY FOR THE REST OF THE YEAR

We wish to make it known that our aquariums are made to safety standards as laid down by guidelines.

Competitive prices given over the telephone on all glass tanks

We keep the whole Mayfair range of cabinets in stock

One of the best quality cabinets produced

It is not always possible for the cabinet craftsmen to be in the shop at the same time you visit us. If you wish to speak to one of them, please phone for an appointment as our workshops are in Portsmouth

Now in stock — over 50 Cabinets and Aquariums in our purpose-built showrooms

WE NOW STOCK LAKE MALAWIS AND DISCUS

★ ALL TANKS ARE AT TRADE PRICES TILL THE END OF JANUARY 1994 ★

ie:—  
 24" x 15" x 12" £ 11.86 + VAT      36" x 15" x 12" £ 16.24 + VAT  
 48" x 15" x 12" £ 20.61 + VAT      5' x 2' x 2' £116.00 + VAT  
 6' x 2' x 2' £140.00 + VAT



We can build Tanks and Cabinets to your own specifications by our own staff

PROBABLY ONE OF THE LARGEST SELECTIONS OF MARINE FISH AND INVERTEBRATES IN THE SOUTH



# KOI CALENDAR

By David Twigg

## MY CHRISTMAS SELECTION

Christmas is rapidly approaching and our Koi are, unless heating is employed, resting in a semi-comatose state in the cold water, maybe smooching about on the odd(?) sunny day and browsing on the remaining blanketweed. We, on the other hand, are preparing our gifts for family and friends and, no doubt, some of these will be Koi related.

## 'Healthy' video

Books are always well received, and there are plenty to choose from, but how about giving a video this year? I have recently received a copy of the latest **Croft Video Services** production entitled *Koi Health Care*. This video is presented by **Paula Reynolds** who is a full-time fish consultant and is consultant to the BKKS Health Forum.

The video features all the usual range of Koi treatments and gives very interesting coverage of 'Bio Dips' (a method of checking the bacterial count in your water) and 'Cryosurgery' (using liquid nitrogen to seal open wounds, etc), as well as anaesthesia and skin scraping for checking parasitic levels under a microscope. This is a very well presented and informative video which I am sure will be viewed often.

*Koi Health Care* (£10 + £1.25 p&p) and a dozen or so others, some of which have been reviewed in this column, are available from **Croft Video Services, 8 Croft Avenue, Simister, Prestwich, Manchester M25 5SE. Tel: 061 643 9107.**

## Choice books

Some books for consideration are:

The Dr Kuroki books entitled *The Latest Manual to Nishikigoi* and *Modern Nishikigoi*; *Koi Vari-*

*eties* by Dr Herbert Axelrod; *The Interpret Encyclopedia of Koi*; *Textbook of Fish Health* by Dr George Post, a fish pathologist; *The Cult of Koi*; and *Hobbyist Guide to Successful Koi Keeping* by Dr David Pool.

All these books, and probably many more, can be found on the shelves of your local Koi dealer.

## Join a club

If you are not a member of a Koi club, then I would suggest that you treat yourself to a membership for Christmas (see *Diary* below for a contact number of someone in your area). This is an ideal way for the beginner or expert Koi keeper alike, to improve his/her knowledge and to get a look at some of the best fish in the country.

If you can't find a suitable club in your area, please give me a ring on **0926 495213** and I will try to put you in touch with a Koi keeper nearby.

## WHERE HAVE I BEEN? Central Section BKKS Show



Great Start! Some young winners at the Central Section Show.

DECEMBER						
S	M	T	W	T	F	S
5	6	7	1	2	3	4
12	13	14	8	9	10	11
19	20	21	15	16	17	18
26	27	28	22	23	24	25
			29	30	31	



DAVID TWIGG



Ian Stewardson's magnificent Grand Champion Sanke at the Central Section Show.

This was a two-day event held at an unusual location for a Koi show. The Avoncroft Museum Buildings just outside Bromsgrove was where Lyn and I found the large marquees which housed the Central Show.

The entrance into the first tent led to the exhibitors' vans containing 185 super Koi. At the rear was an exit into the second tent, where the dealers were housed. A wide variety of Koi were on sale here to tempt the hobbyist, as were **Ann Telford of AllClear Water Purifiers** and **Bernice Brewster** with her **Tetra Information Centre**.

One of the first things I noticed while browsing around the competition Koi were the slightly unusual 'photographs'. These were, I understand, taken with a digital camera and printed by a colour printer on site. Wonderful idea, I thought, and congratulations to Central Section on what must be a 'first'.

Over the weekend, more than 1,500 people passed through the doors to see and admire the many lovely Koi in the show, which included the magnificent **Grand Champion Sanke** belonging to **Ian Stewardson**.

Major prizewinners were: **Grand Champion, Best Size 5**, and **Best Size 4**, Ian Stewardson; **Best Size 3**, Christine Green; **Best Size 2**, Alan Burgess; **Best Size 1**, Paul James; **Best Tateigoi**, Trevor and Hazel Hunt.

Other first prize winners were: Julia Levin, Alan Willets, Mike James, Eileen and Tony Bowcott, Barbara Atkins, Rebecca Glazard, Chris Carter, Des Saddler, Mark Osbourne, Andrew Glazard, Dave Greensill, Ken Smith, John Shuttleworth, Graham Jones, Yvonne Thornton, Wyn Greensill, Pat and Colin Stevens, and Glyn Tyres.

## Future show date

**30 April and 1 May** — International Koi Show at Telford Exhibition Centre

## WHAT'S ON IN DECEMBER

- 2 — The Potteries & District Section BKKS.** Monthly meeting, the Thistleberry Hotel, Newcastle-u-Lyme. Contact **Ivan Riwatschew** on 0782 45864.
- 8 — South Hants Section BKKS.** Social evening and buffet at 8 pm, Denmead Church Hall, Hambledon Road, Denmead, Hants. Contact **George Rooney** on 0420 473169.
- Merseyside Section BKKS.** Speaker is **Geoff Lambert** of PROKOI, Millbrook Manor Restaurant, Knowsley Village. Contact **Robbie** on 051 549 2001.
- 9 — Northern Section BKKS.** A Kor Appreciation Evening in conjunction with, and at, **Infiltration Ltd**, Golborne. Open to all Koi lovers at 7 pm for 7.30 pm start. A buffet is available for those who wish to partake, at £1.50 each. Contact **Steve Blackett** on 0282 453281

- for bookings and further details.
- 10 — The Potteries & District Section BKKS.** Christmas meal, The Thistleberry Hotel, Newcastle-u-Lyme. Contact **Ivan Riwatschew** on 0782 45864.
- 11 — Central Section BKKS.** Christmas Dinner Dance at Stanleys, Walsall. Contact **Sue Finney** on 021 747 2733.
- Heart of England Koi Society.** Annual Dinner Dance, Warwick. Contact **me** on 0926 495213.
- 12 — Mid-Somerset Section BKKS.** AGM. Contact **Alan Purnell** on 0458 72132.
- Northern Koi Club.** Speaker is **Ron Sharp** from **Pet Products International** followed by Cheese and Wine, All Souls Church, Salford. Contact **Tony McCann** on 061 794 1958.
- Central Section BKKS.** Christmas Buffet and yearly Round-up at T P Riley Community Centre, Bloxwich. Contact **Sue Finney** on 021 747 2733.
- Northern Section BKKS.** AGM. Contact **Phil Adamson** on 051 220 2970.
- 13 — Northants Section BKKS.** Monthly meeting at

- Saints Social Club, Northampton. Contact **John Byles** on 0604 718648.
- 19 — Yorkshire Koi Society.** Monthly meeting, Cottingham Memorial Hall, Nr Wetherby at 2.30 pm. Contact **Rita Thomson** on 0723 864867.
- 25 — Happy Christmas from David and Lyn!**
- 29 — Northern Koi Club.** Christmas Coach Trip. Contact **Tony McCann** on 061 794 1958.

## An invitation

I understand that this monthly column is proving useful to many readers. Although I do my best to ensure all events are mentioned, it may be that some information which arrives a little late, misses my deadline.

May I therefore remind all Secretaries, PRO's and other organisers that I need to have the information **at least eight weeks** before the date of the event to guarantee publication? You may, of course, ring me direct on **0926 495213**, which will allow a little leeway.

All Koi keepers are welcomed to the events mentioned (an

## Vortex delight

I mentioned a couple of months ago the difficulty I was experiencing keeping good-quality water due to the overcrowding in my pond. Well, I can now report that I have passed on to good homes just over 100ln of Koi and have seen the results of a lower filter loading happening before my eyes. The fish went over a period of three weeks and daily improvement in clarity was obvious.

A couple of days later, I introduced, albeit temporarily, my first Vortex chamber and, again, the water clarity improved to the point where I am tempted to call it "sparkling".

Daylight hours have, I know, shortened and taken water temperature down with them, but even so, I could not have wished for such an improvement. I cannot wait for the second Vortex to be commissioned; it may well improve quality yet again.

entry fee may be payable). Details can be obtained from the contact telephone number quoted alongside the diary entry.

Please write to me at your earliest convenience via the **Editor** at **9 Tufton Street, Ashford, Kent TN23 1QN**.

# New Book Information

## The Natural Aquarium: How to Imitate Nature in your Home

by Satoshi Yoshino and Doshin Kobayashi

This new book from two of Japan's best known aquarists will be of particular interest to aquatic hobbyists. There is a rapidly growing interest in reproducing as closely as possible in an aquarium the natural conditions in which fish live in the wild. This new book sets out in detail the best way to reproduce many of these habitats, from a Brazilian stream, to a West African river bank to the depths of Lake Tanganyika - and many more. It does so in the precise detail needed to ensure success.

The Natural Aquarium is not only an interesting book to read but it is visually beautiful. It is illustrated throughout with full colour pictures, each one individually laminated to give them the clarity of the original photograph. It is a book that will be sought by most of Britain's many aquatic hobbyists and is quite exceptional value at £14.95.

### The Natural Aquarium: How to Imitate Nature in Your Home

by Satoshi Yoshino and Doshin Kobayashi

ISBN: 0-86622-629-X Style: TS-195

7" x 10" (175mm x 260mm), hardcover, 128 pages, over 210 full colour individually laminated photographs. Price: £14.95

### Salamanders and Newts as a Hobby

by John Coborn

ISBN: 0-86622-730-X Style: TT-020

7" x 10" (170mm x 250mm), laminated soft cover, 100 pages,

88 full colour photographs and illustrations. Price: £5.45

### Tropical Fish as a Hobby

by Mary Ellen Sweeney

ISBN: 0-86622-520-X Style: TT-017

7" x 10" (170mm x 250mm), laminated soft cover, 100 pages,

117 full colour photographs and illustrations. Price: £5.45

### Turtles as a Hobby

by W P Mara

ISBN: 0-86622-324-X Style: TT-013

7" x 10" (170mm x 250mm), laminated soft cover, 100 pages,

100 full colour photographs and illustrations

Price: £5.45

For further information about these books or any of our other titles contact

TFH Publications, The Spinney, Parklands, Forest Road, Waterlooville PO7 6AR. Telephone 0705 268122 Fax 0705 268801

A200



# Nature's BOUNTY

Juicy slugs, tasty earthworms, nutritious aphids . . . As Robert Davies explains, they are all there for the taking if you are a keen enough herptile keeper.

**D**uring one of my more recent live-food collecting 'expeditions', my thoughts went back to an article in *Aquarist & Pondkeeper* in July 1960 entitled *Natural Foods for Small Reptiles and Amphibians* by David Morris (yes, my memory and *A & P* collection both go back that long!). Thirty years ago one couldn't pick up the phone and, using a credit card, obtain a variety of livefoods the following day . . . or too many other things, for that matter! The only livefood readily available was mealworms.

As Mr Morris' article described many of the garden insects that could be collected and used, I found it both interesting and useful. Ever since, I have regarded my garden as an important supplementary source of livefood for some of the creatures in our collection.

During gardening operations, Val (my wife) and I are accompanied by various containers in which to place anything useful. Consequently, although we do not use insecticides, or even artificial fertiliser, many of the problems faced by organic gardeners do not arise.

## Slugs and worms

For many gardeners, slugs present a big problem, but, for me, there are times when I just cannot find enough, especially in dry spells! Slugs and worms are available throughout most of the year, except during spells of hard frost. They favour a moist habitat, so steps need to be taken to provide places where they will congregate.

My compost heap is not scientifically constructed with layers of garden refuse, soil and various chemicals as recommended in gardening books. Instead, it is, literally, a heap upon which everything, including kitchen waste, is spread.

Several pieces of old carpet placed on top tend to harbour dozens of slugs. Underneath the carpet, in the top layer of the heap, there is a seething mass of Brandling Worms which are not liked by herptiles and are therefore not used. The compost heap does actually work and produces first-rate compost, while the lower depths contain Common Earthworms (*Lumbricus*) which are eagerly collected for feeding purposes.

At various points in the garden there is

an assortment of plastic sheets, wooden seed boxes and old boards, all of which provide refuge and collecting stations for slugs and worms. Some of the garden paths consist of pieces of broken flagstone which, when turned over, usually yield something useful. Over the months, these paths assume all sorts of shapes and have to be periodically relaid to look reasonably neat.

In addition, although unsightly, pieces of cardboard box left for a few days seem very attractive to slugs, if not to visitors. Things like cabbage leaves and pea pods placed on the compost heap also seem to attract them in large numbers.

## Desirable Slugs

It must be stated at this point that not all slugs are used for feeding. Over the years, I have found that three particular species available in the garden are acceptable to certain herptiles. These are a greyish-white type, a light brown, very soft, variety, and a light-coloured species with brownish flecks (I must learn their scientific names someday).

All of these small slugs have been used for creatures such as Slowworms, Fire Salamanders, Dekay's Snakes (*Saoteria dekayi*), Red-bellied Snakes (*Saoteria occipitomaculata*), baby Chinese Water Dragons, Plumed Basilisks, various newts, frogs and toads, Box Turtles, baby Blue-tongued Skinks (*Tiliqua gigas*) and all ages of Pink-

tongued Skinks (*Tiliqua gerardi*). One of the Pink-tongues has eaten as many as 35 hand-fed slugs at one sitting.

For many years, I have had an outdoor enclosure containing Slowworms. The only feeding they've ever needed has been slugs dropped in periodically.

If further proof was needed of the acceptability of slugs, one of our garden frogs, which used to spend much of its time near the compost heap, would wait until I had overturned a piece of carpet and quickly snatch slugs before I could get them.

## Undesirable Slugs

Three large species of slug inhabit our garden — one a dirty yellow colour, another a shiny black one, and a third which is brown with a bright orange line around the lower part of its body. These three assume 'banana-like' proportions and one instinctively feels them to be unsuitable on the grounds of possible toxicity or, at very least, unpleasant taste.

A war of attrition has been waged against these three for many years, since they occasionally ravage lettuce plants.

## Worm Eaters

Worms are a highly nutritious food for many creatures, especially newts, frogs, salamanders and toads. Young Garter Snakes





eagerly consume earthworms, as do the *Storeria* species mentioned above. Another worm eater, the Ringneck (*Diadophis*), is sometimes available.

These all make good beginners' snakes and are ideal for those who do not like the thought of feeding mice to their reptiles. Another plus point is that these species require only small vivaria, being about 30cm (12in) in length. Some lizards, such as Water Dragons and Basilisks, are very fond of earthworms, so they make a welcome change from insect fare.

Worms and slugs can be kept in ventilated plastic containers with damp leaves or moss. This allows them to empty their gut before being used as food. Keep these worm and slug 'banks' in a cool place; in this way, they will keep for quite a time.

## Aphids

One of the gardener's enemy is, of course, aphids, but we use these in large quantities every year to feed young and adult Arrowpoison Frogs and young Green Tree Frogs (*Hyla arborea*).

Aphid-covered leaves are quickly stripped of their inhabitants, and many small newts, in their terrestrial stage, will make a meal of them. We have also fed them to newt tadpoles which grab them from the surface of the water.

Aphids on many plants can be collected by bending the plant over a plastic tub and tapping gently to dislodge them. They make an ideal first food for many newly metamorphosed and young creatures, as they are soft, but very nutritious.

Most herpetile books refer to sweep-netting, but it is not always easy to remove from the net all the tiny insects gathered in this way. Instead, we favour a large plastic ice-cream tub fastened to the end of a long pole by means of a Heath Robinson arrangement of wire and bulldog clips. By gently moving this upwards against the leaves of trees, bushes, etc (sycamores are especially productive of greenfly) one can gather substantial numbers of greenfly, spiders and other small creatures.

This is best done early in the morning for two reasons. First, the insects are sluggish and drop easily into the container. Secondly, your neighbours, hopefully, will not see you and doubt your sanity!

## Other tasty morsels

All the foregoing can be collected in large quantities. In addition, smaller numbers of such things as spiders — a delicacy for most herpetiles, leatherjackets — relished by Water Dragons and others, and smooth caterpillars can also be found. Hairy caterpillars are not used. We are often plagued by caterpillars of the Large White Butterfly, but these are not used for feeding, as we have yet to find out whether they are nasty or toxic.

Occasionally, things such as woodlice and millipedes are collected during gardening operations — the former being taken by some toads and small terrapins, the latter by some lizards.

Moths are also used, but not on a regular basis, since, without a proper moth trap, they are only captured on rare occasions.

Snails are ideal for Pink- and Blue-tongued Skinks (*Tilapia* species), but our garden yields only three very small types, so these are reserved for the baby *Tilapia*.

Finally, the garden pond and some old sinks and containers provide *Daphnia*, bloodworms and gnat larvae, which are welcome food for small newts and their tadpoles.

## Plusses of collecting

Collecting not only provides a useful variety of food for a wide range of herpetiles, which is most welcome to them, but it also helps to reduce the number of pests and the cost of buying livefoods.

Wild-caught insects are usually regarded as being more nutritious than cultured ones, so the herpetiles, again, benefit. It is, obviously, more time-consuming than buying in cultured foods, but certainly worthwhile. It becomes easier if you establish a routine and methodically search the most likely places.

A cautionary note, however; today, the extensive use of pesticides and the like means that, in many areas, garden insects may well be carrying traces of toxic chemicals which could harm herpetiles. If you have any doubts about your garden, stick to cultured foods.

Neither we, nor any close neighbours, use any toxic substances and, so far (touch wood), we have not experienced any deaths attributable to them. At the risk of being thought slightly dotty by one's neighbours, your garden should provide a bountiful harvest most of the year.

IT'S ORIGINAL ! IT'S A "CRYSTAL CLEAR" PRODUCT !  
 "CRYSTAL CLEAR" PRODUCTS (Bolton) LTD.

**BIOTIC POND FILTERS**

REMOVES AMMONIA - NITRITE and NITRATE  
 Aerobic and Anaerobic Filtration

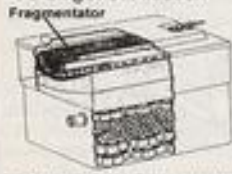
All "CRYSTAL CLEAR" Filter Materials are "BACTERIAPHILIC"

**BIOTIC '7'**  
 7 Stages of Filtration



Distribution Trickle Tray

**BIOTIC '5'**  
 5 Stages of Filtration



REGAN STREET WORKS, HALLIWELL, BOLTON, LANC. ENGLAND. BL1 8AR  
 Tel. 0204 842801 Fax. 0204 849499

With the "CRYSTAL CLEAR"  
**FRAGMENTATOR**  
 (No Spraybar)

Plus the "CRYSTAL CLEAR"  
**DISTRIBUTION TRICKLE TRAY**  
 Utilizing "CRYSTAL CLEAR"  
 Filter Mediums

**BIO-PLUS**  
 Aerobic Filtration



**FILTER GAUZE**  
 Physical Filtration



**BIO-PADS**  
 Physical and  
 Aerobic Filtration



**BIOTIC-ROCK**  
 Aerobic and Anaerobic  
 Filtration



**CASCADE**  
 WATER GARDENS

Tanks  
 24x15x12  
 Only £12.99



Tanks  
 36x15x12  
 Only £19.99

5,000 SQ. FT.  
 BURY BRANCH  
 SPECIALISTS IN  
 RARE AND  
 UNUSUAL FISH

eg. L. Galois, L. Helmsdon,  
 A. Hopkings, Syno, Candale,  
 Syno, Roberto, Syno, Contreras,  
 Syno, Albert, A. Hyster,  
 P. Spinos, M. Irwin, Moch,  
 Paves, Cory, Morbio, Cory,  
 Eliaudi, M. Cory, Barbato,  
 Unchasing Lampreys

Expert advice given freely  
 TOP QUALITY KOI

Brochis Multirad  
 Syno, Aleremus  
 Botia Dario  
 Gold Nuggets  
 Gogata Schmidt  
 Phylloncarina  
 Pseudohemiodon

SPECIAL OFFERS  
 ON FISH  
 EVERY WEEK

Well worth a visit

Newbank Garden  
 Centre, Bury Rd.  
 Rodcliffe, Manchester  
 ☎ 061 725 8142

All in One Garden  
 Centre, Rochdale Rd.  
 Middleton, Manchester  
 ☎ 0706 31677

**FISH**  
**WORLD**  
 Magazine



Name: \_\_\_\_\_

Address: \_\_\_\_\_

Post Code: \_\_\_\_\_

Society if any \_\_\_\_\_

Send your cheque or postal order to:  
 Fish World Magazine, Dept QB, 194 Greenhill Road,  
 Herne Bay, Kent CT6 7RS  
 Please make cheque payable to F.B.A.S. THANK YOU

The best value  
 money can buy.  
 This magazine is  
 suitable for all  
 fishkeeping  
 Hobbyists  
 whether they  
 have the smallest  
 Aquarium or the  
 largest Pond.  
 Articles include:  
 Caring for your  
 fish, Lighting,  
 Water Quality,  
 Plants, Solving  
 Aquatic  
 problems,  
 Filtration and  
 many other  
 interesting  
 items.

Also  
 includes:  
 Society  
 News  
 PUBLISHED  
 QUARTERLY

Become a  
 subscriber now  
 at the special  
 rate of £5.00  
 (including  
 postage &  
 packing)  
 Overseas  
 subscribers £11  
 (inc postage &  
 postage). For  
 FOUR editions,  
 starting with the  
 next issue.

**FASCINATING**  
 FISH FACTS

**LUMINOUS ANAL DRUMMER**

Did you know that there are some fish in which light (almost) shines out of their anus...? And they can play the drum as well! These unusual — to say the least (!) — fish are called Grenadiers or Rat-tails.

The "Grenadier" tag came about because of an unusual ability that males of certain species possess. These males can vibrate a series of 'drumming muscles' which are attached to the swim bladder which, in turn, resonates and produces a surprisingly loud drumming sound. This acts as a means of communication between individuals in the dark deep waters where the fish are found.

The Rat-tail bit refers to the long, thin, rat-tail-like end of the body which gives these interesting fish a rather awkward-looking and rather unattractive appearance (unless you are another Rat-tail, of course).

Many species also possess a special gland close to the anus which produces luminous slime that glows in the dark!

And how about this for a quote? (It's taken from a book entitled *The World of Fish*, edited by John Honders):

*"The author recalls his pleasure at first encountering this in fishes hauled aboard a trawler on a dark night off the west coast of Ireland. As the fishes slithered onto the deck streaks of brilliant blue light could be seen and, being his first experience of luminous fishes, the author wrote his initials in glowing letters across the deck."*

Talk about having your name in lights!



The weird and wonderful drumming Grenadier.

# WRITEBACK

## BIOPLAST LETTERS OF THE MONTH

### Mutant Rejection

I would like to congratulate you on the new style of A&P. It is a lot easier to read and an improvement on an already fine publication.

Further to November's BioPlast Letter, may I applaud the writer on his fine sentiments? I feel that as a hobby which is being looked at ever more closely by bureaucrats, etc., we must make a big effort to promote the responsible side of our activities. To this end, we should strive to breed and keep going the natural forms of fish, particularly with the threat to habitat (eg. Amazon) and species (Lake Victoria Haplochromines).

As a result of this, I feel that from the breeder-importer-retailer, down to the hobbyist, we should reject the genetic mutations offered for sale which would have no hope of survival in the wild. As a responsible publication I feel A&P should also promote only these species.

I feel that articles on the Fancy Goldfish (Bubble-eyes, Celestials, Pom Pons, etc) have no place in a responsible publication. The only mention of these 'delicate' specimens should be as a warning to hobbyists to avoid these creatures!

Two other species that I have spotted recently are, firstly, Long-finned Albino Oscars (what chance of survival in a Cichlid community let alone the wild?) whose albinism and elongated fins leave the fish open to all sorts of potential pathogens. The second species is the Red Widow Tetra. It is bad enough having a mass-produced albino strain of this beautiful Tetra, but there is no need (other than commercial gain) for a red strain. The red colouring does not appear to be a dye (mercifully) as in the Indian Glass Fish, but I doubt that it is a natural sport either.

I hope that the fish trade will consider carefully the future of the hobby, and do everything in their power to ensure that no charge of irresponsibility can be levelled at our favourite leisure activity.

Michael Jacques,  
Washington,  
Tyne and Wear.



The White Tetra: not an albino but, nevertheless, a colour mutant of the Black Widow Tetra which is quite popular with aquarists, particularly in the US.

MARY GREEN/LONDON TROPICAL FISH FARMERS ASSOCIATION

*Thank you, Michael, for your comments. I wonder what other readers think of your views.*

*Where, in your opinion, do we draw the line between what's acceptable and what is not? After all, even the 'basic' Common Goldfish which we all love, is a mutant colour strain of the wild type.*

*You may well have stimulated a vigorous debate among our readers. We await developments with great interest.*

*£30 in BioPlast goods will shortly be on their way to you, courtesy of BioPlast (UK) Ltd. (Tel: 0535 630230).*

### In support of bubbles

Bubble Eye — not a man-made mutant as such.



BILLY WHITESIDE

As a lifelong aquarist and keeper of Fancy Goldfish, I was pleased to see the article on the Bubble-eye in the November issue of your magazine.

Too often, the more unusual varieties of fish are neglected by the aquatic press, especially where the mutant is considered bizarre or strange.

Actually, there is no such thing as a man-made mutant. Evolution is changing life-forms continuously, and animals such as the Bubble-eye are only selectively bred by man (or woman, of course). Breeders just give nature a chance to show what is in the genes; they bring forth a form that is dormant. Selective breeding only speeds up what nature may take millions of years to create.

If man had bred the elephant, no-one would accept that its nose was normal!

For these reasons, goldfish breeders are often criticised for producing Bubble-eyes, not to mention Twin-tails, Veiltails, Pom-Poms, Wakens and so on. Such criticism usually stems from ignorance (in its proper meaning of lack of knowledge, not rudeness). Fancy Goldfish breeders are devoted to their pets and ensure that their fish have a happy life.

For example, in Alex Stephenson's otherwise excellent article, the photographs show a Bubble-eye over a gravel base. In fact, breeders use a bare bottom tank for these fish so that the delicate bubbles are not damaged.

If anyone wants to see really beautiful, and healthy, Fancy Goldfish, kept under perfect conditions by devoted aquarists, they should visit the goldfish societies' annual shows, e.g. The Goldfish Society of Great Britain in London, or the Northern Goldfish and Pondkeepers Society in Atrincham.

Bill Ramsden,  
Northern Goldfish & Pondkeeper Society,  
Bolton,  
Lancs.

*Thanks Bill, for a most original slant on the question of Fancy Goldfish. No man-made mutants? Very interesting! We couldn't really choose between your letter and Michael Jacques' — despite the fact that they came from diametrically different viewpoints. You will therefore also be receiving £30 of BioPlast goods from BioPlast (UK) Ltd, as we feel that your comments also warrant a Letter of the Month award.*

# KEEPING and Breeding:

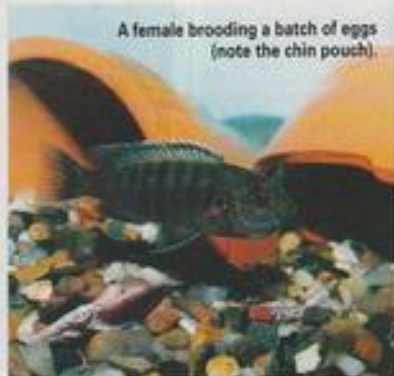
# MALAWI'S

Dr Iggy Tavares introduces a delightful mouthbrooding dwarf cichlid from Lake Malawi.

Photographs by the author.



An adult male in full colours.



A female brooding a batch of eggs (note the chin pouch).



The male clears away a few small stones in preparation for spawning.

Lake Malawi, a rift valley lake in Africa, is home to over four hundred and fifty endemic cichlids, more than half of which have not yet been scientifically described or named. As a result, any new fish exported for the first time might end up with nothing more than a trade name. A large proportion of these are very colourful fish, but only a comparatively small number of species have been exported for the aquarium trade.

Whenever I visit an aquatic store, I am always on the lookout for new fish from Lake Malawi, particularly colourful Mbuna (rock dwellers). Therefore, when, during one of my outings to Living Waters in Surrey, I came across a few wild-caught fish labelled *Pseudotropheus 'mami'*, I could not contain my excitement and proceeded to purchase a trio.

## Beautiful colours

The male 'mami', 6cm (2.4in) TL (total length), was a royal blue with several vertical indigo stripes along the whole length of its body. These stripes were sometimes less prominent, depending on the mood of the fish. The dorsal fin, the pelvic fins and the anal fin, which were also blue, were edged in white with a black sub-border. The caudal fin was also blue, while the anal fin had one small yellow egg spot on it.

The female fish, 5cm TL (2in total length), was a pale pinky brown in colour with darker brown vertical stripes.

My 'mami' were slender fish compared

to Zebra (*Pseudotropheus zebra*), had a relatively small mouth and looked more like fishes of the genus *Labidochromis* than *Pseudotropheus*.

## Name search

I consulted *Ad Konings's Book of Cichlids and all the other Fishes of Lake Malawi* to try to identify the fish by its scientific name, but was unable to get an exact match.

On cichlid specialist Mary Bailey's suggestion, I sent the photographs which I had taken to Stuart Grant, the well known fish exporter from Lake Malawi. Stuart kindly replied to my letter and identified the fish as *Labidochromis freibergi*. He explained that the trade name of 'mami', had probably degenerated from the name of a fisherman called Edward Chioko, who worked for Peter Davies at Likoma Island. The fish I obtained had a black submarginal band in the dorsal fin, while the fish in Konings' book do not.

## Aquarium layout

The trio of *Labidochromis freibergi* had to share an aquarium, 100cm (39in) long, 150 litres (33 gal), with the trio of Kenyi Mbuna (*P. lombardoi*) (9cm TL) and a trio of Socolof's Mbuna *P. Pindani (socolofi)* (6 to 7cm, TL). A pair of Livingston's Mbuna (*P. livingstoni*) (6.5cm TL) were later added to the tank, making eleven fish in all.

The aquarium, fitted with undergravel

filtration with a three-inch gravel bed run with a powerhead, worked successfully. However, I had to rearrange the gravel on occasions when the lombardoi male, in particular, dug all the way to the filter plates.

The caves that Mbuna need to hide in, to defend, and, ultimately, to spawn in, were provided by clay flower pots and large barnacle clusters. Other decoration consisted of plastic plants which, nowadays, look very realistic, last indefinitely and add colour to the aquarium. Untreated, hard London water maintained at 27° C (80°F) completed the housing.

## Varied diet

In the wild, a lot of the Mbuna graze on 'Aufwuchs', which consists of algae and any small accompanying crustaceans and insects. In the aquarium, the *freibergi* thrived on a basic diet consisting of commercial flake and pellets, often supplemented with live food. They are particularly fond of small earthworms, white worms and *Daphnia*.

Their requirement for vegetable matter was satisfied by always having a piece of lettuce leaf in the tank, on which all the fish would occasionally graze.

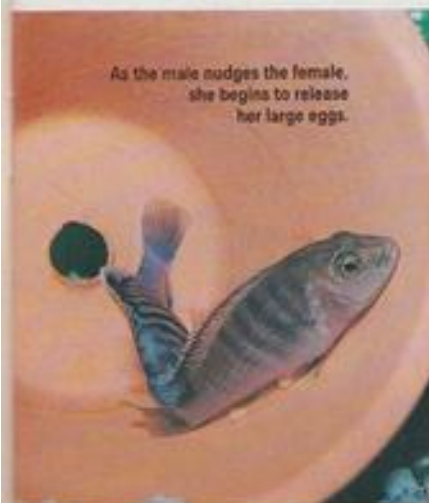
On this diet the *freibergi* grew and the larger 'female' turned blue and developed an egg spot on its anal fin; it was obviously a young male. Unfortunately, this fish was killed soon afterwards.

The yellow male Kenyi was the most dominant fish and ruled the roost, but did

## RECOMMENDED READING

Ad Konings (1990), *Ad Konings's Book of Cichlids and all the other Fishes of Lake Malawi*, Tropical Fish Hobbyist Publications Inc.  
Ad Konings (1989), *Malawi Cichlids in their Natural Habitat*, Verduijn Cichlids.  
H R Axelrod and W E Burgess (1986), *African Cichlids of Lakes Malawi and Tanganyika*, Tropical Fish Hobbyist Publications Inc.

# BLUE DWARF



As the male nudges the female, she begins to release her large egg.

The female then picks up the eggs she has laid.



Young fish all have female coloration.

not trouble the other fish much. The *freibergi* initially tended to be shy fish, possibly because they were wild-caught, and would disappear into the nooks and crannies whenever I approached the tank.

Observing them from a distance, I noticed that they were more dominant than the bigger, but friendlier *livingstoni*, and that the male had established his territory in one of the smaller pots. The *Pin-dani*, on the other hand, were rather quarrelsome fish and were all more dominant than the *freibergi*.

## Spawning successes

Within five weeks of acquiring the fish, the female *freibergi* had spawned and appeared to be carrying a few eggs in her small mouth, an event that I missed. After eleven days, she was carefully removed by using a net to entice her into a small container and then put in a separate small tank which was properly conditioned and contained water of the same temperature as the main tank, a small mature sponge filter and a flowerpot for the fish to hide in.

Six days later, she released her brood of seven fry, which she had carried for a total of seventeen days at a temperature of 27°C (80°F). These fry were permitted back into their mother's mouth (buccal cavity) for a few days following release.

I now kept the female in a separate tank containing a flowerpot and a mature sponge filter. She was fed primarily live food and, four weeks post-release of fry,

she was clearly gravid again. The male was therefore introduced to the tank and they set about spawning almost immediately, allowing me to observe and photograph the whole sequence with considerable ease.

The courting male's display was in typical Mbuna fashion and involved fin flaring and shivering body movements in front of the female, who he would seek out in all parts of the aquarium. Eventually, he coaxed her into the flowerpot, where spawning proceeded.

The pair circled each other, alternately nudging each other with their mouth in the region of the anal fin. A few eggs were occasionally laid by the female as the male nudged her, and she then turned round, picked up the eggs in her mouth and nudged the male, picking up sperm.

Although only a small number of eggs were laid, the whole spawning sequence still took almost an hour. When spawning was complete, the male was removed back to the main tank, leaving the female to brood the eggs in peace.

Seventeen days after spawning, the female released twelve fry, which were permitted back into her mouth for a few days following release. The fry, which were brown-striped fish, like their mother, were fed a diet of small white worm and powdered flake which they ate voraciously, three times a day. Although both males

and females grew evenly, their rate of growth was slower compared to other Mbuna. This is probably because mature *freibergi* are smallish, only reaching a total length of some 7cm (2.75in).

The free-swimming fry were 10mm (0.4in) TL, reaching a length of 21mm (0.8in) after eight weeks, and 28mm (1.1in) after sixteen weeks. When the young fish were moved to a larger aquarium fitted with an undergravel filter, they grew a little faster, reaching a length of approximately 45mm (1.8in) after 24 weeks.

## Gold mine

Lake Malawi is a goldmine of colourful cichlids and hence, the mammoth task of scientifically describing and naming all the fish is going to take several more years. Meanwhile, we are fortunate to get new fish, even though scientifically unnamed, to study and to grace our aquaria.

*Labidochromis freibergi* is one of the smaller Mbuna and, in a sense, a true dwarf cichlid. It is also, as mentioned earlier, sold under the trade name of "Eloson". It is a superb little rock dweller with a lot of character for its small size. The blue male and the pleasantly coloured brown female make an interesting addition to any Mbuna tank.



# BAF '93 OUT &

## The Wood Man Wins Again

by Dr David Ford — Aquarian Advisory Service

Photographs by Jon Montgomery

Things are really hotting up on the Aquarist & Pondkeeper sponsored **Champion of Champions** competition front. Even as this year's top award was being named, the buzz going around was that some very special fish are being prepared for the next show season to join battle with this year's double-winning entry.

Bearing in mind the outstanding quality of our current champion, the new crop being groomed for stardom in 1994 is going to have to be REALLY special. What a mouthwatering prospect! And, by all accounts, some of these newcomers on the show scene promise to be giants of their kind.

Not that this is going to put off **Andy Duck** of the **Northern Area Catfish Group** who won the **Champion of Champions** at the British Aquarist Festival for the second year running with his magnificent Suckermouth Catfish, *Pseudacanthicus leopardus*. The only other aquarist to achieve this distinction was **Ted Derrick** of **Alton AS**, who gave Andy lots of competition this year with no less than six entries for the **Champion of Champions** final.

Another competitor for the title was **Alex Torbet** of **Edinburgh AS**, who was featured in the November issue of *Aquarist & Pondkeeper*. He won the Best in Show at the Scottish Aquarist Festival with a Green Swordtail, *Xiphophorus helleri*, raised in his Fish House in Edinburgh Prison.

The same fish was sent by rail to the British Aquarist Festival venue of Bowler's Leisure Centre, Manchester. Alex then followed to collect his fish on prize-giving day. He also entered a large *Tilapia* from his work with the Institute of Aquaculture at the prison. This was a *Tilapia rendalli* which is not known in the hobby. The fish did not reach the final four, but if it would have scored better under the *T. rendalli* standards, rather than those for *T. mariae* under which it was judged, Alex will never know.

The Show was held on 30 and 31 October for the 42nd time, and for 40 of those years **David Shields** of **Halifax AS** has been showing his fish! At BAF '93 his club won the beautiful *Cussons*



General view of the packed hall on the Sunday.



**I. Rowbottom** — second placed winner in the C of C competition. The impressive *Distichodus fusosus*: the second-placed C of C fish.



**Fergie Brown**, deserved third placed winner in the C of C.

Trophy for Society Furnished Aquaria for the 16th consecutive time! To celebrate this event, David was given a special diploma, along with the trophy. As presenter of the prizes, I was also very pleased to award him an Aquarian sweatshirt.

**Best in Show** was another Catfish (always popular with the judges) *Anicetus dolichopterus* owned by **Trevor Morris**, another member of Andy's Club, the **NACG**. The Gold, Silver and Bronze Aquarist & Pondkeeper pins were awarded to Andy, to **I. Rowbottom** of **Tameside AS**, and **F. Brown** of the **West of Scotland Goldfish Society**. As



# ABOUT

**MAJOR BAF '93 AWARDS**

**Champion of Champions:**  
 1, Andy Duck (NACG);  
 2, I. Rowbottom (Tameside AS);  
 3, F. Brown (W. Scotland Goldfish);  
 4, Mr and Mrs P. Dawson (CAST '88).

**Highest Pointed Tableaux:**  
 1, Darwen AS; 2, Isle of Wight AS;  
 3, Scorpion AS; 4, CAST '88;  
 5, Silatown ST.

**Best Fish in Show:** T. J. Morris (NACG).



The top C of C fish, *Pseudacanthicus leopardus*, is likely to come up against stiff competition next season.

The winning tableau from Darwen AS was a well constructed fish house. This was a tableau with real relevance to the hobby.



Andy Duck — the 'Wood Man' — receiving his C of C award.



Inside Darwen's fish house.



Fergie's outstanding Calico Fantail.



Ferdie-Dee the clown has become a welcome fixture on the show circuit. Children love him . . . and he's a pretty decent fishkeeper, too!



There were about forty entries in this year's 'expanded' C of C.

of Stockport, Euro Discus, Peak Aquatics and Bubbles Aquatics. As usual, plenty of fish food and treatments were on sale at specially reduced prices for the show, including Aquarian, Tetra, OSI, Ruto Frozen Foods, WaterLife and Yorkshire Brine Shrimp Supplies. Aquariums and accessories were available from Merlin, Coral Reef, Global-custom, Rosewood and so on. Sunday saw many more visitors and the show was much busier, with many charabancs of aquarium clubs from around the country, including Scotland and Wales. The general public, too, arrived in force on Sunday, and to cater for these, 13 societies in the FNAS showed their fish in tableaux.

The well deserved winning tableau was a complete, life-size fish house with flowing tap and rain pipe running into a rainwater tub, by Darwen AS. Second was an unusual display by the Isle of Wight AS of antique items for aquarists collected by members over the years. Scorpion's 'Mouse with Cheese' came third, despite their mouse getting jammed!

Several societies opted for the simple box display, a trend that has developed over recent years. However, Cast '88 managed a fourth prize because the box was so well made.

The title of this article: **Wood Man Wins Again** refers to the fact that Andy Duck is called the Wood Man, he is so keen on adding petrified wood to his display tanks. His collection of catfish are kept in ideal conditions with the acid, brown waters created by petrified logs, and Andy believes that catfish such as his winning *P. leopardus* feel more at home in the twisted wood caves of the logs.

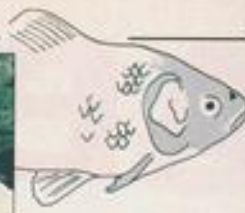
Andy forsook all the usual prizes offered to the Championship winner and asked for the pick of the stall of Cornish Bogwood. He chose two interlocking giant pieces of petrified wood, to be installed in his brand new 6-foot aquarium, a suitable new home for the double winner of **Champion of Champions**.

a result of introducing silver and bronze pins, the number of entries for the Champion of Champions has increased dramatically since 1992, with names already being registered for 1994!

The Show did not attract large numbers of visitors on the Saturday, so it was never too crowded. However, traders reported that those visitors who did attend were buying, not just looking. There were many things for aquarists to buy, too, with no less than six stands selling live fish. These were JMC, BeltonFish Farm, Tropics

# COLDWATER JOTTINGS

BY  
STEPHEN  
J. SMITH



## Seasonal sense

It is at this time of the year that the short days and long hours of darkness remind us that the pond season is well and truly over for another year. The garden is looking rather sad, the water a little on the dark side, and the fish virtually dormant as the temperature of both air and water fall dramatically with the onset of winter.



Despite the fact it's not too pretty, sturdy netting stretched over stout frames will not only keep predators away from your fish, but will also help to keep leaves off the pond.

Simply because the season is over does not mean that there is nothing for the hobbyist to pay attention to, however. It is all too easy to 'forget' the pond, and its inhabitants over the winter months, but not only are there those leaves to clear from around the pond (and IN the pond if you haven't already done so), but plants need to be pruned by removing dead stalks and leaves, and repotted, while the occasional partial water change will do our fish a power of good.

Having recently completed my Koi pool project, I am in the process of constructing a cover to keep the worst of the winter off the pool. Stout timber is being bolted together to form a pair of frames over which a sheet of bubble polythene is stretched and secured. This material is

reasonably cheap and has the dual advantage of letting light and heat in, but not let the heat out. Combined with the use of a pond heater installed in the settlement chamber of the filter, I am hoping that my fish will enjoy quite a luxurious winter!

## Telegram time for Tish the Fish?

Remember Big Bertha? No, not the aircraft, but the Shubunkin who thought she was a Koi (featured in *Coldwater Jottings* exactly two years ago). Bertha was one of my favourites and the longest-living member of my coldwater collection. Sadly,

she joined that fish pond in the sky at the age of 13 years.

But Bertha was only a juvenile compared with Tish the Fish, a Goldfish with no fewer than 37 rings on her scales, and owned by Yorkshire pensioner Hilda Hand.

According to Dr David Pool, head of Tetra's Information Centre, Tish is only three years off the record for the world's oldest Goldfish. "It is very unusual for a Goldfish to live to such a ripe old age. The Guinness Book of Records reports that the oldest known Goldfish was 41, but I very much doubt if there is another living Goldfish older than Tish anywhere in the world."

My own establishment is home to several Goldfish at seven or eight years of age, some of

which were spawned with Big Bertha herself. However, perhaps readers would let me know o/o *Coldwater Jottings*, of your own long-lived coldwater favourites.

## Did you know . . . ?

That there are no less than 25 British species and several varieties of water fleas (Daphniidae), of which the commonest genera are *Daphnia* and *Simocephalus*? The largest species is *Daphnia magna*, of which the female measures up to half a centimetre. The most common is *Daphnia pulex* — the one we use to feed to our fish — which has many varieties.

The Daphniidae belong to the sub-order Cladocera, the water fleas, which range in size from 1mm in length to 3mm and are abundant in shallow pools of fresh water.

Water fleas need oxygen — and plenty of it. So, if you wish to culture water fleas successfully, you should provide a shallow pool specifically for the purpose. I have found that the greater the surface area in proportion to the volume of water, the greater the success of the culture.

A further tip is to divide the culture pool by means of a fine mesh: newly-born *Daphnia* will swim through the mesh, which will divide them from their parents. It is these young *Daphnia* which should be 'harvested' for feeding to your fish, and the parents will subsequently produce greater quantities of offspring.

Self-cultured water fleas provide the ideal live food for young fish: they are rich in protein and calcium, and if you have cultured them yourself, should be free of parasites (one of the risks of collecting water fleas from wild ponds). Goldfish fry will eat *Daphnia* voraciously and will show rapid development. Along with garden worms, they are "God's gift to fishkeepers".

## And finally . . .

Christmas Greetings from this Coldwater Jotter to all my fishy (and not-so-fishy) friends around the world.



ANNOUNCE

Big Bertha, my own favourite Goldfish, was 13 years old and over 14 inches long when she died — a mere junior compared with Tish the Fish!



Whatever happened to the Panda? This attractive 'new' variety of Fancy Goldfish took the coldwater scene by storm just a couple of years ago. However, apart from its presence at the occasional specialist show, it seems to have disappeared. Are they being successfully bred . . . ? Perhaps you could drop us a line at *Coldwater Jottings*.

STEPHEN SMITH

## CHEEKY TORCHBEARER

The Flashlight Fishes are small tropical marine fish which live in deep water during the day, migrating upwards in large shoals into shallower water as night-time falls. Unlike many other species of fish that go to sleep at night, Flashlight Fishes actually come awake during the hours of darkness.

This presents a bit of a problem, particularly to a shoaling species, where every individual needs to know exactly where every other individual is in the inky blackness.

The solution — shine a light! But how? The Flashlight Fishes get bacteria to do the job for them. Not any common or garden bacteria, mind you, but very special ones that are luminous and are packed into special cheek pouches — one on each side of the face.

These fish can switch the lights off at will and by changing

Flashlight Fish with a cheekful of luminous bacteria.

their position in the dark at the same time, they have a really effective way of escaping and confusing predators — especially when thousands do the same thing together. Also, they can announce their presence, sex, mood... and all manner of things... by 'speaking' light language. Amazing what you can do with luminous bacteria... if you only know how!



CORAL WORLD-ELAT

Pay a visit to

## WHOLESALE TROPICALS (RETAIL ONLY)

Large selection of Tropical Fish always in stock  
Plants and Equipment

Many of our customers say we have one of the best selections of tropical fish in London, and probably the country. With over 20 years experience supplying the aquatic trade.

**WE STOCK FULL RANGE  
OF EHEIM PRODUCTS  
PRICES ON REQUEST**

**150** Tanks of tropical fish which normally include 20 species of Synodontis, 30 species of Corydoras, 25 species of killies, Blue Brown Tefe — Turquoise — Heckel discus. Clown — Blue-eye, a good selection of Cichlasoma Apistogramma, and many others. Also Corydoras Panda and Brochis Britskii.

A selection of aquatic grown Cryptocorynes

● SPECIAL OFFER — CASH ONLY AT THESE PRICES ●

Tank, F/top cover, heater, thermostat, internal power filter, GroLux lighting, thermometer, gravel.

24" x 15" x 12" £60.50 — 36" x 15" x 12" £81.20 — 48" x 15" x 12" £97.10 k/down tubular steel stand 24" £25.20 — 36" £26.50 — 48" £32.00

All-glass aquariums 24" x 15" x 12" £12.50 — 36" x 15" x 12" £16.50 — 48" x 15" x 12" £21.00

Any size of All-glass aquariums made to order at competitive prices

If you are in the area please pay us a visit **Ask for Terry — Club visits welcome**  
Open: Mon, Tues, Wed, Fri, 10am-6pm. Thurs, 10am-2pm. Sat 9am-6pm. Sun 9am-1.30pm.

**10% DISCOUNT WITH A CUTTING  
OF THIS ADVERTISEMENT,  
APART FROM SPECIAL OFFERS**

**On No 8 Bus Route — Opposite main Post Office**  
220 BETHNAL GREEN ROAD, LONDON E2 Tel: 071-739-5356 Fax: 071-729-2444

PRICES CORRECT AT TIME OF GOING TO PRESS



### REMOVING THE MYTH THAT MARINES ARE HARD TO KEEP

• Have you ever been awestruck by the striking beauty of a Marine environment?

Here on video Barry Jackson explains:

1. Setting Up A Tank
2. Tank Decoration
3. Water Quality
4. Filtration
5. Stocking Levels

By following his expert explanation the Marine Keeping Myth will become a reality.

The video costs £17.99. Cheques payable to John Bamberger  
Practical Video Productions, 28 Adley Street, Hackney, LONDON E3 8DT  
Tel: 071 729 3333



# QUESTION TIME

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: Question Time, Aquarist & Pondkeeper, 9 Tufton Street, Ashford, Kent TN23 1QN. Herpetology, Julian Sims. Kol, John Cuvelier. Tropical, Dr David Ford. Coldwater, Pauline Hodgkinson. Plants, Barry James. Marine, Gordon Kay.



## PLANTS



**Marble Queen** — 'viral', but beautiful.

### Viral marbling

I have come across a new Amazon Sword Plant called *Echinodorus cordifolius* 'Marble Queen'. It has very attractive yellow mottling on the leaves. Can you tell me anything about it?

This variety was developed by Tropica of Denmark. The yellow markings are caused by a virus, but the cultural requirements are the same as for *E. cordifolius*, except that it seems to need more light, and so is more suited to shallower tanks. Dennerle have now managed

to infect other species of aquatic plants with the same virus as the one in 'Marble Queen', so watch out for new yellow-mottled plants before too long.

### Hairy problem

I have tried to eradicate 'hairy algae' from my aquarium for over a year now without success, despite having tried all sorts of algicides. My plants are infested. Any suggestions?

You might try changing your lighting tubes to the new Trocal 3085 fluorescent lamps. These have been developed specifically to deal with this problem.

## MARINE



### Lack of algae

I have two surgeons in a tank but green algae (growing naturally) are in short supply. What can I do?

If you have a dearth of green micro-algae, then congratulations — you are looking after things well and there are very few nitrogenous wastes for the algae to feed upon.

You could: (i) try to cultivate *Caulerpa* and other macro-algae species; (ii) cultivate algae stones in a separate aquarium on the window ledge; or (iii) feed your surgeons with lettuce occasionally, and vegetable flakes more regularly.

four large pieces of Living Rock, one Percula Clown, one Regal Tang, one Cleaner Shrimp, one Dancing Shrimp, one Malu and a green Bubble Anemone. What else could I add?

If your aquarium holds 32 gallons nett, then you have a FISH carrying capacity of sixteen inches after the tank has been running for twelve months. Invertebrates can — to all intents and purposes — be ignored and stocked, within reason, at will.

If I were you, I would start by adding, perhaps, one or two small fishes — maybe a Royal Gramma and a Centropyge Angel, such as a Flame Angel or a Coral Beauty. Alternatively, you could add two or three juvenile Percula Clowns to give a small group, with a view to breeding them.

As far as more invertebrates are concerned, I would add at least one other Cleaner Shrimp, because Cleaner Shrimps do better in groups and, certainly, another anemone or two.

### 32-gallon stock

I have been running a 32-gal. marine aquarium for six months without any problem. My current stock consists of:



Cleaner Shrimps — such as *Lysmata amboinensis* — do much better in groups than as solitary specimens.

MARK GIBBS, THE COLLEGE BOWL, OXFORD

## KOI



### Taking stock

I have a pond measuring 10 x 8 x 4.5 ft in which I keep 65 Koi measuring from 19 to 25 in.

The problem, as you may well imagine, is ammonia (and nitrite). I cannot build another pond, but could construct a second filter. Would this solve

the problem? We, obviously, don't want to get rid of any of our fish.

The current parameters are: pH — 8.0; ammonia — 0.25 ppm (parts per million); nitrite — 0.25 ppm; and nitrate — 50 ppm.

I'm not at all surprised that your pond has high levels of ammonia and nitrite! If anything, I'm more surprised that the levels are as low as they appear to be. With a capacity of about 2,300 gallons, your pond is obviously heavily overstocked and you should — as a matter of urgency — take steps to remedy the situation.

You say that you cannot build another pond and, under-

standably, do not wish to dispose of any of your Koi. A classic 'Catch 22' situation.

There are two options open to you: either double the size of your filtration system or, possibly the cheaper and simpler option, install a quantity of Zeolite somewhere in the pond to remove the ammonia and nitrite.

I would suggest the purchase of two, 25-Kilo bags of Zeolite, one to be suspended in a rigid perforated plastic container within the pond, the second bag to be used as a changeover for when the used bag needs cleaning and reactivating.

The water quality will need to be monitored continuously and checked for levels of contamination and under no circumstances should you add salt to the pond as a fish treatment, as any ammonia will immediately be leached back into the water.

The Zeolite can be reactivated by soaking in a salt solution of two pounds of salt per gallon of water, with only enough water to cover the Zeolite. I always soak it for 48 hours and then wash the material well and allow it to dry somewhere warm.

I fear that all this merely adds yet another chore to the hobby but, at least, you should be able to retain your stock of Koi... but please, no more additions!

### Testing time

This past season we decided to change the shape of our pool from an oblong to a figure-of-eight.

Since putting the fish back, we've been losing them, often with no external signs of disease. What could be the reason for this?

It's always difficult to make a diagnosis from afar, but I feel fairly certain that your problems — as is often the case with new pools — stem from environmental imbalance.

You make no mention of any water quality testing, so you should start in this area. Unless there is an actual virus causing your problem (relatively unlikely), the fish could be reacting to stress caused by poor water quality. A set of test kits for pH, chlorine, ammonia, nitrate and nitrite would be a very worthwhile investment.



A crowded Koi pool may look nice... but the problems it can create often prove difficult and distressing to overcome.  
GORDON WIGENS

### Scratch avoidance

How do you clean an acrylic tank without scratching it?

The best way of avoiding scratches in acrylic (and other plastic) tanks is not to get them scratched in the first place! Use a soft sand base, rather than gravel, only use a paper towel to wipe the sides, and do not trap the sand when wiping the insides.

Do not use algae magnets or algae scrapers.

If small scratches do occur, rub the emptied tank with a soft cloth and a little metal polish. This will smooth the acrylic, but cannot be expected to remove deep scratches.

RINSE THE TANK THOROUGHLY BEFORE RE-USING!

### Unfounded fears

Being new to freshwater tropical fishkeeping, I seem to be unable to lay my hands on information regarding the breeding and export of fish

from foreign countries to the UK.

I am, for example, concerned that too many fish may be taken from the wild, thus depleting natural stocks and possibly causing an imbalance in the ecosystem.

I am also concerned that those who breed the fish in foreign countries may be working for next to nothing.

Can you throw any light on these points?

I note your concern about the importing of freshwater fish and the depleting of wild stocks.

However, there is no cause for worry because over 90% of all freshwater tropicals, and 100% fancy coldwater fish, are farmed fish. In fact, some fish are rare or extinct in the wild, and it is only through the fishkeeping hobby and trade that these species survive.

The number of wild freshwater tropicals that are caught (such as the Amazon fish) make no difference to the overall wild populations of fish. Far, far more are caught as food fish and have been so taken since we arrived on Earth. If you ever see pictures of the Amazon jungle taken from an aeroplane, you will under-

stand that thousands of miles of streams and rivers abound where man has not even trod... and they abound with fish.

As to your point about cheap labour in foreign fish farms, if you visited some, you would get quite a shock! It is big business and is often Government controlled or aided, so it brings a good wage to the people involved and enriches the country itself.

For example, the ornamental fish trade is among Singapore's

greatest export earners. You will find clean, modern fish farms using the latest technology, many employing graduates. Singapore city itself is also clean, graffiti-free, with no crime and an economic growth rate we should envy!

As for the Florida fish farms... well, seeing is believing!

No, your worries are unfounded. The fishkeeping trade helps everyone, even the fish.

One of two gigantic fish farms owned by Ekkwill Waterlife Resources in Florida. More than 90% of all freshwater fish are bred in farms around the world.  
JOHN DAVIES



## COLDWATER



Even prize-winning Orandas will often fall short of the ideal standard in one characteristic or other.

JOHN GAMES

### Challenging Orandas

Why can't I purchase good-quality Orandas? I would like to join the band of enthusiasts who enter their fish at some of the specialist shows and have tried to obtain these fish from many different sources — but without success.

I can explain why so few good-quality Orandas are offered for sale; it is simply because this variety presents many problems for the breeder.

The body shape, as the Goldfish Standards demand, should be round, approaching a sphere, with smooth contours above and below. There should be a short, deep head, wide-spaced between the eyes. In addition, the whole of the head should carry a raspberry-like growth or hood protruding from the general line of the body. Few of the young from a spawning would conform to this stage of the requirements.

Another extremely difficult feature to achieve is the full, flowing caudal finnage with the bottom edge straight, as seen on the best Veiltails. Of course, this type of finnage is seldom seen because the shorter, Fantail caudal is much easier to produce and so the fish which are commercially bred would generally have fan finnage.

Each aspect of the Oranda's characteristics is a very big challenge, as any Lionhead or Veiltail breeder will testify, but attempting to put all these characteristics into one variety is, without doubt, one of the biggest challenges in Goldfish breeding.

Even from the best strains,

the number of good, let alone show standard, fish (for these must also have paired anal finnage as well), will be few, perhaps only totalling a dozen or so. If we are also dealing with nacreous scaled fish, then, as only 50% of the fry will be nacreous anyway, this reduces the number from which to select good fish even further.

Even then, the few selected fish must be grown on until it is evident that the hood will develop sufficiently to make them good examples of their type.

### Essential plants?

Is it absolutely necessary to grow real plants in my cold-water aquarium?

The majority of people who have a coldwater aquarium in their home like to create an attractive display. Therefore, most regard a well planted set-up the ideal concept in which to display their pets.

Real plants are, without doubt, of great benefit, aiding the balance between the fish and the elements within the aquarium. Their roots take up the by-products from the fish waste, they help to oxygenate the water, and they provide nourishment for the fish, as well as offering shelter for the timid.

Real plants are not, however, essential, and some of the plastic ones are extremely convincing, though the purists might never consider allowing plastic plants within their aquariums. I, personally, think that mixing real and plastic plants gives a pleasing effect and ensures that there is always a good display of foliage.

## HERPETOLOGY



### Swollen-eyed slider

One of my Red-eyed Turtles has developed swollen eyes which no longer open. It is also now far less active than it used to be, but it is still taking small amounts of food. How can I improve its health?

The symptom of swollen eyelids, which has developed in your Red-eyed Slider (*Trachemys scripta elegans*) is a condition known as Hypovitaminosis A. It is the result of insufficient Vitamin A in the diet. Unfortunately, this is quite a common problem among freshwater turtles maintained in captivity.

Without Vitamin A, the layers of cells on the outside of the body (including the clear cells covering the front of the eyes) and those lining the mouth, throat and lungs no longer act as an effective barrier to bacteria, which then invade the body. In particular, the eyes and lungs are at greatest risk. Thus, puffy, swollen eyelids and respiratory disorders resulting in 'open-mouth' breathing and 'wheezing' are all possible symptoms caused by insufficient Vitamin A in the diet.

These symptoms can be relieved by an injection of Vitamin A (a water-miscible injectable form) administered by a vet.

The swollen eyelids might also need treatment with an ophthalmic ointment.

Alternatively, if the turtle is still feeding, its food can be dusted with a multi-vitamin and mineral powder such as Vionate. This will provide the necessary Vitamin A together with essential Vitamin D and calcium. Vionate is available from pet shops.

Another method of providing the necessary Vitamin A, especially if the turtle is already ill and NOT feeding, is by Abidec drops administered using a small pipette through the open mouth. The help of another person to hold the turtle and open its mouth is particularly useful at this time. Abidec is widely available from chemists shops, including Boots.

### Bloodworm supplies

What are Bloodworms and how do they seem to spontaneously develop in a container of rainwater or a freshly cleaned out pond?

Is it possible to use these aquatic invertebrates to provide a regular source of food for my amphibian larvae?

Bloodworms are not true worms, but the aquatic larvae of Chironomid midges — winged insects. Therefore, colonisation of even the newest pond is relatively easy.

The adult females lay their eggs at the edge of water, and when these hatch, the larvae fall to the mud below.

Bloodworms can be collected from rivers and ponds by using a net with fine mesh. To ensure a regular supply, Chironomid midges can be encouraged to lay their eggs in containers of pond water enriched (ie made eutrophic) by the addition of a little dissolved OXO or Bovril. These extracts promote the development of bacteria — food for the Chironomid larvae.

'Bright-eyed' sliders — most definitely NOT experiencing a lack of Vitamin A in their diet.

JULIAN SIMS





In the wild, environmental conditions fluctuate. Light in particular, is influenced by many factors, many of which will not exert a pronounced effect on growth and can be ignored when attempting to cultivate plants in aquaria.

**A**lthough the British are acknowledged by the rest of the world as having the finest gardens and being the most knowledgeable and innovative gardeners, we are, unfortunately, far behind our continental cousins in the art and science of aquascaping. However, this situation is changing as we see and admire the beautifully planted aquaria of our Dutch and German counterparts. They realised back in the 1970s that getting aquatic plants to thrive in aquaria, needed a more scientific approach than the hit or miss practices then prevalent.

We are primarily indebted to two German companies, Dupla Aquaristik and Dennerle, who, by their vision and enterprise, have created new technological systems to enable anyone to design beautifully planted aquaria and be able to maintain them in pristine condition over long periods.

## NATURAL APPROACH

Both companies realised that to find out how to grow plants in aquaria, it was first necessary to find what conditions prevailed in their natural environment. At first glance, this might have seemed a difficult task, as conditions would undoubtedly vary throughout the tropical areas of the world. In fact, the tropical rainforest areas show remarkable similarity of climatic and other environmental factors.

Teams of scientists set to work collecting data on temperature, soils, the chemical and electrical properties of water, light conditions and other factors. After much experimentation in the laboratory, they formulated their ideas on how to create the ideal conditions for growing aquatic plants in the home aquarium.

# BLOOMING SUCCESS

## PART I

## Light and Water

By combining technology and commonsense, everyone can create the perfect underwater garden. **Barry James** of Everglades Aquatic Nurseries is our guide.



Good-quality lighting is essential for optimal plant growth and health.



Actually, aquatic plants, both in the nursery situation and in properly set up aquaria, are, in many cases, superior to their wild equivalents. This is because they are not subject to attack by insects, molluscs and other herbivores, or are otherwise damaged by weather or animal and human degradation.

The problem with most aquarists is that they think that there is perhaps one magic action that they can take which will improve their plant growth.

Adding some fertiliser, changing their fluorescent lamp to a different type, or putting a layer of John Innes compost under the gravel can certainly result in a dramatic change in the performance of their plants. However, a much more empirical approach is called for if one is to take advantage of the research and development which has resulted in a proven method of attaining success in this field.

## BASIC NEEDS

What do plants need for optimal growth?

- ① Light of the correct intensity, spectrum and duration.
- ② Water of the correct temperature, hardness and pH (acidity/alkalinity).
- ③ The correct concentration of nutrients, including carbon.
- ④ Gravel of the right particle size and make-up, and present in the right quantity.
- ⑤ A substrate medium which is suitable for tropical plants.

## 1 Lighting

Lighting is essential for the aquarium. It provides energy for plant metabolism (for the process known as photosynthesis), and enables the fish to see and be seen.

In the wild, the light enjoyed by plants is never uniform; clouds, rainfall, alterations in the distribution of the jungle canopy, and water turbulence, can all influence the amount of light reaching the plants.

However, these are variable, which, in general, can be ignored. Technically speaking, it is no great problem today to install light sources above the aquarium which simulate sunlight. The industry has formulated new phosphor coatings which give excellent results in aquaria. The new Dennerle tube even inhibits algal growth, while still providing an excellent source of illumination for the growth of higher plants.

Using tubes, a rate of 20 watts per square foot (900 sq cm) of surface area will be necessary. This is sufficient for aquaria up to

15in (38cm) in depth. This formula should be increased by 50% for aquaria 18in (45cm) in depth.

With aquaria 24in (60cm) or more in depth, suspended lamp systems should be used.

These open-top aquaria enable marginal plants to grow out of the water, water lilies to flower, and floating plants to be seen at their best. The lamps should be suspended at least 12in (30cm) above the surface, as they radiate a good deal of heat, and will burn vegetation planted too close to them.

## Suspended systems

Three types of suspended systems are available.

Mercury Vapour Lamps (HQL) give good results, but the replacement lamps are somewhat expensive.

Metal Halide Lamps (HQL) are more expensive, but give a more powerful beam

**Fine-leaved vegetation (this is Dwarf Ambulia — *Limnophila sessiliflora*) are destroyed by a build-up of detritus on their leaves.**



and the replacement lamps are cheaper than mercury vapour.

Dennerle have introduced new 12-volt halogen systems. These give a very classy look to the tank, and fit in very well with modern decor. They are, of course, much cheaper to run than mains voltage systems. HQL lamps are switchable from 80 to 125 watts, which is a very useful feature.

Suspended lamps should be used at the rate of one lamp per 24in (60cm) of tank length.

All lighting should be switched on for exactly 10 hours per day for the best results. Dimming devices, while seemingly of no benefit to plants, do stop the shock to fish of suddenly being exposed to full light from total or semi-darkness.

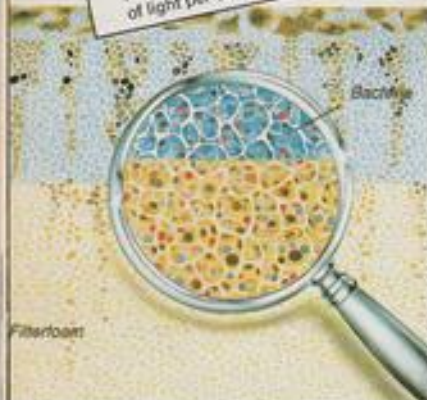
## 2 Water conditions

The temperature of the water in tropical areas varies greatly, depending on season and on many other factors with which we do not need to concern ourselves. In general, a temperature of 75-80°F (24-27°C) will suit the majority of species.

## SUGGESTED LIGHTING LEVELS

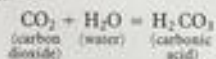
- TUBES**
  - Aquaria up to 15in (38cm) depth: 20 watts/sq ft (900 sq cm).
  - Aquaria up to 18in (45cm) depth: increase above by 50%.
- SUSPENDED LAMPS**
  - Aquaria 24in (60cm) and over depth: 1 lamp/24in (60cm) of tank length.

Recommended photoperiod: 10 hours of light per day.



Healthy conditions for bacteria within appropriate media such as high-quality foam, can simultaneously create nitrifying (blue) and denitrifying (cream) conditions (both essential for a proper balance).

It is a well-known adage that water is the universal solvent. Rain is virtually pure distilled water just after condensing from the atmosphere, but during its passage to the ground, it dissolves various gases such as carbon dioxide (CO<sub>2</sub>). Once this becomes groundwater, it starts to dissolve some of the rocks with which it comes in contact, an action that imbues it with certain chemical and electrical properties. Carbon dioxide when dissolved in rainwater becomes carbonic acid:



## Acidity and alkalinity

Pure distilled water is described as neutral. Water described as acidic or alkaline is relative to pure water on a scale in terms of this neutral point. The scale runs from 0-14. Below 7, the water is said to be acid. At 7, it is neutral, and from 7-14, it is described as alkaline.

## Hardness scale

Where water flows through sedimentary rocks, such as chalk or limestone, the weakly acid content dissolves the rock as follows:



## RECOMMENDED pH AND HARDNESS LEVELS

- pH:** For most plants, values between 5 and 7 (acid to neutral) are fine.
- HARDNESS:**
  - Total Hardness:** best kept as low as possible.
  - Temporary (Carbonate) Hardness:** maintain at around 4° dH (German scale) to prevent marked fluctuations in acidity/alkalinity.

In reality, it is not quite as simple as this, as other substances, such as sulphates, nitrates, phosphates and vegetable acids also become dissolved, resulting in a veritable 'cocktail' of chemicals.

Water containing dissolved calcium and magnesium is said to be 'hard'. This quality, like pH, is expressed on a hardness scale (or scales); the scale most used is known as the dH, or German, scale and runs from 0 degrees upwards.

While the calcium and magnesium contribution to total hardness is important, the bicarbonate portion of the equation is also significant. This is called the temporary hardness, as it can be removed by boiling. It is expressed as the KH level and is measured in degrees the same as used for dH.

## Good conditions

Aquarium water for growing plants should have a pH of 5-7.00, although slight variations to these recommended values are not critical. While the total hardness level should be as low as possible, the carbonate hardness level — KH — should be maintained to prevent 'acid plunge'. This is important when pH is being stabilised by the use of CO<sub>2</sub> diffusion.



pH monitoring should form a vital part of every underwater gardener's routine duties.

Maintaining water quality and clarity is very important for the maintenance of both fish and plants. Fine-leaved plants, such as the Milfoils, are quickly destroyed by a build-up of detritus on the leaves, which chokes up the tiny pores through which the plant 'breathes'. Filters also function as

chemical cleansers, preventing the build-up of harmful excesses, such as nitrates, which can lead to algal blooms.

Dennerle's approach to this problem has been to build very efficient internal power filters. These are multi-functional, having a built-in heater, CO<sub>2</sub> reactor, and a compartment for housing nitrate and phosphate removal substances.

The filter media are a range of highly efficient sponges, which can be changed very easily without disturbing the filter itself.

Dupla has a different approach to the problem, tending to favour the use of drip-feed filters in which the nitrifying process is carried out by employing complex plastic media, such as biospheres.

These, because of their large surface area, act as breeding grounds for aerobic bacteria which will neutralise ammonia and nitrites.

## FERTILISATION

Water, as I have said earlier, is the universal solvent. As such, it contains many substances, both essential and harmless to the organisms which inhabit it. Aquatic plants derive all their nutrients from it, utilising their root systems and by absorption through the leaves.

Like their terrestrial counterparts, aquatic plants need the full spectrum of elements for successful growth.

Firstly, they need the so-called basic fertilisers which are known as NPK, an abbreviation for Nitrogen, Phosphorus and Potassium. In aquaria, these must be administered with care as an overdose will lead to an explosion of algal growth.

Secondly, there is the large group of metals known as trace elements. Iron, manganese and boron are known to be important, but the function of some of the others, such as copper and tin, is imperfectly understood.

Different types of plants have slightly different requirements with regard to trace elements but, in all species, lack of certain of these substances is known to reduce resistance to disease, while others are vital to the essential life processes of all plants.

My own approach to fertilisation is to introduce the NPK when setting up the aquarium initially in the form of NPK tablets. When the tank is up and running, I use daily doses of trace element solution. Trace elements, unfortunately, disappear from the system within 24 hours, as they are destroyed by colloidal action which occurs when the elements come in contact with the detritus in the aquarium.

The use of carbon in filter systems is to be avoided if you are using fertilisers, as carbon is an efficient remover of fertilising substances.

So far, I have discussed the importance of lighting, water chemistry, filtration and fertilisation on the growth of aquatic plants. In the next article, I will consider the other factors and variables which must be considered if we are to provide our plants with the conditions they require to grow and flourish on a long-term basis.

(TO BE CONTINUED)

DECEMBER 1993

**A & P**

**AQUARIST &  
PONDKEEPER**

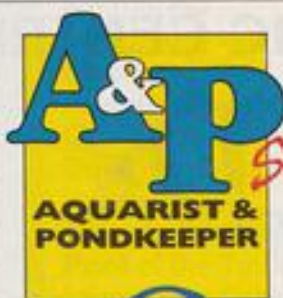
*Supplement*

## POPULAR MARINES

- CLOWNS AND DAMSELS
- FAVOURITE BUTTERFLIES  
AND ANGELS
- TOP TEN NATIVES
- CYANIDE-FREE FISHING  
IN SAN SALVADOR
- THE 'OTHER' MARINES
- SPINELESS FRIENDS



# Popular Marines



Supplement

## Contents

- Clowns and Damsels**  
Tetra's Dr. David Pool helps you choose the best species and offers his tips on how to look after them **39**
- Favourite Butterflies and Angels**  
The top choices... and which to avoid (and why) from devoted Butterfly/Angel fan Gordon Kay **43**
- Popular Natives**  
Andy Horton's packed guide to seashore coldwater marine fish and invertebrates **46**
- Cyanide-Free San Salvador**  
A special first-hand report of interest to all marine aquarists from divers, photographers and aquarists Marie-Paule and Christian Piednoir **50**
- The 'Other' Marines**  
Yes, there's life after Clowns, Damsels, Angels and Butterflies, as Aquarian's Dr. David Ford spectacularly demonstrates **55**
- Spineless Friends**  
The best of the tropical marine invertebrates selected by Dick Mills **62**



EDITOR John Dawes, ART EDITOR Ian Hunt, ADVERTISEMENT  
MANAGER John Young, ADVERTISEMENT PRODUCTION  
Gwen McNeil, PUBLISHED BY Dog World, 9 Tufton Street,  
Ashford, Kent TN23 1QN  
TELEPHONE: ADVERTISING AND PRODUCTION 0233 621877,  
FAX NUMBER 0233 645669

**AQUA PHOSPHATE** TEST KIT - **LATEST & GREATEST**

Latest addition to the AQUA test kit range of products

**PHOSPHA-ZORB**  
- filtrant for the removal of phosphates from marine & freshwater aquariums & ponds

**NEW WAVE** A new range of the most exciting marine & freshwater aquarium care products

**CREATE A UNIQUE AQUARIUM**

using **SPRAYDEKOR**

- coral reefs, caves -
- backgrounds -

**SPRAYDEKOR** also covers filters. Non toxic foam which hardens to a rock like finish!

Send for latest info from:

NT Laboratories, Unit 13, Branbridges Industrial Estate,  
East Peckham, Tonbridge, Kent TN12 5HF. Tel: 0622 871387

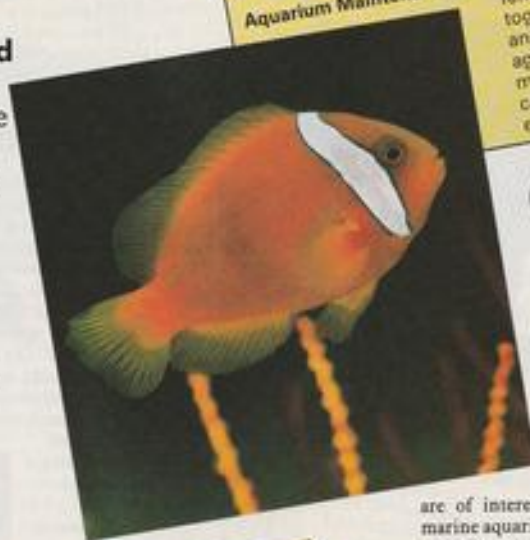
Name \_\_\_\_\_  
Address \_\_\_\_\_  
Post code \_\_\_\_\_

**MACRO-KH** **NEW WAVE** **SPRAYDEKOR** **NEW TECH**

# Clowns and Damsels

No marine community can be regarded complete without Clowns and/or Damsels. Before you dive in, though, **Dr David Pool** of the Tetra Information Centre has some useful details and advice to ensure that things go smoothly.

**Photographs:**  
Max Gibbs —  
*The Goldfish Bowl,*  
Oxford.



**Common name:** Tomato Clown.  
**Scientific name:** *Amphiprion frenatus*.  
**Distribution in wild:** Pacific Ocean.  
**Length:** 4in (10cm).  
**Diet:** Good-quality flake and granular foods. Live, frozen and freeze-dried foods as an occasional treat.

**Aquarium Maintenance:** Best kept in groups of one female and two males, together with suitable anemone — or singly. Can be aggressive towards tank-mates, therefore add last to a community tank. Hardy and easy to keep.

**Common name:** Common or Percula Clown.  
**Scientific name:** *Amphiprion ocellaris*.  
**Distribution in wild:** Indo-Pacific oceans.  
**Length:** 2-3in (5-7cm).  
**Diet:** Good-quality flake and granular foods. Live, frozen and freeze-dried foods as an occasional treat.

**Aquarium Maintenance:** Best kept singly or in groups of one female and two males, together with suitable anemone. Aquarium-bred specimens are hardier and easier to keep than wild-caught specimens. Very peaceful fish — ideal for community tank.

**Common name:** Common or Percula Clown.  
**Scientific name:** *Amphiprion ocellaris*.  
**Distribution in wild:** Indo-Pacific oceans.  
**Length:** 2-3in (5-7cm).  
**Diet:** Good-quality flake and granular foods. Live, frozen and freeze-dried foods as an occasional treat.



**C**lowns and Damsel fish are undoubtedly the most popular fishes for a tropical marine aquarium, and rightly so. They are hardy, brightly coloured, have interesting behaviours and adapt well to aquarium life.

These two groups are both classified in the same family, namely the Pomacentridae. There are around 275 species of fish in this family, but by no means all are of interest, or even available, to the marine aquarist. In this article I will concentrate on some of the more popular species, although many of the details given will apply to the other species.

The Clowns (or Anemonefish) and Damsels are found in all of the world's tropical and sub-tropical oceans. Aquarists snorkelling or diving in the Red Sea, Indian Ocean and tropical regions of the Atlantic and Pacific Ocean will almost certainly see Damsel fish. Clownfish are more limited in distribution, being found primarily in Indo-Pacific regions and the Red Sea.

## CLOWNS

The Clownfish, named because of their bright, bold coloration and waddling swimming action, have a number of interesting behaviours which make them ideal aquarium fish. They are also commonly known as Anemonefish, due to their close (symbiotic) relationship with sea anemones, particularly of the *Discosoma*, *Radianthus* and *Stochacis* types.

These anemones have stings which are fired into anything that touches the tentacles and which can kill other animals much larger than the Clownfish. It is thought that Clowns are covered in a mucus which prevents the stings from being activated, and so allows them to swim freely among the tentacles.

The anemone provides the Clown with a tremendous benefit in an environment where there are innumerable predators. It is, perhaps, not surprising therefore, that Clownfish are strongly territorial and will defend their anemone against all comers. This is, in turn, one of the benefits that the

**Common name:**  
**Scientific name:**  
**Distribution in wild:**  
**Length:**  
**Diet:**

Saddle-back Clown.  
*Amphiprion polymnus*.  
Indo-Pacific oceans.  
5in (12cm).  
Good-quality flake and granular foods. Live, frozen and freeze-dried foods as an occasional treat.  
Dependent on access to its host anemone and will not survive for long without one. Easily bullied by other aggressive species. Not an easy species to maintain.

**Aquarium Maintenance:**

**Common name:**  
**Scientific name:**  
**Distribution in wild:**  
**Length:**  
**Diet:**

Blue Damsel.  
*Abudefduf cyaneus*.  
Indo-Pacific oceans.  
2.5in (6cm).  
Good-quality flake and granular food. Freeze-dried tablets and vegetable matter as a treat.  
A very active species which may chase members of its own species and slow-swimming fish. Best kept in groups of 3+. Hardy and easy to keep.

**Aquarium Maintenance:**

anemone gets from the relationship — that is having one or several fish which will drive away anemone-eating fish.

Other benefits to the anemone include the Clownfish bringing food back to the safety of the anemone to consume. Any particles that are dropped are quickly engulfed by the tentacles.

## Two groups

It is possible to divide Clownfish into two groups, depending on their reliance on anemones. The slender-bodied Clowns, such as Common Clown (*Amphiprion ocellaris* or *A. percula*) and Saddle-back Clown (*A. polymnus*), are relatively poor swimmers and rarely venture far from their refuge.

Deep-bodied species such as the Two-banded Clown (*A. clarkii*), Tomato Clown (*A. frenatus*) and Maroon Clown (*Premnas bu-*

*calanus*) are stronger swimmers which will happily leave the anemone in search of food.

The first group is generally not aggressive to tankmates unless they come very close to their anemone. They are not easy to keep, if not given a suitable anemone, and will hide away in the presence of similar-sized or larger fish.

The second group are more boisterous and tend to be aggressive towards other Clownfish and slow-swimming species. To avoid problems, it is advisable to add Anemonefish of this group to a community tank after the other fish.

In an aquarium, they will live quite happily without an anemone — but you are missing one of the delights of marine fishkeeping if you do not keep the two together.

## Breeding and care

In the wild several Clowns will share a large anemone or group of anemones. The largest individual in the group is the female, the next largest a mature male, and the remainder are immature males. However, should the female be removed, a remarkable transformation occurs. The male changes sex and becomes female, and the largest immature male develops to maturity — all within 24 days or less!

Clownfish may breed at monthly intervals given a healthy environment. The courtship behaviour involves the male and female cleaning an area of rock or coral at the base of the anemone, followed by the two swimming around the anemone quivering and touching occasionally. Finally, the female deposits 300-500 eggs onto the cleaned area.

The male then takes charge, guarding the eggs, removing any which develop fungus, and fanning them to produce a constant flow of oxygen-rich water.



**Common name:**  
**Scientific name:**  
**Distribution in wild:**  
**Length:**

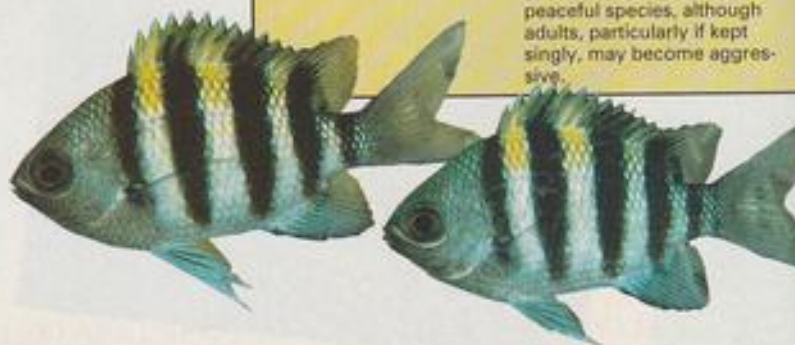
Sergeant Major.  
*Abudefduf saxatilis*.  
Throughout tropical oceans.  
25in (12cm), often less in aquaria.

**Diet:**

A bold feeder on flaked and granular foods. Also feed freeze-dried and vegetable matter.

**Aquarium Maintenance:**

Hardy fish, ideal for new aquaria. Best kept in groups of 3+. It is generally a peaceful species, although adults, particularly if kept singly, may become aggressive.



The fry hatch after 8-10 days, usually during darkness and then swim upwards. In the wild, they spend several months in the plankton before searching for an anemone.

Clowns are one of the few marine fish that have been regularly bred in captivity. Given good water conditions and healthy fish, getting them to spawn and the eggs to hatch is not difficult. Tempting the fry to feed is more of a problem, though the availability of infusoria cultures has helped considerably (see also: **Breeding and Rearing Clowns** by Robert Goldstein in last month's issue of *A & P*).

Clownfish are ideal inhabitants for a marine community aquarium. They are territorial, with the territory being centred around an anemone. However, this behaviour allows you to keep several fish in the same aquarium — providing each individual or pair has its own anemone.

<b>Common name:</b>	Humbug.
<b>Scientific name:</b>	<i>Dascyllus aruanus</i> .
<b>Distribution in wild:</b>	Indo-Pacific oceans.
<b>Length:</b>	3in (7.5cm).
<b>Diet:</b>	Bold feeder which will eagerly consume flaked and granular foods. Feed freeze-dried and frozen foods as an occasional treat.
<b>Aquarium Maintenance:</b>	One of the hardest of the Damsels. Can be territorial and aggressive to its own kind. This can often be overcome if very small specimens are added together. Don't add one fish at a time.

Clowns are hardy fish and will tolerate slight changes in water quality — making them an ideal fish for beginners to the hobby. Anemones, however, are very sensitive, and should only be added when the tank is matured and the owner sure of the techniques required.

Feeding is no problem and they will readily accept a diet of flaked or granular foods. Occasional treats of frozen or freeze-dried foods are also appreciated.

## DAMSELS

Damsel fish are beautiful active fish which do well in an aquarium with constant water movement. In the wild, they are found in, or above, reefs, often in quite turbulent water. They use reefs for protection and, as soon as

**Common name:**  
**Scientific name:**  
**Distribution in wild:**

**Length:**

**Diet:**

**Aquarium Maintenance:**

Green Chromis.  
*Chromis caerulea*.  
Indo-Pacific oceans and Red Sea.  
4in (10cm), often less in aquaria.  
Flaked and granular foods.  
Shy feeder.  
Keep in groups of 4+. A peaceful, active species which looks attractive in a community or mini-reef aquarium.



danger threatens, they disappear into cracks.

Within the group of fish commonly known as Damsels, there is a wide range of behaviours, ranging from peaceful to territorial, and plankton eaters to grazers.

In nature, most Damsels are found in small groups. In the aquarium, it is advisable to keep them either singly or in groups of 3+. Keeping just two — often leading to only one survivor.

Feeding methods vary in the wild. Most *Chromis* and *Dascyllus* are plankton feeders and can be seen riding the currents above the reef in search of small items of food. Other species such as *Pomacentrus* spp. and *Stegastes* are more herbivorous and will pick at algae from the coral reefs.

## Breeding and care

Damsel fish have been bred in captivity and breed in similar fashion to the Clowns. A suitable area of coral is selected to deposit the eggs which hatch after five days.

The fry are also pelagic, that is, they swim in the upper reaches of the water, which allows good distribution of the young.

## Aquarium care

Due to their nitrite tolerance, some of the Damsels are often recommended for new aquaria. The Blue Damsel (*Abudefduf cyaneus*) and Sergeant Major (*A. saxatilis*) are two species often sold for this purpose.

Because of their active nature, it is advisable to provide Damsels with plenty of free swimming space.

Damsels will readily feed on flaked or granular foods in the aquarium. Providing vegetable matter, such as lettuce or algae, will also be appreciated.

## The Ultimate Ozonizer

**REDOX<sub>3</sub> PLUS™**  
Redox controller and ozonizer



**T**his unique unit combines the flexibility of a fully adjustable 200 mg/hr ozonizer with a built-in digital display Redox controller.

- Measures Redox potential
- Variable output ozonizer (up to 200 mg/hr)
- Controlled ozone dosing
- Ozone safe check valve
- Maintenance free

**T**o maintain a stable closed system aquarium environment various methods of water treatment are used. One of the most important to keep a stable environment is the redox potential (measure of the oxidizing capacity of the water). The optimum redox potential (value), can be more easily obtained by applying ozone (a strong oxidizer) to the filtration process.

The REDOX-PLUS is made to exacting standards and has an adjustable output to produce the desired amount of ozone.



**Red sea fish pHarm Ltd.**

Distributed by  
**CORAL REEF TECHNOLOGY LTD**  
62 HIGH ROAD, BYFLEET  
SURREY KT14 7QL  
TELEPHONE 0932 355121

# Favourite Butterflies and Angels

**Gordon Kay** has a field day writing about his favourite fish.

Photographs, unless otherwise indicated: Max Gibbs — *The Goldfish Bowl*, Oxford.

Below, the "drop-dead-gorgeous" Lemonpeel.

Centre, a striking Zoster or Black Pyramid Butterfly.

Bottom, a perfect study in blue and brown: the Blue Ringed Angelfish.



I must have died and gone to Heaven! The chance to get paid for talking about my favourite subject — what bliss! These two families are my all-time favourite aquatic creatures and, with their grace, vivid colours and patterns — together with totally enthralling 'biologies' — they epitomise everything that drives us to keep aquariums in the first place.

My remit is to outline my favourites, and not necessarily good, or bad, aquarium subjects. I will tell you about each species' suitability for captivity, but REMEMBER: do some homework before buying. My list is not in any order of preference, nor is it in anyway exhaustive.

## LEMON BEAUTY

*Chaetodon semilarvatus*, the Lemonpeel Butterfly, ranks — in my opinion — as among the most fabulous creatures on Earth. It is a "drop-dead gorgeous" species which is indigenous to the Red Sea region and, because of this, is both infrequently seen in the hobby, and very, very expensive.

This is a shame, because, as only the best people in the trade seem to import Red Sea species, every one of those species that does appear in the shops is of the finest quality and offers the hobbyist with a year or two experience with Butterfly species, years of pleasure.

Lemonpeels are comparatively easy to keep, when compared to other Butterflies and, when kept in aquariums which reflect their ecology, are a wonderful show species. An aquarium with several Butterfly species — maybe a large Angel, NOT the same colour as the 'Semi' — and a *semilarvatus* of 4-in (10-15cm) would 'knock your eyes out'.

This species should be kept in a large aquarium, with plenty of swimming space yet, at the same time, a good amount of cover. There should be no bullies present, so Triggers, Tangs and the ilk are a definite no-no and, because this is an animal from the Red Sea, salinity should be a touch higher than usual. It shouldn't have to be said that, as with all of the species mentioned here, water quality must be perfect.

## VIVID BLACK PYRAMID

The Black Pyramid Butterfly, *Hemitanichthys zoster*, is the most vivid black and white you can imagine. At night, however, it changes to a dirty, dark-grey colour all over, with just the merest hint of a white spot on each flank. Within seconds of the first light, almost miraculously, that lovely black with a snow-white pyramid returns. Wonderful!

This fish will also change at the drop of a hat when it feels threatened or angry. Fortunately — or unfortunately, depending on your viewpoint — this colour change is also a good indicator of water quality. If the animal swims around all day in its night colours, then either another fish is to blame, or you need to change water.

'Zoster' swarms in huge shoals over the reefs in the Indian Ocean, so I'm surprised



that we don't see it much more often. It is cheap, will eat anything (yes, I do mean anything!) and is really tough. In fact, I would say that this is the strongest Butterfly species in the aquarium — bar none.

It grows to around 6in (15cm) in the wild, probably 3-4in (7.5-10cm) in captivity. There is a cousin, *H. polylepis*, which is yellow instead of black, but it doesn't seem to do as well as *Zoster*.

## FLUORESCENT BLUES

I currently have a Blue Ringed Angelfish (*Pomacanthus annularis*) with another large Angel, which I shall talk about later, in my 100-gallon fish-only aquarium. He is large, fat and very old. I love it.

This Indo-Pacific species is not the most colourful in the world, it has to be said, but in the right type of light — the best being strong natural sunlight — there is nothing quite like the fluorescent blue stripes on the brownish background.

The common name of this species comes from the blue ring which appears behind the gill covers as the creature matures — although my Blue-Ring still doesn't have his and, I guess, never will now. There is merely a blue blob.

Growing to about 10in (25cm) in the aquarium, this species is inclined to become aggressive with age. However, *P. annularis* is a super aquarium subject that will eat any of the usual aquarium fare, as long as water quality is good and it has plenty of space.

## NASTY QUEEN

I said my Blue-Ring lived in the same tank as another large Angelfish; that species is a Queen Angel (*Holocanthus ciliaris*). The only thing that stops my Blue-Ring's aggression becoming a problem is the fact that *H. ciliaris* can be even nastier!

The Queen Angelfish hails from the western Atlantic, as far north as the Bahamas (where my particular specimen came from) down to Brazil.

Sponges form the bulk of the Queen's diet, with these being supplemented by algae, Tunicates (sea squirts), Hydroids and bryo-

zoans in small quantities. Provided that a very varied diet is offered and water quality is up to scratch, then this species is very strong in captivity, giving years of pleasure.

Queen Angels can occur in a wide range of colour variants, this variation not seemingly dictated by the area from which the specimen comes. This species seems to go through a series of colour phases after reaching adulthood.

There is also a cousin, *H. bermudensis*, which lives in the same region. Hybrids of the two species are common and the results of this hybridisation can be quite attractive.

## COPPERBAND ENIGMA

I have spent a lot of time lecturing and writing about *Chelmon rostratus*, the Copperband Butterfly. Gorgeous though this species is, it does represent something of an enigma.

It is not a species which feeds exclusively on coral polyps, so its diet shouldn't present a problem. I've seen dealer's aquariums full of Copperbands that have fed from the hand on all sorts of food. Get one home, though, and they seem to undergo a personality change, absolutely refusing anything — including live Brine Shrimp — and becoming shy and skittish, hiding away for a great part of the time.

Indeed, I once bought such an animal, in the days when Graham Lundegaard worked at the Aquatic Centre at Brockworth. It was in wonderful condition and one of six which I watched being hand-fed by Graham, on mussel meat.

I took it home and introduced it very carefully — by my usual method — into my aquarium. I then watched it starve to death over a period of about six weeks. It broke my heart. I'd swear it used to hang around the back of the aquarium, defying me to find something it couldn't resist.

I've tried four more since, all of which went roughly the same way. I have now resigned myself to admiring them in photographs, because I can't bear to watch them die. I'm sorry to be so negative about this species, but really, I know no one who has kept a Copperband successfully for any length of time.

## DECEPTIVE FRAILTY

Not so the Yellow Long-nosed Butterflyfish, *Forcipiger flavissimus*. This is a Butterfly which looks as though it is very frail and sensitive — with its long snout and slow, graceful swimming.

LAURENCE E. PETERSON



The enigmatic Copperband.



BILLY WATTS



Beautiful, but potentially nasty: the Queen Angel.

**GOLDEN RULE OF SUCCESSFUL ANGEL/BUTTERFLY KEEPING:**  
ENSURE PERFECT WATER QUALITY AT ALL TIMES

**GOLDEN RULE OF SUCCESSFUL ANGEL/BUTTERFLY KEEPING:**  
DO YOUR HOMEWORK THOROUGHLY BEFORE YOU BUY

This is the shy and great Coral Beauty.



A definite no-no: the Red-Fin Butterfly.



The Long-nosed Butterfly is tough, despite its frail appearance.

Nothing could be further from the truth. This is a very strong aquarium subject. As a measure of just how strong it is, I once owned a *F. longirostris*, the very close relative of *flavissimus*. It lived happily for years through all manner of upheavals and traumas — including a break-out of the deadly Black-spot which wiped out almost an entire collection of other Butterfly species.

*Forcipiger flavissimus* is very widely distributed, being found in the Red Sea and around the coast of Africa, through the Indo-Pacific and Pacific to California.

As I said, *flavissimus* and *longirostris* are extremely closely related and the two species are occasionally seen together. However, *flavissimus* is far more commonly encountered over its range.

*Longirostris* is found on the Great Barrier Reef, Queensland and New Guinea, and is at its most numerous around the islands of Hawaii, where an all-black version is often found.

Perfect though this creature is for the aquarium, I've never seen one eat flake food; everything else, but never flake food. This, of course, matters not one jot, providing that a

balanced diet is otherwise offered. With no bullies, perfect water quality and the aforementioned balanced diet, there is no reason why the Yellow Long-nosed Butterfly — of whichever species — will not be with you for years.

## TRAGIC RED-FIN

Tragically, the same definitely cannot be said of *Ghaenodon trifasciatus*, commonly called the Red-Fin Butterflyfish.

This species is widespread throughout the Indo-Pacific, largely in shallow water in pairs. It feeds almost entirely on coral polyps — and thereby is the rub.

A few years ago, Ornamental Fish International members imposed a voluntary ban on the handling of this species, because it just will not live for more than a week or two due to its dietary requirements. It will not eat anything other than coral polyps. DON'T BUY IT — please!

This is a truly wonderful animal that would be particularly tragic to kill.

## SHY FAVOURITE

Some of the best things come in small packages and this was never more true than with the *Centropyge* Angels. My two favourites are *C. bipinnatus* and *C. bicolor*.

Both have given me years of pleasure in the past. *C. bipinnatus* — the Coral Beauty — is a particularly shy species from the Indian and Pacific Oceans and the Great Barrier Reef. It usually lives in water of less than 5 metres depth, generally in small groups on drop-offs. That famed exporter, Earl Kennedy, did a lot to help this fish to its now-popular position and, as a result, the species is often mistakenly called *C. kennedyi*.

The colour variations of *bipinnatus* can be so astounding that an untrained eye could easily mistake the variants for different species. The most common variation is to be found around the Maldives and other popular sites in the Indo-Pacific. It is a gorgeous purple with an orange flank.

In captivity, this creature should be kept in an aquarium with loads of cover. In fact, the more bolt-holes the Coral Beauty has at its disposal, the less it will hide. Again, no bullies should be present, and water quality must be perfect.

## RULE-BREAKING DWARF

Keeping two Angels (or Butterflies come to that) of the same species together is a definite no-no, unless they are a mated pair ... usually!

However, as I've said many times in the past, fishes don't know the rules, and people like me can only issue probability statements as to a given species' likely behaviour in captivity. I once bought a pair of Bicolor Angels (*C. bicolor*) from another hobbyist who had bought them with the intention of spawning them.

Now, here were a pair of the same species, of an almost identical size — so no identifiable sex differences — and a species which was reputedly difficult to keep to boot. I held my breath. They were with me for five years, maturing into definite male and female on the way. Alas, they never spawned, and died of old age.

Anyway the Bicolor Angel is common on the Great Barrier Reef and also lives throughout the Pacific, from Indonesia to Polynesia. Its preferred habitats are drop-offs and areas of coral rubble. They spend a lot of time darting around the rubble, from one hiding place to another. Juveniles are found in water as shallow as 3ft (90cm), but it is unusual to find adults in water of less than 30ft (9m).

I firmly believe that the Bicolor's reputation for being difficult to keep stems from the fact that the majority of those seen in the trade in the past were from the Philippines.

As most of you will know, aquarium fishes were caught with sodium cyanide in most parts of the Philippines until recently. However, with cyanide-caught fishes becoming a rarity nowadays (we hope!), *C. bicolor* is seen less often, but those specimens that are seen, are of much better quality. *Centropyge bicolor* is a wonderful creature that deserves to be more popular in the UK hobby than it seems to be.

# Popular Natives

The best coolwater species, selected by expert native marine aquarist and seashore ecologist **Andy Horton**.

Photographs by the author.

Hermit Crabs, *Pagurus bernhardus* (left) and the much larger *Pagurus prideauxi* (right).



**B**eneath the murky and cold seas surrounding the British Isles there is a rich variety of fish and invertebrate animals, and because the aquarist has the opportunity to capture and choose the inmates for his or her study aquarium, in many respects this is the most interesting of all the branches of aquarium keeping.

Fish and inverts of rock pools and shallow seas are not pre-selected by the retailer as being suitable for aquaria. The 'rockpooler' has to decide on this, something that involves both research and observation which presents both the interest and the difficulties inherent in native marine aquarium keeping.

## HERMIT CRABS

Querulous, hermit crabs continually fight among themselves over the availability of the gastropod (snail-like) shells that they use to protect their soft abdomens. Small specimens of the Common Hermit Crab, *Pagurus bernhardus*, are the most likely to be found in the shore pools, occupying vacant wrinkle and topshells. Adults are housed in the more commodious whelk shells and are common in deeper water.

Their fascinating behaviour makes them the most popular of all species, with 95% of native marine aquarists having kept hermit crabs in captivity, according to my 1989 survey. However, this does not mean that they are easy to keep alive for periods of over six months. They are greedy and, although they will readily feed on boiled mussel in captivity, this may not be sufficient on its own, as they will also extract plankton from the sea.

Temperature Range: 9-22°C (48-72°F)

## COMMON BLENNY

Charming, comical and inquisitive, the Common Blenny, *Lipophrys pholis*, is a firm favourite. This is the typical British rock pool fish found in the warmer nine months of the year. Habitually, it will leave the water and rest on rocks. In aquaria, it thrives best if rocks are provided above the water surface.

Comb-like teeth enable it to feed on barnacles and small crustaceans. It will

The Common Blenny, *Lipophrys pholis*, always a popular, hardy choice.



Two colour forms of the Beadlet Anemone, *Actinia equina*.



Prawns, such as *Palaemon serratus*, can make interesting active choices.





Corkwing Wrasse, *Symphodus melops*, in swimming livery.



Left above, the Hairy Crab, *Pilumnus hirtellus*, is considerably less destructive than some of its relatives.

Left below, a real bully, the Clobberhead or Bullhead, *Taurulus bubalis*.

Above, 5-Bearded Rockling, *Ciliata mustela*, a fish with a unique dorsal fin.



Living rock, with mussel, hydroids, tunicates (sea-squirts) and acorn barnacles. There were also tiny sea slugs on this piece, but they could only be seen under the microscope.

## 'NATIVE MARINE' RULES

Marine fish and invertebrates from the rock pools and shallow seas around the British Isles should be kept according to the rules and procedures for tropical marine fish, with the following important differences:

### 1 TEMPERATURE CONTROL

British seas are cold throughout the year. Even the English Channel only rises to 19°C (66°F) inshore in the warmest month of August. Fish and inverts should not be kept in temperatures higher than those in which they are naturally found, with a 2°C (3.6°F) excess permitted for short periods only.

Tank temperatures tend quickly to equalise the air temperature, unless some form of 'cooling device' is installed. Special aquarium coolers are recommended, but these are expensive, so reconditioned beer coolers are often used. Aquaria are installed in cellars, garages, and outhouses, where the ambient temperature can be kept below 21°C (70°F).

### 2 LIGHTING

Local marine inhabitants are used to murky waters for almost the complete year. Most native species can therefore be kept under a single 40 watt fluorescent light that enables the aquarist to view the various creatures.

Ordinary tungsten bulbs can rapidly heat up the water, especially if the heat emitted is amplified through a cover glass.

Tropical light levels are required for species like the Snakelocks Anemone that house zooxanthellae algae in their tissues.

### 3 STOCKING LEVELS

The approximate rule for tropical marine aquaria of one inch (25 mm) of fish for every four gallons (18 litres) of water can be modified with small elongate rock pool fish, like the blennies and gobies, to one inch for every two gallons (nine litres).

For the larger and free-swimming fish, lower levels than recommended for tropical marine aquaria are essential.

### 4 SALINITY

British seas vary between 3.4% to 3.5% of dissolved salts in the open seas. At 15°C (59°F) this corresponds to a specific gravity of 1.025 to 1.026, slightly higher than recommended for tropical tanks.

### 5 FOOD

Many rock pool fish and inverts are opportunistic feeders and will readily consume most fishy and crustacean foods available in aquarium shops, but they will not recognise flake food as edible.

Rockpoolers collect mussels, cockles, prawns and small crabs from the shore on collecting expeditions.

Pipefish eat exclusively live food, and a few inverts need a special diet. The most difficult organisms to feed are the plankton eaters.

### 6 DECORATION

Rocks usually provide the decoration, as seaweeds require special attention to grow and are not suitable in a mixed aquarium on a permanent basis.

## THE ECOLOGICAL SCHOOL

I belong to the 'Ecology School' of aquarists who aim to mimic in their aquaria the conditions that naturally occur in the wild. This contrasts with the approach adopted by followers of the 'Technological School' who rely on (often expensive) equipment to establish and maintain appropriate conditions.

The succession of events that occur in a properly established marine aquarium can be summarised as follows:

- 1 Conditioning Period:** characterised by fluctuations in ammonia, nitrite and dissolved oxygen as the nitrifying bacteria become established. *Duration:* one week to six months.
- 2 New Aquaria:** with the ammonia at zero and nitrite only registering after a heavy feed. A gradual decrease in pH can be measured and this and other biochemical changes need to be rectified by 25% monthly water replacements. Evaporated water should be replaced by freshwater.
- 3 Established Aquaria:** with a gradual increase in all types of filter-bed

bacteria and overall biomass. The increase in biological oxygen demand (BOD) of organisms needs to be watched. Replacement of the canister filter medium\* in external filters and the cleansing of under-gravel filter substrate is essential. Stocking levels may need to be reviewed as the fish and inverts grow.

(\*Some gravel should be retained with a population of nitrifying bacteria.)

- 4 Transportation:** real seawater contains plankton that can quickly die, using up all the oxygen in the bucket of water. Tips to improve success when taking home collected specimens include the use of polystyrene containers to keep the water cool, water or air pumps to improve oxygen levels, and artificial seawater.

Fresh captures should not be suddenly introduced into aquarium water more than 2°C (3.6°F) higher than that from which they originated.

readily take boiled mussel, but like most of British marine life, it will eschew flake food. On the shore, the Blenny will also be found under rocks and in crevices. The 'book name is the Shanny.

All blennies have a continuous dorsal fin and jugular pelvic fins, ie placed near the chin. The other common shore fish know the gobies, have two dorsal fins and a pelvic fin modified into a sucker-like shape.

**Temperature Range:** 9-21°C (48-70°F)

## BEADLET ANEMONE

This is the most widespread of half dozen sea anemones that commonly inhabit the intertidal zone throughout the year. British rocky shores. Red, green and strawberry are the major colours, but the subtle variations of hues, browns and stripes on the column mean that a few Beadlet Anemone *Acinia equata*, make an attractive addition to the marine aquarium.

If ample water changes are made, the anemone proves to be exceptionally hardy. It will take mussel and most fishy foods, prawn, cockle, brine shrimp, etc. In the south and west, the green Snake-

POPULAR MARINES SUPPLEMENT



The Shore Urchin, *Psammechinus miliaris*, and Common Starfish, *Asterias rubens*, kept together in one of my aquaria.

Anemone, *Anemonia sulcata*, is very common.

Temperature Range: 5-28°C (41-82°F)

## PRAWNS

Prawns are invariably abundant in gullies and pools in the second half of the year. Although often regarded as a source of food for aggressive fish, they are guaranteed to be a source of wonder and fascination with their behaviour and grooming.

The species collected varies according to each coast, with *Palaemon serratus*, a transparent species with orange markings, the most often kept.

Temperature Range: 8-24°C (46-75°F)

## CORKWING WRASSE

Sporting a green and cream livery with horizontal stripes when swimming actively, sleeping specimens of the Corkwing (*Symphodus melops* [= *Crenilabrus*]), or those netted in pools on the lower shore, will appear green with black horizontal banding, which will disappear once the shock of capture has waned.

All five species of British wrasse are aggressive fish that will attack and eat small crabs, prawns and the more delicate invertebrates. In two years, they will outgrow most home aquaria. Wrasse are territorial fish that will attack each other until the weaker fish succumb.

Temperature Range: 12-24°C (54-75°F)

## HAIRY CRAB

Four true crabs are very common on rocky shores, and there are many other crab-like crustaceans, and other rarer true crabs. The most familiar is the green or brown Shore Crab, *Garcinus maenas*, which is not all that popular because it is destructive and rather drably coloured.

By crab standards, the Hairy Crab, *Pilumnus hirtellus*, with one claw larger than the other, is peaceful and will hide under rocks during the day, venturing out when it is dark. It is an attractive maroon-red and

could be mistaken for a very small Edible Crab, *Cancer pagurus*.

Temperature Range: 8-23°C (46-73°F)

## BULLHEAD (Sea Scorpion)

A veritable terror of the rock pools, the squat ugly Bullhead, *Taurulus bubalis*, feeds voraciously on prawns and small fish.

It seems to be called by a different name in each part of the country, and can be very common in the pools on some shores. Juvenile fish are often caught, but they become even more troublesome as they grow. They are intolerant of high temperatures, possess a tremendous appetite, and require oxygen-rich waters. This last fact means that they need to be kept at tropical marine aquaria stocking levels in the larger aquaria.

Temperature Range: 9-19°C (48-66°F)

## 5-BEARDED ROCKLING

The 5-Bearded Rockling *Clinata mustela*, is a bronze, elongate fish that possesses a unique dorsal fin arrangement with a single ray preceding a vibrating row of tiny rays set in a trench on its head. Five barbels help it to locate food of worms and shrimps in soft substrates. It can be found under rocks in spring and autumn.

It is not seen all that often in captivity, only venturing out from underneath rocks at night, or when the lighting is dimmed to mimic twilight.

Egg-bound females will not release their eggs unless a male is present, and will die if no action is taken. Long-term success is not assured, unless continual care is taken.

Temperature Range: 9-22°C (48-72°F)

## COMMON STARFISH

Although often regarded as a typical inhabitant of the shore, the frequency of the Common Starfish, *Asterias rubens*, is highly erratic. When scarce, it will hide under rocks. Its ability to climb vertical surfaces and its method of feeding externally on mussels is fascinating. Live cockles are the best fare in aquaria.

## COASTAL CODE

Like any natural habitat, our presence disturbs the coastal environment. Wildlife needs undisturbed conditions in order to survive. Over-exploitation can destroy the fauna permanently. Therefore:

- ① Cause as little disturbance as possible. Always return rocks to the exact position and the same way up as they were found.
- ② Collection of live animals, fish, etc., should be kept to a minimum.

### ! WARNING !

The coast can be a dangerous place. Seaweeds are slippery. It is easy to have an accident when crossing difficult terrain.

## BEWARE OF THE INCOMING TIDE!

This starfish is highly sensitive to high temperatures, and will throw off its arms when the tank conditions become intolerable.

Temperature Range: 9-20°C (48-68°F)

The Shore Urchin, *Psammechinus miliaris* — a relative of the Common Starfish — can be found under rocks near the low water mark.

Temperature Range: 9-23°C (48-73°F)

## LIVING ROCK

Keeping Living Rock is the province of the experienced aquarist. The most interesting rocks are found at the margins of land and sea at the lowest spring tides.

Calcareous algae, keelworms and other species in limy tubes, moss-like bryozoans, miniature sea anemones, numerous gastropods and sea slugs, hydroids, spawn coils, sea-squirts, porcelain crabs, and amphipods, can all be gathered with an attractive rock that can become a feature in the native marine aquarium. AQU

## SOME USEFUL TERMS

**Biological Oxygen Demand (BOD):** the amount of oxygen consumed by the various organisms, including bacteria. If the dissolved oxygen is consumed more quickly than it can be renewed from the atmosphere, the fish will suffocate. In emergencies, the oxygen intake can be increased by prolonged disruption of the water surface, by an airstone, etc.

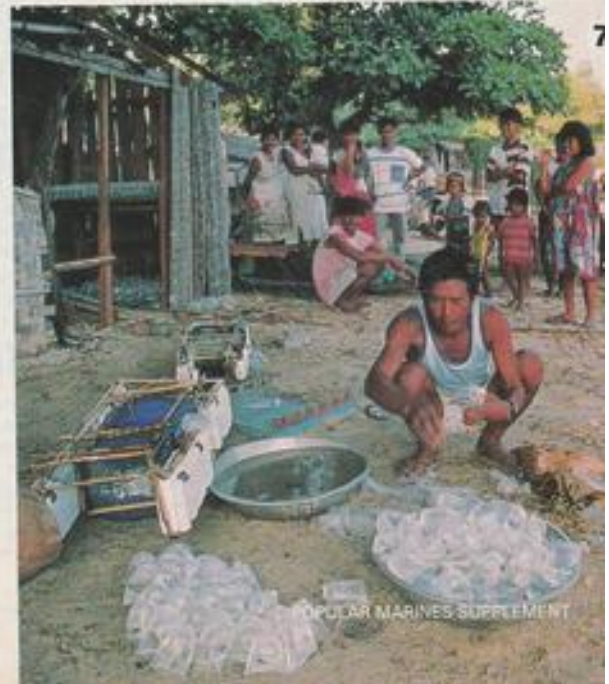
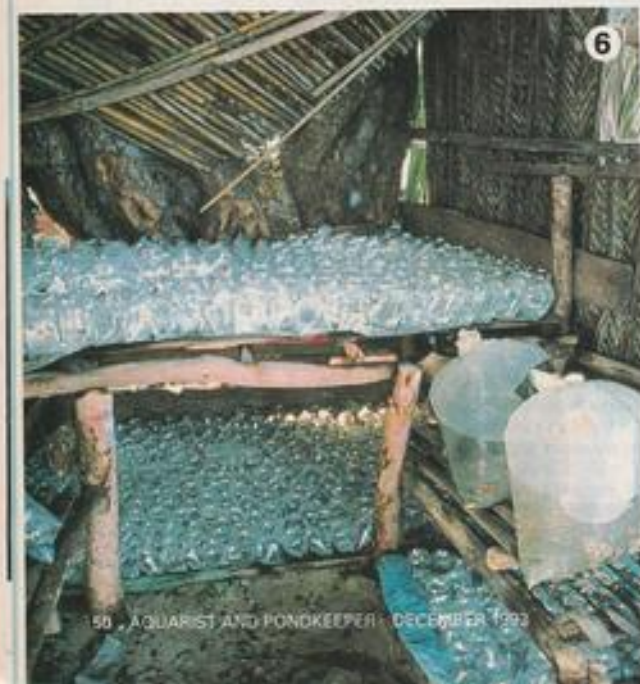
**Rockpooter:** wildlife explorer of the shore, not necessarily an aquarist!

**Ecology:** study of the relationship of organisms, species, etc., with their environment.

## 'TRANSLATIONS' FOR SCOTTISH MAINLAND READERS!

Whelk: buckie.

Winkle: wilk.



# CYANIDE-FREE SAN SALVADOR

# PHILIPPINES

French divers, aquarists and photographers **Marie-Paule** and **Christian Piednoir** visit a tiny island that is turning the tables on cyanide fishing.

*Photographs by the author.*

**A**t the entrance to the fishing village in the tiny island of San Salvador in the Philippines, a little *banca* (a pirogue with twin outriggers), freshly painted in gleaming white, bears the highly unusual legend: "Just say no to cyanide" in the most beautiful writing.

To leave Manila, with its omnipresent poverty and its oppressive pollution, and visit the fishermen of San Salvador was something we had greatly looked forward to, a real breath of fresh air.

Léonore, the secretary at Willen KHO (exporter of aquarium fishes) served as our guide during the three days we spent on the island, meeting the fishermen and studying their techniques.

We were to stay with Léonore's parents, the Abulag family, the only one on the island with a generator. Léonore, who had made a career for herself in Manila, was the eldest of 14 children! In the Philippines, a woman is not classed as such unless she has had 10 children.

On San Salvador there is almost complete self-sufficiency, but more and more often, it is becoming necessary to buy rice to feed the youngest children. There is no piped water, no telephone, no electricity — a complete contrast with our western society — and hygiene is non-existent.

## Missing millions

Our favourite element — the reef — was awaiting us, so off we went, equipped with flippers, mask and snorkel, along the shore to our rendezvous with our beloved fishes. But of the Butterfly Fishes and Damsels which frolic in a few centimetres of water in all the seas of the world... not a trace.

Our astonishment turned to concern when, having decided to investigate further, we crossed the artificial barrier, constructed of blocks of limestone and dead corals, which protects the island from the typhoon. In the seven metres or so of water to which the blocks of stone descended, there was nothing. Only a few patches of *Pocillopora* coral and some minuscule branches of *Acropora* gave a semblance of

life to this desert region. There were numerous Long-spined Sea Urchins, with their spines protruding from the crevices in these rocks, but fishes were few and far between.

A 'ball' of hundreds of *Plotosus lineatus* marine catfishes, which are dangerous when found in large numbers, two Moorish Idols, and a few Damsels were all we saw during 15 minutes of searching. Carrying our flippers we returned to the village, full of unanswered questions about the idyllic reef, with corals in profusion, which we had been promised.

## 'Sleeping booty'

Our embarrassing questions — we knew all about what goes on in the Philippines — produced an embarrassed response. The subject was changed until the atmosphere became more relaxed, and then we learned the history of the island of San Salvador and its fishermen.

In 1974 Ramon Abulag, Léonore's father, had, for the first time, the chance of selling live fishes for the aquarium trade to an exporter in Manila. He quickly realised that the capture of live fishes offered a better return than traditional fishing, and, moreover, he wanted his children (he had eight in 1974, and was well aware that it would not stop there) to go to school and make a success of their lives.

Little by little, the other fishermen of San Salvador, mirroring the pattern in numerous other islands in the Philippines (there are more than 7,000), became fishermen for the aquarium trade, unhindered by any grandiose notions of biology and ecology.

Fishes had been exported from the Philippines before 1974, but it was during that and the following years that the boom really began. In San Salvador, as everywhere else, the inevitable happened. The desire for gain, and an ever-increasing demand for fishes, led to the need to catch more and more.

The use of explosives and a chemical product had been foreshadowed, as early as

① The message is loud and clear.

② The beautifully clear waters on Mabini reef.

③ A diver surfaces with an 'invisible' net at the end of a collecting session.

④ Some colourful, well-loved aquarium species... collected for food!

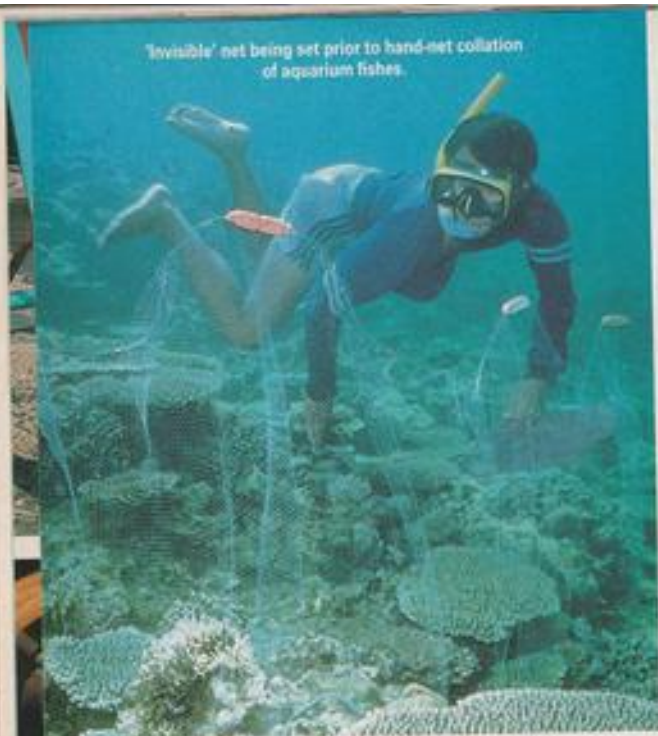
⑤ Anemones being individually examined and packed by hand.

⑥ A full shipment of individually packed fish ready for despatch.

⑦ A fisherman checks his stock of packed fish.



'Invisible' net being set prior to hand-net collation of aquarium fishes.



After holding in safe offshore keep nets, the fish are brought to the village for sorting and packing.

1962, in the capture of fishes for food. The chemical was sodium cyanide, a powerful anaesthetic sold freely all over the Philippines (it is used in the treatment of mangoes) at a much cheaper price than that of anaesthetics used in pisciculture, but also much more dangerous in inexperienced hands.

In 1983 and 1984, this technique was in extensive use: the diver would descend with a plastic bottle filled with dilute cyanide and inject this into the crevices in the coral, the refuges of frightened fishes. In the time taken to take a breath at the surface, the diver could descend again and simply gather up the 'sleeping booty'(!), a good half of which was asleep forever. A mere 10% of the fishes captured in this way were of interest to the aquarium trade.

This abusive 'watering' of the corals with cyanide had a side effect which only the experts had predicted, namely, the unavoidable death of the immobile organisms, and, in consequence, the disappearance of the fishes associated with these biotopes; not to mention the numerous lesions seen on the fishermen, as well as the reddish discoloration of their hair!

In 1974, Ramon used to fish around his own small island, using his own boat to make the trip around it. Since the middle of the '80s, he has had to make a special two-day boat trip just to reach sites still populated by fishes.

Following numerous reports, most notably those by Rubec and Robinson, on the ravages caused by cyanide, and as a result of the agreements entered into by Commander Cousteau and the then president of the Philippines, Corazon Aquino, cyanide and explosives were banned in 1989.

The penalties for breaking this law are

exemplary. For instance, possession of a tablet of cyanide leads to a year in jail, or a fine of a month's salary. The coastguards are alert, and it is to be hoped that they are less corrupt than some other forces of law and order have been.

Despite everything, hope has been reborn since 1989 as regards the fishes of the Philippines. New techniques have been introduced as a result of the past agreements. At the instigation of the Haribon Foundation (Philippines Netsman Training) the fishermen are learning how to use invisible nets. Noël, Léonore's brother, is one of these Government-trained fishermen.

## Complications

Nothing is, however, simple in the Philippines (there is a saying that you need to have your head on back to front in order to understand this country); only one company imports the invisible nets (which are made in Canada) and the fishermen who use them must sell their fishes to this company and not to other exporters. The nets can be bought in Hawaii, but they are expensive.

The Haribon Foundation can also supply them to those who take its training courses, and those already dispensed will last for a while.

Noël's job is to train the other fishermen of San Salvador, so we accompanied him on one of his 'courses'. We set out for a reef where fishing is forbidden, aptly named "Sanctuary", the only place remaining near the island where corals and fishes are still present.

The courses given by Noël are designed simply to demonstrate how it is done, as

there is no profit to be had here... one fishes with one's eyes only!

Noël expounded on the regrettable damage done by cyanide to the corals, and also on its effects on the fishes captured by its use. Once these fish have arrived in the hobbyist's aquarium and started feeding, they die because their livers have suffered irreversible damage from the poison. As a result, the fishes exported from the Philippines during the '80s gained a bad reputation.

The technique is simple: two divers, with snorkels, scrutinise the depths from the surface. A third carries the net (1m x 8m), and when he sees a group of interesting fishes, he spreads it so that it forms a semi-circle around a block of coral. The net is weighted and drops cleanly towards the bottom, while the two divers descend to drive the fishes towards the net and catch those which are of interest with the aid of a landing net.

Upon their return to the surface, the fishes are placed in containers which float by virtue of inbuilt buoyancy chambers.

## Breathing machine

Fishes are captured by snorkelling at depths of 5-10 metres. At greater depths, it is necessary to use the famous 'Philippines Breathing Machine'. Present on almost all the *bancas*, this consists simply of the pirogue's motor, which, with the propeller disengaged, compresses air into an empty butane bottle.

The air is humidified with large ladlefuls of seawater poured between the compressor and the bottle. From the latter extend two or three plastic tubes, hardened by the sun and salt, umbilical cords which

keep the divers in contact with life.

With little wooden flippers on their feet, masked, and with the tubes clenched between their teeth (which serve to regulate the air supply), the divers sometimes descend 50-60 metres to collect a rare pearl, a Lyretail or a superb Emperor.

There are, unfortunately, accidents resulting from ignorance of the principles of diving. In 1991, there were three deaths on San Salvador, one fisherman was left hemiplegic, and another was saved by burying him up to the neck in sand so that the pressure thus exerted could reduce the gas bubbles in his bloodstream, the result of too rapid an ascent. What a price to pay for a derisory gain.

This type of fishing is the preserve of the men; between domestic chores, the women fish in areas accessible on foot, for young Morays or Damselfishes which may have sought refuge a few paces from the beach.

Some tens of metres offshore, there are several 1/2-submerged keep nets, where the fishes are kept temporarily prior to storage on land. The fishermen are paid only for those fishes which arrive alive at the exporter's, so their maintenance prior to despatch to Manila is of prime importance.

How great was our astonishment to see, all along the length of the beach, huts roofed with coconut palms in which are carefully arranged thousands of small pouches containing the favourite fishes of aquarists all over the world — one fish per pouch, with the water in each of these

being changed at least twice daily!

The men and women undo the fastenings, pour the fish and water into a basin, refill the pouch with fresh seawater, replace the fish, and re-secure the mini-aquarium! What progress!

An expedition is made to Manila once or twice a week, depending on the numbers of fishes which have been captured. About 5,000, all caught by the 60 fishermen resident on the island, are despatched each week, except during the monsoon season, from July to September, when it is impossible to set out to sea.

## Unclear situation

It is still difficult to speak of the management of the biotope. At present, the fishermen set off on trips lasting several days, visiting several places to catch fishes, thus limiting the numbers taken from each reef. But all over the island, hope has been reborn that the fishes are returning to its shores, and, by common agreement among the fishermen, their capture there is forbidden.

Unfortunately, the eruption of the volcano Pinatubo in June 1991 once more darkened the horizon by casting tonnes of ashes into the sea, smothering the corals which were beginning to return to life.

In contrast to the situation in other areas where marine fishes are caught for the aquarium, such as the Red Sea, Hawaii or

the Maldives, no fish censuses are made in the Philippines, and there is no management of their populations. Our meetings with the exporters in Manila confirmed this.

Moreover, each fisherman is paid for every fish delivered alive on the basis of species, each having a different value based on the difficulty involved in its capture. A simple centralisation would permit evaluation of which fishes were caught most frequently, and thus, minimisation of catches of species which were being over-exploited.

But this is the Philippines, where everyone sweeps rubbish from his/her own doorstep into the neighbour's yard. Why do they not follow the example of the Red Sea, where the fishes are scrupulously protected, or of the Hawaiian Islands, where there are fixed export quotas?

The inhabitants and the fishermen of San Salvador Island have taught their children that their ecosystem is fragile, and they understand that diversification of their fishing grounds is the best way of protecting their patrimony.

But how much longer will they be able to earn their living from this fishery? More and more often there is talk of limiting the importations of tropical fishes for our hobby. Further, a fair number of species will not tolerate either transportation or captivity. But try telling that to the fishermen who depend entirely on them for their living!

## Waterlife<sup>®</sup> ...Marine Additives



...Effective, Economical, Reliable.

Contact us today for full information pack including disease chart.

**WATERLIFE RESEARCH LIMITED**

Bull Road, Longford, West Drayton,

Middlesex UB7 0DD. Tel: 0753 685690. Fax: 0753 685457

# Waterlife<sup>®</sup>



# The 'Other' Marines

**Dr David Ford** of the 'Aquarian' Advisory Service, selects some of the best-loved tropical marines and offers important do's and don'ts regarding their upkeep.

A beautiful and graceful . . . and highly predatory Lionfish.



MARK CROSS - THE GOLDEN BOVA, OXFORD



MARK CROSS - THE GOLDEN BOVA, OXFORD

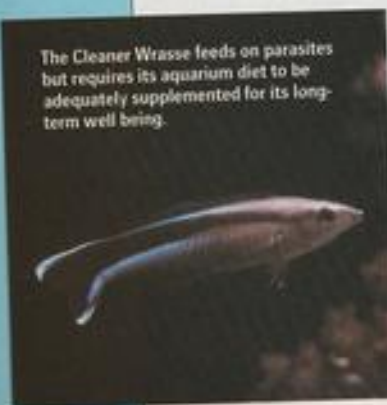
The spectacular and shy Royal Gramma.



AQUARIUM FISH FOODS

The Pennant or Bannerfish is a far better (and wiser) choice than the Moorish idol.

The Cleaner Wrasse feeds on parasites but requires its aquarium diet to be adequately supplemented for its long-term well being.



AQUARIUM FISH FOODS

**T**he most popular coral fish are the Damselfish, Clowns, Angelfish and Butterflyfish (see articles by **Gordon Kay** and **Dr David Pool** in this Supplement). This is because they are in plentiful supply (some are even tank-bred) and many — but certainly not all — are relatively easy to keep. However, there are many other species of interest to the mariner, especially if you want a theme tank (a particular reef) or want a challenge (aggressive or difficult-to-keep species).

The so-called 'passive' marines (other than Clowns, etc) include Cardinals, Gobies, Filefishes and some Wrasses. These can generally be mixed without problems, even added to an invertebrate aquarium.

More aggressive are Polkadots, Hawkfish,

Surgeons and Puffers, and these require a tank to themselves, or mixed with fish of at least equal size. The very aggressive marines include Eels, Scorpions, Groupers and Triggerfish, which are best kept in theme tanks.

Yet a fourth category must be the Frogfish or Lionfish. Although not 'overly' aggressive, they are very efficient predators and will swallow fish even larger than themselves. How many mariner beginners have bought the fascinating Lionfish only to see all the other fish disappear down its cavernous mouth?

A 'Coral Reef' tank is interesting. This is where one particular coral reef (or area of reef) is reproduced in the home aquarium. The search for the correct corals, invertebrates and coral fish can be challenging.

though. The Mini Reef Society are sponsoring such a theme tank at London Zoo based on a reef in the Philippines... look out for more news of this project in *A & P* (see also News Desk in Sept and this month, along with Society World).

The latest coral reef aquarium to be seen in the UK is at the Deep Sea World at North Queensferry (just over the Forth Bridge, north of Edinburgh). Opened in April, Scotland's tourists are flocking to see this huge aquarium. It is actually a flooded quarry, and the longest acrylic tunnel in the world takes visitors through 135 metres of natural seawater stocked with over 40 local species of marine fish. However, of interest to coral-keepers are the tropical tanks in the entrance hall; well worth a visit.

## 'OTHER' TOP CHOICES

Conditions for keeping the listed fish are not included, since they are common to all coral fish. These are: a constant temperature of 28°C (82°F) salinity not less than 1.020 or more than 1.025, pH not below 8.2, nitrites always zero, and nitrates as low as possible with modern tapwaters, but not over 40 ppm, especially where invertebrates are included.

## Popular Perch

The Royal Gramma (*Gramma loreto*) is a spectacular fish that is suitable for most marine community tanks. This fish is found in Bermuda, but none will ever be found in the trade from that country... they ban all collections. It is available from the Bahamas and some South American countries.

It is a member of the Basslet family (Grammidae), closely related to the Sea Bass family which contains fish that can grow to 1,000lb... but the Royal Gramma is a small fish measuring only a few inches.

Its main attraction is the colouring; the Perch-like fish has a purple front end and a yellow back end, and has large black eyes. It is shy and likes its own territory, so supply caves or pipes for it to hide in. Several may be housed in one tank; in fact, some reports of spawning displays have been recorded.

One problem: the fish will not survive if the pH falls; it must be kept at 8.2 (actually, it should be kept at 8.2 for all species).

## Popular Wrasse

Among the vast Labridae family, the Wrasse, the most popular is the Cleaner Wrasse (*Labroides dimidiatus*), once called the Blue Streak. It is a must for all mariners, being fairly cheap and available in most shops.

Widespread in the tropical Indo-Pacific, the fish is famous for its diet of parasites picked off other species. It even pokes into the gills and mouth of other, much larger, fish, the fish being cleaned responding by opening its gill covers and mouth. It is hoped all aquarium mariners are free of ecto-parasites.

There are other species of Cleaner Wrasse; from Hawaii, we have *Labroides phthalopagus*, called the Rainbow Wrasse, which is similar in shape to *L. dimidiatus* but more colourful, but equally efficient in picking parasites. From India, comes *L. bicolor* or Bicoloured Cleaner Wrasse, which is an unusual yellow and black colour.

Note that the fish is not dependent on parasites for its nutrition. It is a carnivore and will happily take marine or carnivore flake, as well as the usual frozen foods. It has been suggested that all the Cleaner Wrasse should be on the banned list as specialist feeders, but any mariner will confirm that this is not true. The fish is easy to keep and feed in aquaria.

## Batfishes

The Orbiculate Batfish (*Platax orbicularis*) is often seen in home aquaria, despite its propensity to outgrow the tank. When young, specimens look like the freshwater Angel and so are an attractive buy, but with age the fish can grow to 12in (30cm) or more.

The Batfish is not colourful, mostly brown, but has real character, each fish having a definite personality. It is greedy, eating almost anything, and will take food from the hand of its owner.

One of the fascinations of marines is that if you take any species, there are related fish, which are almost, but not quite, identical. The Batfishes are no exception. There is *Platax pinnatus*, the Long-finned Batfish, which has a scarlet nose, and *Platax teira*, the Round-faced Batfish, which some aquarists claim is more intelligent than *P. orbicularis*, since it will answer to its name!

## Two Moorish Idols

One of the most popular marines must be the Moorish Idol (*Zanclus cornutus*) with its vivid colouring, pouting mouth and long, long dorsal fin. Unfortunately, it is a difficult fish to keep in the small aquarium, where it tends to pine and die.

The reason is not known, but it may be partly diet. Although omnivorous, this fish picks at certain algae found on coral reefs. The algae will only grow in the larger public aquaria, so it is best to see these fish in zoo aquaria, where they survive much better.

The alternative is the so-called Poor Man's Moorish Idol (*Heniochus acuminatus*). The name refers to the fact that the fish is more common and easier to keep, and so is cheaper to buy. It is also known as the Pennant Butterflyfish or Bannerfish. The two species are similar, but *Heniochus* does have a shorter dorsal and not such a peculiar expression. However, it is happy in the home aquarium, taking most foods, including flake.

*Heniochus* swims in shoals (Tropical Indo-Pacific) often in open waters, rather than on the reef. Therefore, two or three specimens should be purchased at a time so that the fish can shoal in the home tank.



MAX GIBBS - THE GOLDEN BOW, DARTMOUTH

Batfishes are popular (this is *Platax orbicularis*) but they grow to a considerable size.

## Lionfishes

Beware the Lionfish: the dorsal fins inject a protein poison that is very, very painful! There is no antidote either, because the poison is based on the protein of the individual fish, so each specimen injects a slightly different toxin. Painkillers and advice on fish handling is all that can be given.

Despite the hazards, Lionfishes are among the most popular of marines, both in home and zoo aquaria. Their incredible shape and colouring make them very attractive. The many filaments of the fins are designed to hypnotise other fish and the Lionfish have a distensible mouth which allows them to swallow very large fish whole.

There are several species in the trade, such as the Dwarf, the Spotted, the Grass, and the Reef. They are also called Scorpionfish, Turkeyfish, Zebrafish, Featherfish and so on.

The proper name should be Scorpionfishes, because they belong to the family Scorpaenidae, and include *Dendrochirus brachypterus* and *zebra*, *Pterois lunulatus*, *antennata*, *miles*, *radiata*, *russelli*, *spilax* and more.

The most common is *Pterois volitans*, the 'Lionfish'. Treated with the respect it is due, the Lionfish makes an interesting pet. It can even be hand-fed chunky foods, say mariners braver than I!

The fish has moods, shown by colour changes, and can grow quite large (12in - 30cm) or more in big aquaria.

It is a nitrite-resistant fish and so will survive a crisis, unlike Butterfly and Angelfishes. This resistance was once used as a reason for installing the fish in the new marine tank to help mature it. The problem then is that subsequent additions such as Damselfish, are promptly swallowed.

It is best to keep Lionfish in a theme tank, or only with specimens too large to be eaten whole.

If you want to see a spectacular display of a shoal of Lionfishes, visit the aquarium at Chester Zoo.

## The Humuhumu

The Hawaiian name for the many Triggerfishes is Humuhumu (which means: to fit pieces together - this refers to the nest building habits of the Triggers) and the most popular one, the Picassofish (*Rhinocentrus aculeatus*) includes the Hawaiian word for 'nose like a pig', giving: Humu humu nuku nuku apua'a.

The family of Triggers (Balistidae) look most odd, with a gormless expression on the big head and strange colour patterns, but mariners know them to be a fascinating group of fishes.

The eyes are set back on the body to protect them from the spines of prickly sea urchins included in their diet. These eyes can also rotate independently so the fish can see different scenes at once. The protruding teeth are real bone crushers, so no mollusc or echinoderm is safe from the Trigger.

The body is covered in flexible armour, as effective as any knight of old, and the sliding



The Picasso Trigger is a spectacular tough character.

doesal spine (the reason for the fish's name of Triggerfish) can lock the fish into crevices, such that no predators can remove it. The curtain-like dorsal and anal fins allow the fish to swim gracefully and slowly, and a powerful tail can snap and thrust the fish forward at surprising speed. This fish is a masterpiece of predation and protection despite its initial odd appearance.

One of the Picassos' abilities is to spit a jet of water to bowl over a passing meal. It can do this to an owner too, spitting water into your face when raising the tank lid. Feed chunky foods, especially shellfish. Obviously, this is not a suitable fish for the invertebrate aquarium.

## Boxfishes

Box or Trunkfishes, family Ostraciidae, are numerous in the tropical Indo-Pacific, and many species are available in the hobby. They swim mainly in shallow waters over coral sand, blowing the sand with water jets to reveal shrimps and other crustacea for a meal. They cannot swim fast and so are easily taken by collectors.

Just a few are both vicious and anti-social, while some can produce a toxin as a defence that will kill all the other fish in the aquarium. These are well-known to collectors and they should not appear in the trade.

Some get through, however, the most common being the Spotted Trunkfish, *Ostracion cubicus*, which is very attractive with its bright yellow colour and large black

spots. However, this bright colour is a warning to predators ... it shows it is poisonous.

The Boxfish's attraction to hobbyists is the cute face, almost cow-like, due to the external skeleton structure from which the eyes, mouth and fins protrude. One of the most popular is actually called the Cowfish (*Lactoria formosini*), which has two 'horns' over the large eyes.

The little Boxfish bouncing around in the water with its rolling eyes and dinky little fins makes it a must for the mariner's collection. Providing the brightly coloured poisonous ones are avoided, these fish are easy to keep and feed (any flake and frozen small-particle food) and some aquarists have reported tank breeding. The eggs are large and free-floating, and hatch within a week (then comes the problem of feeding with essential zooplankton).

## Eels

The ultimate challenge for the experienced marine aquarist is to keep tropical marine eels in captivity. The best known is the Moray Eel (*Muraena helena*) because this species lives in cool waters and so is often seen in TV documentaries from scuba diving camera teams. Other Morays include *Gymnothorax thysoides* the White Snout, *G. eurosta* the Common Moray, *G. melanocephala* the White Spotted Moray, *G. asellata* the Leopard Moray, and so on.

Morays are popular in zoo aquaria, with the voracious head weaving about from some

All eels are predatory, so handle with care. The Leopard Moray is, however, ideal for a suitably stocked tank with rocky caves.



◀ cave it calls home. The continuous snapping of the mouth is actually part of its breathing as it pumps water through the operculum. The canine teeth are large and sharp and, unusual in fish, hinged, so that they can fold back when swallowing prey. The occasional devoted mariner may keep one specimen in a seawater aquarium, but it is not recommended for the community aquarium.

Young Blue Ribbon Eels (*Rhinowaratus amboinensis*) are sometimes seen, but attractive as they look, with the ribbon of blue and yellow, resist buying unless you can supply a large tank. This eel soon grows to a metre long and will certainly swallow Damsel-size fishes.

A less dangerous, and more colourful choice is the Zebra Moray (*Echidna zebra*) which has blue-black rings and grows to several feet. If kept in a suitable aquarium (caves and crevices in tuffa rock are best) with larger marines (so they cannot be swallowed) the Zebra will take chopped mussel, shrimp and clams, etc.

## The final choice

The choices of marines other than the popular Damselfish, Clowns, Butterflies and Angels could go on and on, but space is limited, so the final choice, albeit of a difficult fish, is the Seahorse.

Apart from their fascinating shapes, the Seahorses are famous examples of sex-role reversal, with the male incubation of eggs and females competing for mates.

There are many Seahorse species and, as reported by Dr Amanda Vincent in her PhD dissertation on 'Reproductive Ecology of Seahorses' at Cambridge University (1990), the taxonomy is in desperate need of revision, with over 100 species recorded in the genus *Hippocampus*.

Many of these hundred species are available for the keen fishkeeper, from the large oceanic Seahorse (*H. kuda* from Hawaii) to the bizarre Sea Dragon (*Phycodurus equus* from Australia). The larger Seahorses are plentiful, but the Sea Dragons are becoming extinct, although Undersea World in Perth, Australia, have successfully bred them in captivity and hope to release specimens back into the wild.

Seahorses are difficult to keep in aquaria because their feeding behaviour is to cling to seaweed and wait for suitable morsels to flow past their tiny mouths. They are also short-lived, some being little more than annuals. Hence, they are unsuitable for the community marine aquarium and are best kept (by experienced hobbyists only) in miniature tanks where their special needs can be studied by devotees. Live Brine Shrimp is the best food, which the Seahorse will kill for sport, as well as nutrition.

A suitable species for study is the Dwarf Seahorse (*Hippocampus zosterae*) mostly found in Florida. How numerous they are can be seen by Florida holidaymakers who visit the numerous 'Shell World' shops in tourist areas. The external skeleton of Seahorses means that when they die, the carcass can be air-dried and used for decoration.

## GENERAL MAINTENANCE TIPS

Temperature: 28° (82°F)  
Specific Gravity: 1.020-1.025  
pH (acidity/alkalinity): Not below 8.2  
Diet: The fish mentioned in this article should all accept a good marine flake, but complement this with deep-frozen and live foods regularly. Seahorses require a diet consisting exclusively of small live foods, such as Brine Shrimp (*Artemia*)  
Ammonia & Nitrites: Zero  
Nitrates: Not exceeding 40 ppm (parts per million) or 40 mg per litre

## READ ALL ABOUT IT!

Books listed by increasing price:  
*A Fishkeeper's Guide to Marine Fishes* by Dick Mills. Salamander Books Ltd.  
*Marine Aquarium Keeping, the Science, Animals and Art* by Stephen Spotto. John Wiley & Sons.  
*The Interpret Encyclopedia of the Marine Aquarium* by Dick Mills. Salamander Books Ltd.  
*Marine Aquaria and Miniature Reefs* by Dr C W Emmens. TFI Publications Inc.  
All the above titles are available from any of the larger aquatic stores.



Among the Box/Trunkfish, the Cowfish species *Lactoria cornuta* is perhaps the most striking.



Seahorses are only suitable for experienced... and expert... aquarists.

## WHERE TO SEE MARINES

From the south, northwards:  
Sea Life Centre, Weymouth  
Sea Life Centre, Portsmouth  
The Portsmouth Aquarium  
Sea Life Centre, Brighton (was the Brighton Aquarium)  
Sea Life Centre, Hastings  
Sea Life Centre, Southend (latest Sea Life to open)  
London Zoo Aquarium, Regent's Park  
Royal Botanical Gardens, Kew  
Whipsnade Wild Animal Park, Dunstable  
Kingdom of the Sea, Gt Yarmouth  
Kingdom of the Sea, Hunstanton  
Sea Life Centre, Rhyl  
Chester Zoo Aquarium, Chester  
Sea Life Centre, Blackpool  
The Tower Aquarium, Blackpool  
Sea Life Centre, Scarborough  
Roundhay Park Aquarium, Leeds (free)  
Deep Sea World, North Queensferry, Fife  
Sea Life Centre, St Andrews, Fife  
Sea Life Centre, Oban, Argyll (the original one)  
The Northern Ireland Aquarium, Portaferry

Literally thousands of corpses lie in boxes for sale at a dollar a dozen. Once the Seahorses were collected and ground up and sold as an aphrodisiac, pain reliever and as a cure for baldness!

The Seahorse and the related Pipefishes, have other unique properties that can be studied in the aquarium. The stabilising dorsal fin beats at 35 times a second. Their eyesight is very sharp and Brine Shrimp can

be 'hoovered' up with great accuracy.

The colour can change dramatically throughout the day, from black to red, orange and yellow, but the greatest reward is to breed the fish in captivity and watch the male giving birth. The easiest Seahorse to breed in the small aquarium is *H. fuscus*, originally from Sri Lanka, but now farmed for the marine trade. A&P

# Spineless Friends

Dick Mills helps you choose the best species for an invertebrate set-up

Photographs — unless otherwise indicated — by the author

Oreaster Starfish in outdoor pool.



Not a fish in sight, yet a fascinating aquarium nevertheless!

## RECOMMENDED WATER CONDITIONS FOR INVERTEBRATES

**Temperature:** Between 24-27°C (75-80°F)  
**pH (Acidity/Alkalinity):** Between 8.1 and 8.3, i.e. alkaline  
**SG (Specific Gravity):** Between 1.021 and 1.024  
**Ammonia:** Zero  
**Nitrites:** Zero  
**Nitrates:** Minimal — try to keep them below 5ppm/mg l\*

\*ppm = parts per million = mg/l = milligrams per litre

## FEEDING GUIDE

**Predators** (eg. lobsters, crabs, octopi): once a day — fish, shellfish, etc).

**Filter Feeders** (eg. sponges, fanworms, crabs): maximum of once a day — liquid proprietary food or liquidised 'flesh-based' home preparations; newly-hatched brine shrimp should also be offered, along with live rotifers if possible).

**Scavengers** (eg. starfish, sea cucumbers): maximum of once a day—flesh-based feeds).

**Notes** (1) Always remove all uneaten food to prevent water pollution.

(2) Check on specific requirements. For instance, many filter feeders, like corals and clams, have their own 'in-built' food providers in the form of micro-algae.

From such small beginnings are coral reefs made.



**D**efining just what constitutes an invertebrate is not that easy. Basically, the word means "without an internal skeleton or backbone", but the range of animals exhibiting this characteristic is enormous. Invertebrates are everywhere on earth (one estimation puts 97% of all living species into the invertebrate 'group'), from the Arctic wastes to the tropical jungles, and from humble skirting boards to coral reefs.

They also take many diverse forms, from spiders to jellyfish, worms to winkles; some are extremely mobile, while others are either completely sedentary, or hitch transportation on other, more agile, life-forms.

One cannot even say that invertebrates all live similarly, as some require neither light nor oxygen to exist, living out their lives in the deepest, darkest oceans, sustained by volcanic heat and goodness knows what else.

## FIRST DECISIONS

Turning to invertebrates for the marine aquarium, the range is still very wide for, again, the word invertebrate means many things to many people.

At first, most associate invertebrates to be shrimps, crabs and starfish. Other species included under this umbrella word can also be live corals, sea anemones, sponges, sea slugs and sea cucumbers, clams and so on.

The would-be invertebrate keeper has as much difficulty, if not more so, in selecting suitable species for the collection as has a fish-only hobbyist. Because of the diversity of form and lifestyles, compatibility between species is important, as is the ability to live side by side with fishes (should this option be chosen). Again, not every invertebrate requires the same conditions, nor feeds in similar ways.

So, the first decision to be made is what type of collection are you going to have — fish and invertebrates, or invertebrates only? One very important factor (which usually decides the issue for you) is the question of dealing with disease should it arise, as most invertebrates will succumb to some of the standard fish-disease treatments which are often copper-based.

Obviously, in a combined collection, only 'invert-friendly' fish should be chosen; fishes with similar feeding patterns as the invertebrates (plankton feeders, for example) and large predatory fishes to whom invertebrates are not worth bothering about (although some will take shrimps and other crustacea) are both possible choices, but in between are many species to whom inverts are an important part of their diet (Angels and Butterflyfish prey on sponges and coral heads, respectively, while Triggerfish terrorise sea urchins).

This narrows the choice down to Anemonefishes, Damselfishes, Gobies, Biennies, Basslets, Dragonets, Mandarinfish and Seahorses at the smaller end of



Squirrelfish are wary of *Diadema* Sea Urchin's spines.

the scale, although the Lionfish (if you've room for one) is usually safe.

Some Dwarf Angelfish are safe with certain inverts — it's up to you to decide whether to risk a trial and error period or not, as some safe, but often unlikely, fish/invert combinations can be found.

## MAIN GROUPS

Invertebrates can be conveniently divided into two groups — those that stay put (give or take a few inches) and those that are completely mobile and free-swimming (crawling, sliding, drifting etc).

### 1 Anemones

The first group are often chosen for decorative purposes and sea anemones (Coelenterates) are a prime example, having a bonus in that they can be kept in a symbiotic (some say commensal) relationship with the Clownfishes, *Amphiprion* spp.

Anemone species such as *Anthopsis*, *Condylactis*, and *Heteractis* (formerly *Radiantus*) are commonly available. Sea anemones propagate in two ways: by physical division or by ejecting eggs and sperm. Also in this group are living corals, another possibility, and, with the advent of reef tanks, rocky outcrops become the site of richly coloured Soft Corals often beautifully set off by the contrasting green of macroalgae.

Lighting plays an important part in the culture of invertebrates (apart from showing off their bright colours). Some of the more sedentary forms act as hosts to algae (*Zooxanthellae*) within their own cells. These

algae act as a waste disposal and oxygenating unit and require a considerable amount of light for this association to continue.

As the most effective looking tanks are usually also much deeper than 'standard size', an increase in lighting levels will be needed in order to reach down to the aquarium floor; a four-fold increase is not uncommon. The type of lighting should also be appreciated. Actinic blue tubes producing ultra-violet light are often coupled with deep-water-penetrating metal halide or mercury vapour lamps which otherwise lack this part of the light spectrum. It is not uncommon to find that even the less active movers manage to manoeuvre themselves beneath the right lighting levels.

### 2 Stationary worms

Other stationary favourites are the Featherduster Worms (*Sabellastarte* spp from Indo-Pacific areas and Serpulid and *Spirorbanchus* spp from the Caribbean). Each of these segmented worms (Annelids) has its own calcareous self-built tube in which the animal lives. The constantly waving, food-searching tentacles often prove too much of a temptation to some fishes and may be snapped at.

## Feeding factors

An important factor to be considered, especially with sedentary species, is feeding. Unlike the more active species, stationary filter-feeding species have to have their food



Chromodoris Nudibranch (Sea Slug) in typical garb.

ROY GIBBS — THE COLDFISH BOAT, OXFORD



delivered; this poses the question as to whether the aquarium's filtration system, won't grab the suspended food particles before the invertebrate can.

The answer is not altogether clear-cut either; the filter-feeders depend on water currents set up by the filter system to carry food to them (reverse-flow sub-gravel biological systems help in this aspect too) but some people switch off the filter for a few minutes while feeding, just to be on the safe side. Sophisticated filtration systems have an intermittent 'pulse operation' for this very purpose.

So what to feed, and how much? Liquidised shellfish meat and fine powdered fry foods form a good staple diet. Once a day is quite adequate and if the lighting is correct, the inverts will be sustained by the algae within them, too. Sea anemones can take small chunks of food, placed in their tentacles, despite the fact that they are usually grouped with the filter feeders.

### 3 Shrimps and Crabs

While most people can appreciate a colourful picture, there is no doubt of the increased enjoyment of a moving scene. The red-striped Shrimps are popular first purchases, and several species are available. The Boxing Shrimp (*Stenopus hispidus*), Cleaner Shrimps (*Lyamata amboinensis* and *L. grabhami*), Dancing Shrimp (*Rhinocinetes uritae*) and even the greenish, more transparent, *Periclimenes* sp, all add an extra dimension to the reef scene.

The aptly-named Pistol Shrimp, *Squilla* sp, often shares a burrow with the Yellowheaded Jawfish, *Opistognathus unri-frons*. One shrimp definitely to avoid is the very predatory Mantis Shrimp, *Odotodactylus* sp; this creature is very dangerous to other animals and can exert tremendous forces with its club-like claws; even heaters/thermostat units and the tank glass are at serious risk!

Crabs come in two sorts: those with their own homes (bony external carapaces) and those such as the Red Hermit Crab (*Dardanus megistos*) who take up residence in a suitably-sized vacant shell; when moving to a new residence, as increasing growth demands, the naked Hermit Crab is at risk from predators and must find a new home quickly.

With Crustacea, it is important that the pH of the water is kept at a high optimum level to assist correct maintenance of the shell parts, a factor just as important to the next group, the Molluscs.

### 4 Molluscs

Members of the Phylum Mollusca may be divided into two distinct groups, those with shells — Giant leg-trapping Clams (*Tridacna* sp), browsing Cowries, Conches, Scallops, Sea Snails etc — and those without, Sea Slugs, and, just for that specimen tank, an Octopus.



The Dancing Shrimp, *Rhinocinetes uritae*.

WAL GIBBS — THE GLOVER BOWL, OXFORD



*Dendronephthya*, the Red Cauliflower Coral — a 'soft' choice.



**Sabellaster Tubeworms; watch those tentacles — they're brittle!**



**These Mediterranean Sea Anemones, *Actinia viridis*, can put up a more than competent rival display to their tropical relatives.**



**If you are choosing any fish for an invertebrate aquarium, make sure they are 'safe' — such as this Neon Goby.**

Although undeniably attractive, many of the brilliantly-coloured, or exotically-moving Sea Slugs such as the Spanish Dancer (*Hexabranchia* sp), carry the same problem as some of the more brilliantly-coloured fishes — a difficulty in finding the correct diet, or enough of it, if known at all. Many Sea Hares and Sea Slugs feed on sponges and algae and, maybe, soft corals themselves.

POPULAR MARINES SUPPLEMENT

Included in this most colourful group of invertebrates are the Nudibranchs, or Sea Slugs, particularly the spectacularly-marked *Chromodoris* and *Glossodoris* genera. These are typified by tufty, external gills, usually at the rear end of the body, and two retractable 'horns' at the front.

Apart from the obvious use as species identification, colour is used for several other reasons, not just to provide pleasure for the hobbyist. The more garish colours indicate that the owners have (or wish to give that impression) poisonous skin and so deter predators.

## 5 Stars and relatives

The Starfish, *Protoreaster lincki*, is a good example of this. Red is often a colour much admired, but it is likely that it plays an important part in the invertebrate's defences. Although vivid when seen in the comparatively shallow, well-lit

aquarium, on the seabed, where the red spectrum is lost, bright red changes to muddy brown or even black and so the animal is less likely to be detected.

The Echinodermata contain yet other marine-tank desirables: sea cucumbers and sea urchins. Of the three, perhaps the most familiar, but least kept, are the starfish, which can range from the emaciated-looking Brittlestars (eg *Uphio-mannix* spp) which tend to hide away among rocks, through the more traditionally-formed *Fromia* species (ideal for the marine tank, and safe with other invertebrates), the knobblier *Protoreaster* types, to the positively gorged-looking Bun Stars (*Calappa* spp) and Cushionstars (*Asterina* spp).

Just as other groups have their definite no-nos, so too does the starfish sect: the Crown-of-Thorns Starfish, *Acanthaster planci*, for example, is a real coral-crunching predator responsible for cyclic periods of great browsing devastation to such areas as the Great Barrier Reef itself. Not only is this animal a danger to its own kind, but its spines are poisonous too, so it's risky to handle — even when you're trying to throw it away!

A longstanding favourite for the aquarium is the sea cucumber paradoxically known as a Sea Apple (*Pseudocolochirus axiologus*), owing to its more usual upright stance when compared to its more horizontally-positioned relatives. The yellow and violet 'body' colours, together with the bright yellow 'crown' make this species easily recognisable.

Similarly, there is no mistaking the spiky appearance of the sea urchins (*Diadema* and *Echinometra*), as they make their way around the aquarium. They have one vulnerable spot — their undersides which Triggerfish are expert at exposing by simply blowing them over with a jet of water and then getting to work with those sharp teeth.

Referring back to the opening paragraphs, there is simply no space to do complete justice to the massive range of animals which, potentially, could fill our tanks. This is probably a good thing, otherwise there'd be no room for the fish!

Finally, although the apparent emphasis has been on tropical invertebrates, don't overlook the possibility of keeping a cooler, native marine invertebrate collection which has, as a bonus, the benefits of personal species gathering during a day trip to the coast (see Andy Horton's article elsewhere in this Supplement). Happy shrimping! **ADP**

## TWO GOOD READS

Two books which are especially worth getting hold of are: *Interpet Manual of Marine Invertebrates*, by Martyn Haywood and Sue Wells (Salamander Books 1989) and *Marine Life* by David Jennifer George (Harrap 1979). Very hard to get hold of, but well worth the search.

# Tomorrow's Aquarist

BY GINA SANDFORD



## Marshland horrors

I've just heard the news — white phosphorus gas in the marshes. As if the destruction of life in and around the waters of the Gulf wasn't enough, now we have the destruction of an ecosystem in the marshes at the junction of the Rivers Tigris and Euphrates in Iran.

Areas have been drained and dead fish are being pulled from the waters. The report I saw on TV showed Marsh Arabs leaving their homelands, but what of the unseen problems? What of the loss of invertebrate life, the poisoned waters flowing out to

sea, the loss of the only low-lying marshland in the region that provides a stop-over point for thousands of migrating birds?

What can we do about it? I don't know at present, but I'm thinking. Any ideas? There has to be an answer, we just have to find it.

This planet is a special place, and it deserves better. This latest horror is but one in a list that is now almost endless. The Indians have a saying: "We do not inherit the earth from our parents, we borrow it from our children." Think on it!

## Stocking fillers

"How about some last-minute suggestions for Christmas stocking fillers?" our Editor asked. Well, here are a few that will save you a bit of pocket money, or make a relatively cheap present for a relative or friend.

- 1 Airline — you can never find any when you need it.
- 2 Airstones — they always fall apart when you least expect them to.
- 3 Pots of food — fry food, flake food, all are useful.
- 4 Test kits — pH, Hardness, Nitrites etc; at least, you'll know what the water conditions were like when your fish bred.
- 5 Nets — you can never have enough of these.
- 6 Heater/stats — spares are always useful.
- 7 Spares for air pumps and power filters — these things always go wrong when the shops are shut.
- 8 Air-operated sponge filters — useful when you have to set up a quarantine or breeding tank in a hurry.
- 9 Binder for A&P — but you'll need a big stocking for this one!
- 10 One-year subscription to A&P — unbeatable!

## Fish at Christmas

During the Festive Season, don't neglect your fishes (as if you would!). Remember, if you're going away, check that their filtration systems are working, change water a couple of days before you go, and get someone in to make sure everything is working properly. If there is a power cut during your absence, make sure that the minder knows how to restart a power filter, etc. Last, but not least, leave a phone number for emergencies.

## New Year thoughts

### New Year challenge

Try and breed a fish that you haven't bred before. Let's see who's breeding what.

During 1994, how about I keep a record of all the species you can manage to breed and raise? I don't just want notes such as "I bred my Angelfish". I want to know how you did it, what conditions were like, what you fed them, how you raised the fry, or what problems you had. Even if you tried and failed, that could be useful too.

You don't have to write an essay — diary form will do. Then, at the end of 1994, maybe we can share these experiences with each other and do a little bit for conservation. They can be tropical or coldwater fish, freshwater or marine.

We could even offer a few super prizes for the best/most interesting! How about it?

For those of you who like plants, how about trying to propagate them? I've given you some ideas in past issues, but what have you learned, what have you discovered? Share your experiences. Send your notes to me, care of A&P.

**My once-badly-bitten African Lung Fish — completely cured as a result of earlier notes in my aquarium log.**  
MIKE SANDFORD

What about keeping an aquarium log? Most of us have good intentions, but very few of us carry them out. It took a while before I started keeping notes of what went on in my tanks, but now I'm glad I took the trouble.

Over the years, I've noted down successes and failures and probably, of the two, the failures have been the more useful. You can be talking to someone about breeding a fish and, consulting the notebooks, may save your friend an awful lot of time if you can tell them exactly what you do: tank size, water conditions, time of year, foods, water changes, etc., etc. That way, they can at least see what didn't work for you and, maybe, start off

on a better track. I've also written up my experience with pests and diseases. There was the fight between the Walking Catfish (*Clinas*) and the Tilapia that both inhabited the 4-foot tank. I used to feed one at one end of the tank, and one at the other — except that, one day, I was in a hurry and threw the food in the middle.

The Tilapia came off worst — great chunks were bitten out of its back and I suffered a severe case of the guils. The wounds fungused and none of the usual treatments worked. In desperation, I painted the whole fish with neat Myxazin twice a day. The fungus lifted from the wounds, leaving them clean. I kept painting and they healed.

A few years later, fish that had been living peaceably together started fighting. Again, it was my fault, I'd moved a couple of rocks and mucked up their territories — another lesson learned. The result this time was a badly bitten African Lung Fish — it was missing a tail, and its back was bitten through almost to the backbone. Consulting the fish log, I came across the Myxazin notes — it worked again.

The log also contains the good parts to fishkeeping — "After the Convention, we all went home, 14 of us — it was like the United Nations — Americans, Germans, English, Dutch — they ate me out of house and home during the evening and on into the early hours while discussing all matter of fishy things. But it was fun."

# OUT & ABOUT

## Cricklewood's 'Bold' Petworld

By Jerzy Gawor of AQUALITY-AQUATIC PROJECT CONSULTANTS

Photographs: AQUALITY



Below left, view into the retail area.

Below right, part-view of filtration system installation. Apart from correct specification for running the aquaria, the pipework and electrical layout must be easily accessible by staff for maintenance, and be safe for operation.

"Petworld — Europe's Finest Pet Store", is a bold statement included as part of the logo for this company's advertising. Bold words, yes, but seeing is believing, and for the aquarist, both beginner and advanced, seeing this branch of Petworld is an absolute must!

Situated in North London, just off Cricklewood Lane NW2, The Petworld Superstore is located next to the Food Giant supermarket. Parking is easy (room for hundreds of cars) and free. This is a welcome development, as the ability to park your car outside your favourite aquatic shop is often not possible. Councils seem to be in favour of 'yellow-lining' everything but the shop-fronts these days, making life very difficult for shoppers and retailers alike.

Walking through the automatic opening double doors of the store (perfect for wheel chairs and buggies), you are greeted with a staggering sight. Almost 10,000 sq ft of designer-built pet store, just waiting to be explored.

For the pet enthusiast, there is literally everything you would wish for in this store. The managing director of Petworld Superstores Ltd, Michael Olsen, has developed the concept of 'one-stop pet retailing', meaning that customers can find all they require under one roof, from a dog grooming parlour, to a

selection of American King Snakes, and for those more aquatically minded, from a tin of Goldfish flakes, to an acrylic trickle filter system.

A great favourite among customers is the Animal Ark, which holds a fantastic selection of small mammals and birds in excellent surroundings, complete with environmental control within the cages. This is a very futuristic approach to pet animal retailing, where every aspect of the animals' well-being is catered for.

Aquarists will find their area of greatest interest at the rear of the store, some 2,500 sq ft being dedicated to a vast selection of equipment, aquaria, pumps, filters, accessories, books and of course, fish.

### Wide selection

Darren Burgess, the fish department manager, is well versed in aquatics and ensures that ample levels of all the latest, as well as the most popular, tried and tested products are in supply at Petworld. The stocks of equipment are well ordered and displayed in a self-serve manner, allowing you to browse comfortably at leisure. You are likely to find exactly what you are looking for, and that includes the little finicky bits such as filter spares, items of aquarium plumbing and so on.

Anything that cannot be found on the shelves or, indeed, any special requests for spares or items, need only be conveyed to Darren or his assistants, in the aquatics department, and Petworld will locate the stocks for you.

The fish section is a delight to see. Coldwater enthusiasts will see a rather artistic display unlike anything seen before in aquatic retailing — a purpose-designed and built fountain and tank system with its own integral filters allowing quite an extensive selection of coldwater species to be held in stock.

You will not find huge Koi in this store — these are best left to those retailers with plenty of land space and extensive holding ponds. However, you will find a great variety of coldwater fish which includes small Koi, Goldfish and Shubunkins, Orandas, Veiltails, Moors, Lionheads and others.

### Spacious layout

To get into the fish section, you pass around either side of the 'Coldwater Fountain' and enter the world of the aquarium. Central to the whole layout is a huge aquarium holding some 500 gallons of water. It has a specially sculpted rock and stalactite/stalagmite glass fibre background and is home to a growing

shoal of Red-bellied Piranha.

You will find almost all the 'bread and butter' tropical and marine fish species at Petworld, as well as many specialities like Discus, catfish, Rift Cichlids and marine Butterflies and Angels in the peak of health. Tropical plants and marine invertebrates are displayed in their own custom-built systems which are in the centre of the room.

### Top water quality

Water quality is the key to aquarium success, and, at Petworld, little expense has been spared in the quality of filtration and control systems necessary for the maintenance of first-class water conditions. Seeing the quality of the fish within the aquaria is not only a reflection of the 'behind the scenes' filter technology, but also indicates the dedication of the staff.

Central filtration systems are used to run the tropical and marine aquaria. These are systems whereby water from each aquarium on a particular system drains via gravity (or other means) into central reservoirs (sumps) which are located below ground level. Water is picked up from this point and pumped through a system of mechanical and biological filtration modules to remove debris and oxidise ammonia before being returned via a high-capacity ultra-violet steriliser, through individual valves, back into the aquaria.

Each system is augmented by tall trickle towers for really excellent ammonia oxidation in the 'wet/dry' manner, while the marine system is further assisted by a 2.5 metre tall venturi protein skimmer and ozoniser controlled via a Redox monitoring unit. Even so, Darren will conduct regular partial water changes with pre-conditioned and prefiltered water to ensure the continued success of the system.

Petworld Superstore at Cricklewood has only been open since the beginning of this year but is already establishing itself as a force in aquatics and pets in the North London area. A visit is well worth the time and travel.

**Opening hours:** Mon, Tues, Wed — 10 am to 6 pm; Thurs, Fri — 10 am to 8 pm; Sat — 9 am to 6 pm; Sun — 10 am to 6 pm.

For further details contact:  
**Petworld Superstores Ltd, Units 1 and 3, Broadway Retail Park, Cricklewood Lane, London NW2 1WS. Tel: 081 450 3030; Fax: 081 450 0600.**

# KOI TALK



BY  
John  
Cuvelier

## Christmas blues

It suddenly hit me with a sound not unlike that which a large cod makes when it arrives on the fishmonger's slab! I've got to write the Christmas edition of our favourite column.

Rubbish, it can't possibly be that time of year, can it? I mean to say, we haven't seen summer yet, have we?

According to the Met men, September was the coldest and wettest for three decades! I wondered where it had gone. Anyway, with typical British forbearance, we grin and sigh, thinking all the while that next year will be better.

To add insult to injury, I, too, have now joined the ranks of the OAPs. Woe is me, for I am undone! Should you happen to meet me in Hereford some day, please spare a thought for that old codger shuffling along in front of you hanging on like grim death to his pension book!

## Old age demise

Actually, Koi-wise, it has not been too bad a year apart from the blasted blanketweed (not that again). We have seen very good growth for our Koi and only one loss of a fish from post-spawning stress. Needless to say, it was one of our favourite Koi, a nice

Ai-goromo we purchased from Peter Waddington some 12 years ago.

It does seem strange though, that however well you care for your 'babes', there always appears to be at least one a year that decides it's time to go. Each morning when I crawl out of my pit and look out of the window, I'm half expecting to see our oldest inhabitants swimming around the pond in trouble because you know that there's something inevitable about getting old, be it fish or fowl.

## Wonderful Dragons

We have also had a wonderful display of dragonflies this year. I don't mean the small damselfly, but the very large types with wingspans of almost six inches.

I've certainly never seen as many before, and some of the colours have been out of this world. Perhaps one of our resident naturalists could explain the sudden increase of these splendid creatures?

## Shopping list

Right, let's be having you. I don't want a new front tooth! What I would like is a matching pair of Gin Sankes, circa 20in, for me to spawn from!



Some super Gin Sankes like this one would make an ideal Christmas present for me!

I also want a complete set of new tubes for my UVs (plus some spare quartz tubes for the inevitable breakages), plus new wet suit for when I fall in (it hasn't happened yet, but I'm trying hard).

And how about Arnie's Mini-gun, complete with ammo, for use on that \*\*\*\*\* Heron!

There, that wasn't too painful was it? Only joking, but we can all dream.

Anyway, I'd better be wrapping up for another (short) year, the next time you see me in print, it will be '94... Saints preserve us! Have a very Happy Christmas and a Prosperous New Year and as the saying goes: 'We Love You All'.

## KOI DICTIONARY/Zeolite

This naturally formed material is known mainly in Japan, where it has been used for many years. It has an appearance rather like railway ballast, but is creamy in colour.

Zeolite has the almost uncanny ability to absorb impurities from water in which it's immersed. Nasties, such as ammonia and nitrite, can be removed at an astonishing rate, and it's said to remove up to six times its own weight in contaminants, though I feel this to be somewhat of an exaggeration. Nevertheless, it is extremely effective.

Zeolite is virtually everlasting and can be used over and over again, simply being reactivated by soaking it in a strong salt solution for a couple of days, giving it a good wash and allowing it to dry before putting it back into service or storing for future use.

The only proviso in using this material is the fact that it must not be used when salt has been added to the pond as medication, otherwise all the contaminants will be released back into the water. The simplest way to utilise the stuff is to suspend it in a net bag in the pond or the filter. I prefer to have small pieces, as opposed to large chunks.

You should have no difficulty in obtaining Zeolite, as most Koi dealers will have stocks. The best time to use it (assuming you don't use it permanently) is when your pond or filter has had a good clean-up and the filter is not yet fully functional.

AQUARIUM PHARMACEUTICALS



## DID YOU KNOW?

There is only one point on their respective scales where Celsius and Fahrenheit coincide. Minus forty degrees (-40 F and C).

Did you also wonder what had become of the now dropped Centigrade term in the weather forecasts? You can blame the EC for that rearrangement (among many).

These little 'gems' of information might not help much with the day-to-day chores of Koi keeping, but they will help you stay awake!

## DID YOU SEE?

The recent series on TV, *Wild About Angling*, was superb. Some of those 40-pound-plus Carp were real beauties. As an EX-angler, I don't wish to go into the rights and wrongs of the sport, but merely wish to admire the beauty and cunning of these lovely fish which, I should say, were all returned immediately to the water unharmed.

I would add just one word of caution, however, on the subject of the 'anti' brigade, and it's this. Should these people ever get their way and angling be banned, how long will it be before their attention turns on the pondkeeper who keeps ornamental fish? Think about it!

During the run-up to the launch of the new 'Sky' multi-channel programmes on satellite television, one preview contained a very quick shot of the most gigantic Sanke I've ever seen. Although the shot was only, perhaps, about one second's duration, thanks to my VCR I was able to freeze the shot and view it a frame at a time.

Quite honestly, I would not have thought it possible to lift a live fish of that size, never mind move it to another vat. My only regret about this Koi was the fact that it didn't belong to yours truly!

# SEAVIEW

BY GORDON KAY

## Captive-bred corals

There was an item in the latest issue of *SeaScope*, the freebie from Aquarium Systems, which I thought might interest you.

It was by **Richard Perrin**, the proprietor of Tropicorium in Michigan, and told about his methods for propagating corals. Richard has been involved in the wholesale and retail business since 1980 and, in his own words (well, sort of), "seen the areas from which corals can be obtained, dwindle down to Indonesia."

The thought that even this supply could eventually be blocked, prompted him to become involved in captive coral breeding. He already owned a large greenhouse in Detroit, which was ideal for the job, and he originally devoted around 25% of his holding capacity for cultivation.

He took advantage of the large numbers of organisms passing through his business to pick the best and most colourful for his endeavours.

He uses eight plywood vats —

**Captive breeding of corals is gradually becoming a realistic proposition.**

each measuring 10 x 6 x 2ft — lined with plastic, giving a total capacity of 12,000 gallons of synthetic seawater at a specific gravity of 1.022. He still uses air-driven undergravel filters below dolomite gravel, but also controls nutrients by means of macroalgae (seaweeds) such as *Caulerpa*. During the summer, he

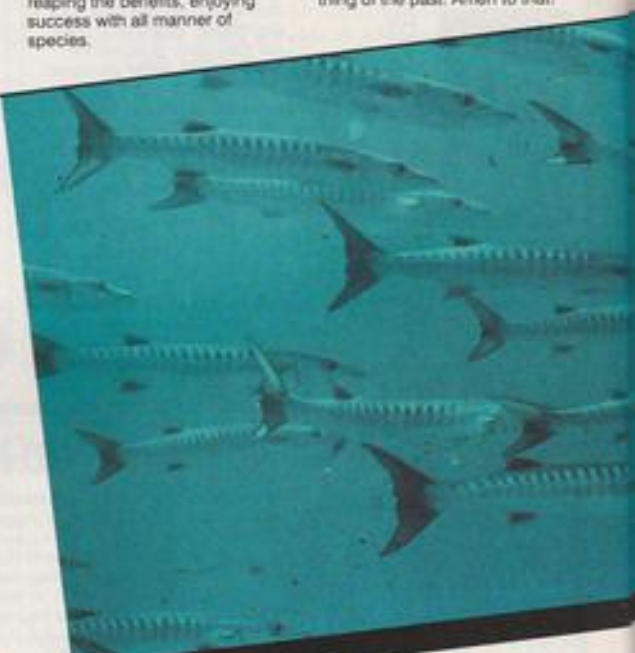
harvests around a bushel (8 gallons) of *Caulerpa* and other species every week.

Recently, three large protein skimmers have improved things even further and now Richard is reaping the benefits, enjoying success with all manner of species.

Another greenhouse — this one to house 18,000 gallons — is planned. Richard is so bullish about his enterprise that he's not afraid to predict that wild-caught aquarium animals will soon be a thing of the past. Amen to that!

**AMAZING**  
The largest ever recorded shoal of fish contained an estimated 3,000,000,000 Herring. Wow!!

A thankfully(!) modest shoal of Red Sea Barracuda.



CORAL WORLD ELIAT

## Exciting future

London Zoo is well-known to us all. Most of us have spent many happy hours there, growing to love the creatures which share our world, learning more about them and — hopefully — being made to think about their future in it. The different marine aquarium societies with which I have been involved have used the Zoological Society's facilities over the years in order to boost the quality of their seminars and other events.

London Zoo — like it or not — has made a major contribution to wildlife, in terms of enlightenment, education and conservation. Yet, for all that, the Zoo is in dire straits.

Only a few short months ago, it was on the verge of closure and only survived at the eleventh hour. To get bodies through the

turnstiles — in other words, to increase revenue — the place needs a facelift. Part of that facelift is the rebuilding of the aquarium, which was originally built in 1924 and is more or less as it was then. Filter systems, for example, are antiquated, to say the least.

Well, it is now planned to rebuild the aquarium at a cost of £3 million. Plans include a new shark tank, touch pools (a most effective teaching aid) and even an outdoor Koi pond.

In an exciting new initiative, the **Mini-Reef Society** — a new body of hobbyists founded by **Peter Newman** to promote the

hobby — are to install a 150-gallon reef aquarium as a permanent display within the new building.

Although the Zoo have, historically, shipped seawater from Lowestoft, the Society will use synthetic water in its display, which will have all the filter systems and other hardware exposed. There will also be a display, explaining the biological system, and the various functions of the equipment will be shown on a diagram board.

Peter Newman and the Aquarium's **Brian Harris** have decided that a display of animals from one particular reef would be effective, so they are at present in the middle of dialogue with the Philippine Government about the possibilities of a joint project.

As well as several British companies — who will all receive publicity from their involvement — the Mini-Reef Society will be getting input from **Ocean Voice International** from Canada, an organisation you may remember from earlier **Seaviews**.

The society will also be exhibiting at the Lakeside Exhibition Centre in Frimley Green and any proceeds from the show will go to the Zoo Aquarium.

London Zoo holds some special memories for me, and I'm glad to see that it has enough friends around to keep it going.

# AURATUS IMPORTS

DISTRIBUTORS OF ACRYLIC AQUARIUMS

Mossford Green Nursery, Abridge Road,  
Theydon Bois, Essex.  
Tel: 0992 814853 Fax: 0992 814321



Above:  
Double  
Octagon.  
Right:  
Single  
Octagon.



Below:  
2ft, 2.5ft  
and 3ft  
Octagon  
Column.



STRICTLY TRADE ONLY.  
PHONE US FOR YOUR  
NEAREST STOCKISTS

## Gift ideas

Just to show that I haven't completely forgotten the time of year, I've jotted down a few gift ideas. These are things which I've come across in the past year and which I'd like to receive myself.

**1** The Redox Plus — the combined Ozoniser/Redox Unit from Red Sea Fish pHarms Ltd. A serious piece of kit, as I'm sure you remember I said in September's *Seaview*.

**2** *The Book of the Marine Aquarium* from Salamander. Readers of last month's *A & P* will recall that I think very highly of this tome.

**3** Eheim's new 2006 Internal Filter — superb!

**4** A Nitraway unit from Purity on Tap Ltd — ditto!

**5** One of the new powered protein skimmers from Aquarium Systems. Not a Tunze unit... and nowhere near as expensive.

**6** An invitation to Aquarama '95!

**7** A baby — although I'm getting one of those anyway, in March '94! (I've been waiting for a chance to slip that in since July!).

## Water in and power on

Keeping water and electricity apart is one of the first safety rules learned in fishkeeping. Two products from the newly-formed ZENTEC company will help to keep things this way.

The nylon HOSE CLIPS produce a tight water seal in seconds, needing no tools; simply press together and twist to release. Obviously rust-proof, they can be re-used as many times as needed, and come in four convenient sizes for aquarium or pond use.

Does your home suffer from 'little fingers' interference? If so, then there's a danger that important power plugs can be removed (or even switched off)



ZENTEC LTD

from time to time. The POWER GUARD is a simple, yet effective, foil for such happenings; the plastic guard can be fitted in a couple of minutes over any twin socket electrical mains outlet.

Apart from deterring tampering with the switches, the Powerguard also completely protects the socket against the ingress of water.

Details from: ZENTEC LIMITED, 10 Lloyds Court, Manor Royal, Crawley, Sussex RH10 2QX. Tel: 0293 400128; Fax: 0293 400129.

## Purifiers for Koi-keepers by Koi-keepers

Seems obvious, doesn't it, but it's surprising how many water purifiers used in Koi ponds were originally designed for something else!

The ALLCLEAR range of WATER PURIFIERS has the edge in that they are designed with fish, not human, needs in

# WATER'S EDGE

BY DICK MILLS

mind. It also helped the company that many of the research, design and manufacturing teams involved in the development programme were Koi keepers anyway.

Two main types of purifiers are available — Total Chlorine Systems and Total Metals Systems, each correspondingly highly efficient in their own distinct area of operations, with the option of upgrading from Chlorine to Metal if this is

required at a later date.

The Chlorine System features three models: the DS2 (upgradable to DS3 and MS4), the DS3 (upgradable to MS4) and the DL2 (upgradable to ML3). The system is tested for chloramine, free chlorine, pesticide group and free lead; fluoride reduction is also known.

The Metals System has two models: MS4 and ML3, which are



Metals Systems — right: System MS4; left: System ML3.

ALL CLEAR WATER PURIFIERS

## Gifts & foods from Interpet

Unless we're very lucky with the weather, now's about the last chance for you to get nourishing food into your Koi, or any other pond fish for that matter, as dropping water temperatures (certainly, once below 10°C) take the edge off their appetites and physical activity, especially between November and March/April.

The floating food hoops, KOI SEASONS and 3 SEASONS, from INTERPET represent premium food which fish can easily convert into body weight and energy stores to ensure successful over-winter survival.

Although of low density, these foods are claimed to contain twice as much food (and half as much air) as other competitive 'extruded stick' type foods; they are sold by weight rather than volume for this very reason, providing excellent value for money. 3 Seasons is suitable for all types of pond fish while, as its name implies, Koi Seasons has been specifically formulated to meet the special requirements of Koi.

Hang a stocking on your tank and you could find it filled with really useful aquatic gifts, which while very acceptable in themselves, also represent money-saving offers or include extra goodies.

The POWERHEAD and POWERFLOW aquarium pump/filtration systems will include vouchers (redeemable until October 1994) for free bottles of FRESH START, the tapwater conditioner.

A special banded 'aquarium check' promotional pack for the Festive Season combines, in a single package, the EASY-TEST NITRITE and EASY-TEST pH BROAD RANGE tablet-based test kits at a saving of £1.50.

The Interpet Encyclopedia of Freshwater Tropical Aquarium Fishes will include a free full-colour FRESHWATER TROPICAL FISH WALL CHART.

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

tested for chloramine, free chlorine, pesticide group dissolved aluminium and lead; known to reduce fluoride, copper, zinc etc. The ML3 system is available on a hire basis.

Each system comprises a series of treatment canisters for optimum efficiency (very detailed research resulted in specific materials being utilised for each segment). Carbon blocks were discarded in favour of granular forms, for instance, while some chambers have radial or axial flows, the latter having the waterflow reversed (anti-gravity), for optimum 'contact time'.

An explanatory leaflet entitled Tap Water & its Effect on Koi by Bernice Brewster and Ann Telford is available, price £1.50, along with full product details direct from: ALL CLEAR WATER PURIFIERS, 19 Tylera Avenue, Billericay, Essex CM12 0RA. Tel: 0277 624741/214911; Fax: 0277 631548/201740.



INTERPET

## After GLEE

Following on from the appearance of the recently-formed company OASE (UK) at September's Garden and Leisure Exhibition (GLEE) at the NEC, we have received details of products especially of interest to pondkeepers.

The five new additions to the NAUTILUS range of pumps are both impressive in performance and in innovative design. Looking like something Captain Nemo





**PURITY**  
ON TAP



WICKFIELD FARMHOUSE SHEFFORD WOODLANDS  
NEWBURY BERKSHIRE RG16 7AL

TEL: 0488 648319 HELPLINE OPEN 7 DAYS  
FAX: 0488 648997

TRADE AND RETAIL

THE NEW METALEX Systems — Proven at  
Euro Discus from £121.00 (MM20)  
Removes chlorine, chloramine etc, toxic "metals"  
and even fluoride — Simply the best

7 purpose built aquatic  
systems from £169.50  
for the P1500 (5-10  
galls per day)  
plus the \$5035 "Under  
Sink" model (35GPD  
rated TFC membrane)  
£265.00



**REVERSE OSMOSIS**  
"As chosen by London Zoo"

**KOI POND "SUPABLOCK" SYSTEMS**

Now with enhanced "metals" removal  
from £108.00



## WINDSOR AQUARIST

County Gardens, Dedworth Road,  
Windsor, Berks. Tel: 0753-832281

**20% DISCOUNT ON ALL FISH THIS  
CHRISTMAS**

(OFFER LASTS DEC. 1ST TO 24TH INCLUSIVE)

HUGE SELECTION OF TROPICAL + BRACKISH FISH  
FORTNIGHTLY IMPORTS OF TROPICAL + COLDWATER PLANTS  
EXTENSIVE SELECTION OF HIGH QUALITY  
COLDWATER FANCY FISH  
STUNNING RANGE OF MARINE FISH + INVERTS

UNIQUE  
LIVING  
PAINTINGS\*  
(pictured  
right) +  
MANY  
MORE  
ORIGINAL  
AQUARIUMS



MADE-  
TO-  
MEASURE  
SUPERBLY  
FINISHED  
AQUARIUMS  
+  
CABINETS

OPEN: 9.30am-6pm Mon-Wed  
9.30am-7pm Thurs-Sun

# WATER'S EDGE

would appreciate, the pump is totally and neatly enclosed in its own large cylindrical filter basket which prevents premature clogging and allows much longer periods between cleaning.

To take one example, the Nautilus 3000 has a turnover of some 3000 litres/hr but consumes only 30 watts. Bearings and rotor shafts are of wear-resistant ceramic, and there is no shaft seal, so friction is therefore minimised which, in turn, achieves virtually silent running. A long and trouble-free life due to the use of high-quality stainless steel and plastic materials should mean that the comprehensive three-year guarantee period is passed without a hitch.

All of these pumps are equally suitable for 'dry' installations and can be used with a speed regulator to vary the height of a fountain display.

Of more interest to the garden, or in moving water in other installations, are the AQUAFLO 40 and 50 GARDEN PUMPS. Rapid connection and uncoupling is achieved without tools using a

completely new (and secure) rolling system. The pumps are, of course, sealed against rain, or even their own very efficient output.

The AQUASIL 40 and 50 pumps are equally useful around the house (showers, washing machines etc) and a new patented membrane switching system makes for ultra-small housings; they also feature the new coupling systems.

Details from: **OASE (UK) LTD., No 5, Focus 303, Waltham Industrial Estate, Andover, Hampshire SP1 5NY. Tel: 0264 333225; Fax: 0264 333226.**

## Aquarium coal(?) and no-foam conditioner

Yes, it's true, and not for a decorative or warming purposes either. Carbon is a well-known adsorptive substance which is

able to remove dissolved pollutants and 'polish' the water at the same time, but in marine aquariums, there is a danger of reducing the pH (acidity/alkalinity) to below desirable levels when ordinary carbons are used.

MARINECARBON from BIOPLAST overcomes this problem by actually maintaining the pH at the optimum, natural value of 8.1, and has the added attraction of having far more adsorptive powers, only requiring to be replaced every six months or so, rather than every 2-4 weeks.

So where does coal enter into all this? Well, Marinecarbon is actually made from highly-activated coal and shaped, under extreme pressure, into small pellets. It is also of equal effectiveness in native marine tanks and in such high pH aquariums as those for Rift Valley Cichlids.

Any Jacuzzi owner will tell you that bath foam is a no-no, unless your idea of fun is cleaning the whole bathroom of bubbles. Similarly, most aquarium water

conditioners can send protein skimmers into a corresponding 'lather'. OCEANCLEAN NF is a marine aquarium conditioner which effectively neutralises adverse substances, removes chloramines and protects fish gills and membranes.

However, 'NF' (for non-foaming) tackles things from the opposite direction to other conditioners by coating and neutralising unwanted substances, rather than the fish or other animals present. It promotes biological water purification, enhances colours and prolongs life expectancy of fishes, 'masks' and neutralises waste products of micro-organisms and is essential at every water change, especially where de-ionized water is used, as it reintroduces essential and stabilising ions which are absent from such pure water.

Details from: **BIOPLAST (UK) LTD., Unit 1, Old Railway Goods Yard, Kildwick Crossing, Crosshills, Keighley, West Yorkshire BD20 7DA. Tel: 0535 630230; Fax: 0535 633690.**

# THE GREEN IGUANA GUIDE

Our regular reptile expert **Julian Sims** lays down all the golden rules for the successful keeping of this large, beautiful and extremely powerful lizard.

*Photographs — unless otherwise indicated — by the author.*



LINDA LEWIS

Big and almost unreal. A beautiful adult Green Iguana

**C**ommon or Green Iguanas (*Iguana iguana*) are truly spectacular reptiles. These popular 'dragons' have a row of elongated scales which form a dorsal crest from behind the head, along the body and down much of the tail. Further, the top of the neck is covered with conical tubercles which project like little pyramids.

Overall body coloration is variable and ranges from light green to blue-green. Alternating rows of darker pigmentation can give a 'banded' appearance, especially noticeable on the tail. Juveniles are a much brighter green than adults, but this vivid coloration darkens with age. Adult males are more orange-brown compared with female Green Iguanas.

In fact, there is quite a marked sexual dimorphism (differences in external features) between mature males and females of this species. Males, for example, can grow to a larger size (longer and heavier) and they have a more pronounced dorsal crest.

At the onset of sexual maturity, males also develop a row of enlarged femoral pores along the underside of each hind leg.

Mature male iguanas have an erectable flap under their throat. Called the dewlap, this is used for display purposes and to enhance a fearsome posture if threatened by predators... including humans!

## Distribution

Green Iguanas have a natural distribution on the American mainland from northern Mexico, through Central America, and into South America as far as



Note the impressive crest on this mature male.

Paraguay and south-eastern Brazil. They also occur on many of the Pacific islands off the coast of Panama and Colombia and on numerous islands in the Caribbean Sea, including Curaçao, Trinidad and Tobago, Montserrat, the St. Lucia group, Grenada and the islands of the St. Vincent group where trees are present.

Green Iguanas naturally inhabit trees. In particular, males are very territorial and aggressively warn off rival intruders by nodding their head. Due to this behaviour, only one male should be maintained in a vivarium or conservatory if a colony of these reptiles is established.

## Availability

Green Iguanas are widely available through the pet trade. For example, in 1992, the country of Guyana in South America had a quota to export 8,400 of these reptiles, and other countries also export the species.

Usually, juvenile animals are offered for sale and these are only about 28 to 45cm (11 to 18 inches) in length. At this size,

they look most appealing and 'manageable', but please consider carefully that Green Iguanas can grow to a length in excess of two metres (more than six feet!). Quite a handful!

## Space is essential

The large size of these adults and their preference for life in trees dictates that a VERY LARGE vivarium with opportunity to climb must be made available.

Kathleen Pickard-Smith, who wrote the classic book *Living with Reptiles* (originally published in the early 1960's by **Thomas Nelson, Edinburgh**) provided a special 'reptile room' for her iguanas. Mrs Pickard-Smith is a dedicated iguana enthusiast and her example should be followed. A conservatory, heated in winter and well ventilated in the summer, would be an alternative method of providing a similarly spacious environment.

In the wild, iguanas often bask on branches over a river, plunging into the water and swimming to safety if they are disturbed. As they would naturally live

Adult 'crested' Green Iguana.



Alternatively, large round gravel or bark chippings could be used as vivarium substrate to provide a natural appearance. The disadvantage of using such materials is that they are very difficult to keep clean and dry. Damp conditions can promote infection by bacteria and/or fungi under the belly scales of heavy-bodied lizards.

If large, rounded stones are used as a floor covering, this medium can be washed and sterilised in very hot water.

near water, it is essential to provide a large pool in their vivarium, where they will sometimes sit in to have a good soak. The water should be changed regularly to keep it fresh.

If a conservatory is used to accommodate these reptiles, it should be possible to arrange a pond for their use. This will also provide an opportunity to see iguanas swim. They are fascinating to watch as they rhythmically flex their tails from side to side in the water, while holding their legs close to the sides of their body.

## 'Floor' thoughts

Prominent claws are a characteristic of most large lizards, and Green Iguanas are no exception. The continuous growth of claws is an indicator that a reptile is in good health and eating a well-balanced diet with sufficient minerals and vitamins.

If part of the floor of the vivarium is covered with sheets of sandpaper as used for cage birds, for example Capern's Tydisan, this will help to wear down their claws naturally, preventing them from growing too long. Sheets of sandpaper are easily changed when they become fouled.

With regard to covering the rest of the floor of the vivarium, you could use newspaper. This has the outstanding advantage that it is easily replaced when it becomes contaminated with faecal material and/or uric acid, and therefore hygienic conditions are easily maintained.

Iguanas love to climb. This orange-brown specimen, perched on the back of a chair, also shows the distinctive tail bands.



## LIGHT & HEAT

Natural sunlight is particularly beneficial to iguanas for the maintenance of health and vivid body coloration. Unfortunately, the useful ultra-violet (UV) rays in sunlight, which help to make vitamin D in the skin, are filtered out by the glass in windows and the glass of the vivarium. Thus, an alternative source of ultra-violet must be provided during the day.

Suitable sources include specific types of fluorescent tube, for example, the aptly named True-Lite — manufactured by the Duro-Test Corporation in the USA, where the tubes are known as Vita-Lite. Alternatively, a Blacklight tube (manufactured by General Electric) could be used. This type of tube only emits a small amount of visible light, but a large proportion of ultra-violet.

A silvered spotlight should be used during the day to create a basking 'hot spot' so that iguanas can raise their day-time body temperature to between 30° and 35°C (86° and 95°F).

## Background heat

A background environmental temperature of around 25°C (77°F) should be maintained at all times, day and night. This can be achieved by using a suspended ceramic infra-red heating unit or a small wall heater encased in a tube (mounted high up and very well protected from the inhabitants of the vivarium).

These sources of heating must be controlled by a good quality electronic thermostat.

It is advisable to control the basking spotlight by a time-switch. This will establish a regular day and night lighting cycle

for the iguanas. All types of fluorescent tube should also be turned off at night-time.

As Green Iguanas are active climbers, it is also essential to include strong branches in their vivarium. It is permissible to allow iguanas to climb as close as 25cm (10 inches) to a UV emitting fluorescent tube.

However, precautions must be taken to ensure that the branches in the vivarium do not allow these large lizards to come in contact with spotlights or a suspended ceramic infra-red heater.

## Varied diet

Unlike many other species of iguana, adult Green Iguanas are mainly herbivorous. However, they will also take some meat-based foods, and this is especially true of younger animals.

The carnivorous part of the diet can include live invertebrates such as Waxworms — the larvae of the Greater Wax Moth (*Galleria mellonella*), locusts and crickets. Green Iguanas will also take small amounts of canned cat food.

Favourite herbivorous foods include leaves, especially lettuce and Nasturtiums, fruit, including fresh apple, pear, banana and oranges (fresh and tinned), and vegetables, including sliced cucumber and tomatoes.

Food for iguanas can be dusted with a multi-mineral and vitamin supplement such as Vionate Powder, produced by Sherry's Pet Care. Calcium and vitamin D<sub>3</sub> are especially important in the diet to promote the healthy growth of the skeleton. All forms of food which are offered to these lizards can be treated in this way.

An alternative method of offering calcium to iguanas is in the form of cuttlefish bone. This can be powdered and sprinkled on their food.

## Difficult breeders

Regrettably, Green Iguanas are not one of the easiest species of lizards to breed in captivity. This may be due to the territorial requirements and the display behaviour of males but, additionally, there could be a need for a communal nesting site.

Changes in the climate, as experienced by these reptiles in their natural environment, might also be important synchro-

### GREEN IGUANA FACT FILE

**Scientific Name:** *Iguana iguana*.  
**Distribution:** Central and tropical South America; Caribbean.  
**Size:** To over 2 metres (more than 6ft) maximum.  
**Accommodation:** Very large vivarium or greenhouse supplied with a pool, heating, adequate lighting and adequately strong perches for the animals to climb on to.  
**Diet:** Varied — to include both a meat-based and a vegetable component.  
**Breeding:** Difficult in captivity, owing to the need for suitable burrowing/ nesting areas.  
**No of Eggs:** 20 to over 65.  
**Incubation:** 73-81 days at 31°C (87°).

nisers. For example, in northern Colombia, as the amount of rainfall decreases towards the end of November, large males are seen displaying from their tree-top perches. This behaviour stops in early January when the large males spend much more time on the ground.

Life on the ground results in a high incidence of road casualties, particularly during early February. In fact, hundreds of iguanas (male and female) are killed by road traffic during each breeding season — known locally as 'Highway Madness'.

One reason for these casualties is that the sandy embankments at the edges of roads are highly favoured communal nesting sites. Gravid females select sandy areas because they excavate deep elongated burrows in which to lay their eggs.

## Captive encouragement

To encourage breeding in captivity, a suitable sandy nesting bank should be provided in the vivarium. In particular, it must be remembered that eggs are naturally laid at a depth of at least 61cm (24 inches).

Depending on the size of the reptile, female Green Iguanas lay from 20 to more than 65 soft-shelled eggs in their annual clutch. The eggs are spherical in shape.

To prevent interference during incubation (as might occur in the wild), and to control temperature precisely, the



Large Green Iguanas can be handled ... as long as they are well used to it ... and you know what you are doing, as Kathleen Pickard-Smith — one of the greatest reptile keepers of modern times — demonstrates. Also in shot: Stumpy, the Stump-tailed Skink.

eggs should be carefully removed after laying and incubated in a container of moist Vermiculite at 31°C (87°F). This temperature is quite critical — even small fluctuations above or below can result in the clutch failing to hatch. Incubation takes from between 73 to 81 days.

Undoubtedly, Green Iguanas are magnificent reptiles, but serious consideration must be given before this species is acquired. Careful preparation of very spacious accommodation is an essential prerequisite.

It should also be remembered that adult iguanas are extremely powerful reptiles with sharp claws and a long muscular tail which can be menacingly lashed from side to side.

They are not always as easy to handle as some of the smaller species of heavy-bodied lizards which have shorter legs and tails. Yet, they are great animals for all that.

## Regents Reptiles

THE INTERNATIONAL PET/REPTILE CENTRE  
360 Edgware Road, London W2 1EB  
Tel: 071-258 0931/071-258 3051



For the widest range in Lizards, Amphibians, Snakes, Chelonia, Arachnids. Full range of Accessories and Books. Offering a friendly service.

Opening Times:  
Weekdays 9.30am to 5.50pm  
Saturday 9am to 6pm  
Sunday 11.30am to 4.30pm

## FASCINATING FISH FACTS WOMB-BOUND CANNIBALS

Have you ever heard of cannibalism ... in the womb? It exists, honest ... both among the most inoffensive-looking and interesting fish imaginable ... as well as among some of the more 'expected' types.

The species involved all have several things in common, even though they may not be related to each other. For a start, the females ovulate (just like humans do), with the embryos undergoing development in a cavity which acts like a womb. While in this cavity, food comes directly from egg yolk at first.

However, when this runs out, alternative sources need to be found if development is going to be accomplished. Some of this comes from the mother herself, but eggs also constitute an ideal source — so do the other embryos.

The result is that the surviving embryos are extremely well developed at birth and can increase their weight by as much as 80,000%(!) during gestation i.e. between fertilisation and birth.

A Goodeid female (*Ameiops splendens*) which died during 'pregnancy'. Her well-developed embryos might well have eaten some of their 'womb mates'.

JOHN DAVIES





# FROGS AND FRIENDS



by JULIAN SIMS

## Red Leg trials

In the January and June '93 editions of *Herpetology Matters* (the predecessor of *Frogs and Friends*) I reported on a problem which is currently widespread in many British ponds and lakes. Common Frogs (*Rana temporaria*) are dying, and symptoms of the fatal disease indicate that at least some of the amphibians have been infected with bacteria belonging to the genera *Aeromonas* and *Pseudomonas*.

In response to my two articles, several *Aquarist & Pondkeeper* readers have written in providing further evidence of just how serious the problem of frog deaths is. Following on from these reports, Dr Neville Carrington, chairman of *Interpet*, suggested the use of the company's product *Anti-Ulcer* in a controlled experiment involving similar ponds.

Paul Checkley and a friend had two suitable (infected) ponds in Warwickshire. One was treated with *Anti-Ulcer* and the other left untreated for comparison. *Anti-Ulcer*, in conjunction with another *Interpet* product, proved successful and now the second pond has been similarly treated. Livestock in both ponds no longer exhibit the symptoms of the "reddening disease", and ulcers on fish have been cured.

However, some very interesting observations have been made during this experiment. The initial treatment of Paul Checkley's pond with *Anti-Ulcer* alone was not successful — the sores on the fish did not heal. This was because parasites were feeding at the edge of the ulcers.

To overcome this problem, another *Interpet* product, *Anti-Parasite*, was added to the pond water. *Anti-Parasite*, used in conjunction with *Anti-Ulcer*, brought about a positive improvement within two weeks. In particular, Paul reports that the frogs responded very well to the treatment.

In view of this success, Neville Carrington would like to carry out more extensive tests of *Anti-Ulcer* and *Anti-Parasite* during 1994. In particular, these investigations would involve the pathological examination of fish and amphibians which die before the disease is halted.



Healthy Common Frog in autumn coloration. New 'Red Leg' trials are to restart in spring 1994.



**TACHBROOK TROPICALS LTD**  
244 VALDHALL BRIDGE ROAD  
LONDON SW19 1AU  
TEL: 071 834 5179  
Large selection of Xenopus Toads, Axolotls — black, white, albino, Tree Frogs, Lizards and Geckos.

**AQUATICA**  
37 BROOK STREET,  
WAKEFIELD, YORKSHIRE  
26 Tanks with Reptiles, Snakes, Amphibians and Spiders  
Vivariums made to order  
Frozen and live foods  
MOST EXOTIC SNAKES & REPTILES AVAILABLE TO ORDER  
TEL: 0924 384477

**BARRIER REEF**  
For a large selection of Reptiles, Spiders & Amphibians.  
Live & Frozen Foods.  
Books & Accessories.  
38 High Street, Cheltenham  
Tel: 0242 238434  
Also at Old Trosside Church Hall, Vauxhall Road, Gloucester  
Tel: 0452 303396

**COVENTRY REPTILES**  
BREEDERS & SUPPLIERS OF REPTILES, AMPHIBIANS & INVERTS  
ALL EQUIPMENT - HEATING, LIGHTING, VIVARIUMS ETC.  
LIVE FOOD, FROZEN FOOD & BOOKS  
EXPERT ADVICE & AFTER SALE SERVICE  
TRADE SUPPLIED - CATALOGUE ON REQUEST  
**0203 223075**  
105, FAR OGBFORD STREET, COVENTRY, CV1 5EA

**CAJEX ACCESSORIES LIMITED**  
The Bury Farm, Pednor Road  
Chesham, Bucks HP5 2JU  
Tel: 0494 791584  
Cable Heaters, Vivariums, Lighting Controls, Thermostats, Lids, Food & Fauna Boxes

**LIMESTAR TROPICALS**  
The area's main stockist of captive bred and wild caught reptiles and amphibians. Suppliers of live and dead foods.  
61 HIGH ST, TARVIN, CHESTER  
TEL 0829 740333

**REPTILE - ARIUM**  
WE STOCK EVERYTHING FOR YOUR HERPETOLOGICAL NEEDS - WHY NOT GIVE US A CALL?  
The Reptile-arium  
Culham, Newbury  
Culham Gate Road  
Tel: 04757 7977  
OPEN DAILY  
MAIL ORDER

**THE SERPENTARIUM**  
8 FREER STREET, WALSALL, WEST MIDLANDS  
Tel: 0922 34657  
Largest European breeders of Reptiles & Amphibians  
Suppliers to Hobbyists  
Trade also supplied

**G. MURRAY & M. HUGHES**  
Suppliers & Breeders of Reptiles  
Buy with confidence! We offer you the opportunity to purchase, direct from the breeder, superb captive bred snakes, together with expert advice. Also a full range of equipment and foods. Please see our most free catalogue and stock list.  
Shadow Barn House, off St. Margaret's Road, Bungey, Suttons NR35 1PG  
0986 892210

**WEST'S OF COLCHESTER**  
STANWAY GARDEN CENTRE  
on the B1408 at Stanway, Colchester  
Tel: 0206 208060  
Probably the largest selection of Reptiles, Lizards and Spiders in East Anglia.  
All accessories, vivariums, food, heat mats, etc. ALWAYS AVAILABLE.  
EXPERT ADVICE READILY GIVEN

If your pond contains livestock which have the symptoms of abnormal 'reddened' coloration, 'bloating' or oedema and ulceration, and you would like to take part in the **1994 Interpet Product Trials**, then please write to me c/o Aquarist & Pondkeeper.

One of the numerous colourful spreads from Doris Cochran's classic. Worth searching for.



DORIS COCHRAN

## Great presents

**Doris Mable Cochran** started her professional career as herpetologist in the United States National Museum, Smithsonian Institution, in 1919 while she was still an undergraduate. In 1927, she was promoted to Assistant Curator of Herpetology at the Museum and in 1956, she became Curator. She retained this post until her retirement in April 1968. Sadly, less than a month later, she died of cancer at the age of 70.

During her career, Doris Cochran named eight new genera and 125 new species and subspecies of frog, toad, lizard and snake. Her main research interests were the herpetofauna of Malaysia, the West Indies and South America (particularly Brazil

and Colombia). She published nearly 90 titles. Most were short taxonomic papers describing new species. However, Doris Cochran also published several pamphlets for use by military personnel (when posted overseas and at time of war).

She also published a number of books. Titles included *Herpetology of Hispaniola* (1941), *Frogs of South-eastern Brazil* (1954) and two books published posthumously in 1970 and co-authored with fellow herpetologist **Coleman J Goin** — *Frogs of Colombia* and *The New Field Book of Reptiles and Amphibians*.

Her most widely known publication is *Living Amphibians of the World*. First published in 1961, the 200 pages of this book were

profusely illustrated with 222 photographs, including 77 in full colour. The highly acclaimed and informative text has been subsequently translated and published in at least eight other languages.

Unfortunately, this super book has been out of print for many years, but a second-hand copy would make a very interesting (and most welcome) present for the herpetologist in the family.

Copies of this book, as well as other titles by Doris M Cochran, are sometimes available from the specialist stockist, **Steven Simpson**. A catalogue giving details of new, out of print and second-hand herpetological and ichthyological titles currently in stock can be obtained from the new address:

**Steven Simpson,**  
Natural History Books,

**Herp fact**  
**50% inflation**

The Chuckwalla (*Sauromalus obesus*) is a heavy-bodied lizard which inhabits the desert regions of the south-western USA, particularly Nevada, Utah and Arizona, into northern Mexico.

This species is predominantly herbivorous, eating the flowers of desert plants such as Prickly Pear and Creosote bushes. Chuckwallas would seem to have a limited ability to protect themselves against predators such as hawks or inquisitive humans. In fact... when disturbed, a 'chuck' rushes into a rock crevice, gulps in air to distend its body, and wedges itself in place. A fully inflated Chuckwalla increases its body volume by over 50%!

23 Melton Street,  
Melton Constable,  
Norfolk NR24 2DB.  
Tel: 0263 860170  
Fax: 0263 860175

Text books bought for professional purposes can be claimed against Income Tax. Steven Simpson will provide a receipt for each text book he sells.

**RED KNEES & REPTILES**  
118 Camberwell Road  
Camberwell, London SE5  
Reptiles, Amphibians, Food & Equipment  
Friendly Advice and Service always available  
Tel: 071 701 6012

**AQUASPLASH REPTILES & ACCESSORIES**  
MJS GARDEN CENTRE  
BATH ROAD, HARE HATCH  
TWYFORD, READING  
Tel: (0734) 404188  
OPEN 7 DAYS 9 AM TO 5.30 PM  
FREE PARKING  
CREDIT FACILITIES AVAILABLE



**THE PET SHOP OF PETS WOOD**  
121/123 QUEENSWAY, PETS WOOD, KENT  
Tel: (0689) 825543  
HOURS: Mon, Tue, Thu, Sat 9am - 5.30pm. Wed 9am - 1pm. Fri 9am - 7pm. Sun closed.  
Reptiles, Amphibians, Vivariums  
Full range of equipment and food.  
Friendly advice.

**BILLINGHAM AQUATIC CENTRE**  
12 MILL LANE, OLD BILLINGHAM, CLEVELAND (2 minutes from A16)  
The clean, friendly shop run by hobbyists interested in reptiles & tropical section with healthy stock of personally selected. Specialists in Cichlids & Catfish.  
Comprehensive range of books & equipment. Live & frozen foods.  
Closed Wednesdays only  
Tel: 0642 360058

**ZENTEC**  
State of the Art Vivarium Heating Control Information from...  
19 LLOYDS COURT MANOR ROYAL CRAWLEY, WEST SUSSEX, RH19 2JX  
TEL: 0292 400 128 FAX: 0292 400 129

**TO ADVERTISE ON THIS PAGE**  
TEL:  
0233 621877

**WALKERS AQUATICS & PETS**  
59 HIGH STREET, BILSTON WEST MIDLANDS WV14 0EZ  
Telephone: 0902 498191  
Available hatchlings — Corn Snakes, Boas, King Snakes, Pythons, Milk Snakes — MOST UK BRED — Full range of equipment, foods and accessories

**WET & WIGGLY**  
Good range of Reptiles, Snakes, Lizards Spiders and Scorpions  
Good range of usual and unusual Fish, Tropical and Coldwater  
76 Brighton Road, Harley, Surrey RH6 7JG  
0293 772771

**VIVARIUM TECHNOLOGY CENTRE**  
4 CROSS STREET, SAFFRON WALDEN, ESSEX CB10 1EX, TEL: 0799 513375, FAX: 0799 513804  
Britain's Principal Mail-Order Suppliers of Reptiles, Amphibians, Food, Vivariums and Equipment  
Send 2 x 24 stamps for catalogue  
Vivarium Technology Products from the Company that started it all!

**BOOTH'S VIVARIUM FISHWORLD**  
261 HENEAGE ROAD, GRIMSBY, SOUTH HUMBERSIDE DN32 9NR.  
Tel 0472 346518  
LARGE SELECTION OF REPTILES  
Full range of Marine Tropical and coldwater fish, equipment, books and foods.  
Open 7 days Sun 11 am-4 pm

**REPTILES & AMPHIBIANS**  
Top quality captive-bred specimens available. Stock changing weekly. Please phone for any information, advice, etc. Trade supplied.  
**TRANSCONTINENTAL GOLDFISH CO.**  
c/o HAMPSHIRE GARDEN CENTRE  
Lang Lane, Dilton, Huddersfield  
Telephone: 0484 620460

## Alfred Leutscher

It is with regret that I have recently learnt of the death of **Alfred G Leutscher**. Alfred was one of the group of naturalists who founded the British Herpetological Society in 1947. During the first five years, he was both honorary secretary and treasurer of the BHS. He was also a Fellow of the Zoological Society of London and, for a time, president of the British Naturalists Association.

Alfred Leutscher also wrote several books, including *Vivarium Life — a Manual on Amphibians, Reptiles and Coldwater Fish* first published in 1952. In 1961, a second edition was released which, not only provided important information about the inhabitants of a vivarium, but also described several practical designs (with diagrams) for vivaria indoors and in the garden.

Alfred Leutscher wrote articles for several different magazines and his insight and contributions about plants, invertebrates, fish, amphibians and reptiles will be sadly missed.

# WHAT'S YOUR OPINION

BY BILLY WHITESIDE



The beautiful shoaling Clown Rasbora.



Worth a try: the Five-Banded Barb.

## Latest buys

I recently bought a pair of Clown Rasboras, a species that I had not kept before. As you can see from my photograph, this is a most attractive little fish and seems to be perfectly peaceful.

Clown Rasboras look especially well in shoals and tend to swim in the upper regions of the aquarium water, near the surface. They are colourful and quick-moving fish that deserve to be more commonly kept; they grow to about 3.25in (8.25cm) in length.

Another fish that I added to one of my aquaria recently was the peaceful and attractive little Five-Banded Barb. It grows to about 2in (c 5cm) in length and seems to be quite happy in mixed community aquaria, as well as in shoals. It tends to swim in the middle and lower levels of my planted aquarium. Give it a try if you have not done so already.

## Local Shark

A local pet shop recently had on sale a Red-Tailed Black Shark of about 4in (10cm) in length that had been returned by a customer who was selling his tank.

BILLY WHITESIDE

BILLY WHITESIDE

Often, such sharks are a dull black-grey colour with orangy tail. This specimen was jet black with a lovely bright red tail, so I was happy to pay a little extra to buy him.

**Have you ever had any sharks breed in your aquarium?**



BILLY WHITESIDE

My new strikingly coloured Red-Tailed Black Shark.

## Dusty problem

I'd also be interested to hear what you use on top of your aquarium to keep out dust, and to keep in fishes, heat and moisture. I've always used sheets of glass, but wonder if plastic condensation trays would be as effective.

### What do you do?

I look forward to receiving your opinions in the form of a short letter — or even a postcard. I'll publish your opinions in a future feature.

## Chameleon fish

Mrs Pat Billsborrow, of 15 Shaftesbury Avenue, New Longton, Nr Preston, Lancs, wrote to me about her Goldfish tank. It is 30 x 15 x 15in and houses five Goldfish, ranging in age from three to 20 years.

"The tank is kept in the kitchen because we have run out of space in the living room," she says. "I find it almost impossible to keep the tank tidy-looking, as

the fish are constantly uprooting plants. I find the easiest way is to bunch *Elodea* (Canadian Pondweed) and anchor it under stones. If you just push plants into the gravel, the fish will have them out within a day or two at most. The *Elodea* grows at a fantastic rate, but the fish tend to nibble it and it can end up looking rather bare at the bottom."

Pat continues: "One of the fish, a large, healthy, six-year-old, has changed colour every year. When I bought it it was a bronze colour; then it became black on top and yellow underneath; then yellow all over; then gold-red; and this year, it has gradually changed to white. I have heard of this before but no one seems to know for sure why it happens".

## Dick Mills' latest

I've just received a copy of Dick Mills' latest book: *Eyewitness Handbooks — Aquarium Fish*. Published by **Dorling Kindersley** at £12.99, with a flexible "soft" back, it contains literally hundreds of photographs of individual fish, and details about them. I can thoroughly recommend it. Well done, Dick!

## WHAT'S YOUR OPINION ON THE FOLLOWING STATEMENTS:

- 1 Dried foods are poor substitutes for live foods.
- 2 Tapwater is adequate for the majority of aquarium fishes. It does not need any proprietary chemical products added.

Send me your letters c/o **Aquarist & Pondkeeper**, 9 Tufton Street, Ashford, Kent TN23 1QN.

# TRADE TALK

## Peter joins KB

Peter Webb has joined King British as sales director. Peter has over 20 years' experience in the pet and aquatics trade. Commenting upon his appointment, Keith Barraclough, managing director of King British, remarked: "Peter is well-known and respected in the industry and his considerable expertise will help King British to enhance and further strengthen the company's position in the marketplace."

## Horace Foden dies

Horace Foden, one of the best-known and nationally-respected personalities in the freshwater tropical fish hobby in the fifties and sixties, has died, aged 81.

Affectionately known as 'Horace' by fishkeepers throughout the country, he lived and worked in Huddersfield, and was a major influence in northern aquatic circles in the immediate post-war years. A truly dedicated aquarist, he was considered by many as one of the pioneers of the aquatic hobby. He kept his fish in a 'tank-lined' greenhouse (formerly used for

growing prize cucumbers), and is said to have had up to 30 whiteworm cultures going at any one time (reputed to have consumed 22 loaves of bread per week!) He enjoyed all tropical fish, though his favourites were, initially, Angelfish and, later, Congo Tetras, and people travelled from all parts of the UK to buy his quality stock and to draw on his vast wealth of knowledge.

Horace's hobby eventually turned into a business, B.T. Foden, Huddersfield, formed over 25 years ago and which is run by his son, Bruce.

£1,500 annual bursary scheme for conservation and research projects. The bursaries will go towards a variety of projects, ranging from a conservation programme in the tropical rain forests, to small individual projects.

## Fish foods up

Sales of food for birds and fish increased during 1992, according to a report published by Market Assessment Publications.

In total, says the report, the pet products sector reached £1.4 billion of retail sales, and represents an increase of just 1.4% over the previous year.

"Dog food is still the largest market, taking 43% of sales," says the report. "Sales of food for cats, small mammals, birds and fish performed better; while sales of food for pets other than cats and dogs rose by 11% in 1992."

The Pet Products market sector report covers the markets for cat food, cat litter, dog food, other pet foods, pet accessories, pet treatments and pet treats. Copies are available (price £495) from: Market Assessment Publications, 2 Duncan Terrace, London N1 8BZ.



Peter Webb, newly-appointed as sales director at King British.

## Aquarium Code of Conduct

Ornamental Fish Industry (UK) has issued a Code of Conduct for the manufacture and sale of glass aquaria.

All wholesalers and retailers of aquaria are urged to be fully conversant with the Code, which provides protection for manufacturers and the public, and covers insurance, installation, manufacture and testing.

Full details of the Code are available by contacting OFI (UK) at: Bedford Business Centre, Mile Road, Bedford MK42 9TW. Tel: 0234 355315; Fax: 0234 273550.

## Ministerial praise for industry

Education minister Tim Boswell has praised the ornamental fish industry for its financial support programme for young people.

Full-time courses have been established at Sparsholt College in Hampshire, and the industry provides money and goods to help train young people for all sectors of the trade.

Mr Boswell, Parliamentary Under-Secretary of State for Further and Higher Education, remarked: "Links between industry and education are vital for growth in this country and I am keen to see other business members following this path."

Ornamental Fish Industry (UK) chief executive Keith Davenport, who was instrumental in setting up Sparsholt's courses for the industry, recently announced a



!l0d9q0w9 810503

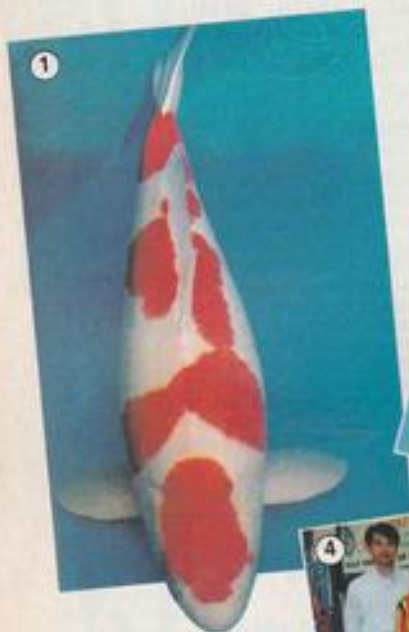


# TOP KOI

of '93

**Nigel Caddock** selects some of the very best fish he's come across in his wide-ranging travels through the world of Koi.

Photographs: Nishikigoi International



4 Show people: Japanese visitor, Mr Ogata (centre) with the Clearwater team at Koi '93, Northampton, UK.

1993 has seen the continually improving standards of Koi keeping of previous years, not just being maintained, but actually being raised to new levels of excellence. During the year, Koi shows all over the world have been the focus of the efforts of Koi enthusiasts keen to show their pets, not only for their own enjoyment, but also to help encourage new hobbyists to become involved at the highest levels.

One of the major benefits I enjoy is the

opportunity to visit Koi shows all over the world. During the past twelve months, I have covered more than 50,000 miles and visited seven countries to see how the hobby of Koi keeping is developing internationally.

One of the things I have found is that as the popularity of Koi keeping continues to develop apace throughout the world, the UK still maintains its position as the second nation of Nishikigoi (the top one still being Japan), and, with a record

number of events having been staged during 1993, the future development of our hobby seems assured.

Koi Shows held during 1993 have seen an unprecedented quality of exhibits so, as the season ends and 1994 beckons, I have great pleasure in offering you a brief look at some of the world's best Koi, from the mountains of Niigata, to the lowlands of the Netherlands. I hope you enjoy seeing these fish as much as I enjoyed taking their pictures.



5



8

1

Supreme Champion at Niigata Noh-gyosai, Ojiya City, Japan. 75cm Kohaku owned by Seitaro Hirasawa.

2

Champion Mature Koi at Aqualife '93, NEC, Birmingham, UK. 66cm Sakai Ai-Goromo owned by Grant Clifton.

3

25th All-Japan Combined Nishikigoi Show, Tokyo, Japan. This is the Supreme Champion, an 85cm Sanke owned by Shinji Matsumoto.



6



9

5

U.K. Dealers Show, Telford. The Supreme Champion was this 70cm Sanke owned by Eric Sida.

6

Nishikigoi Vereniging Nederland 1st Show, Arcen, Holland. This is the Hobbyist Supreme Tategoi Champion, a Showa owned by Warnier Kraut from Germany.

7

This 55cm Shiro Utsuri — a very good fish by any standard — was among the 'losers' at the All-Japan Show . . . which goes to emphasise the unbelievably high quality required from the winners!



10

8

Another Supreme Champion Kohaku. This time it's a 70cm specimen owned by Keith O'Riley and exhibited at the BKKS South East Section Open Show, Bromley, Kent.

9

The Supreme Champion at the Northern Koi Club 1st Open Show, Cheshire, was this impressive Showa owned by Stan Collinge.

10

Show people: Golfer and keen Koi keeper (and winner) Mark McNulty and son Matthew photographed at the BKKS South Eastern Section Show.

## FBAS helps avoid date clashes

To help societies avoid clashing dates when organising shows, FBAS support officer Paul Corbett is 'available' to all UK societies.

Paul's aim is to help maximise support by providing information, wherever possible, on possible clashes of proposed event dates. The message from Paul is simple: "Tell me what dates you have booked, or ask me which dates to avoid, but please do so as soon as possible so that I can issue a definitive list in the New Year." (Paul asks that you should keep 22-24 April clear — these are the dates of his own society's Grocklemania '94, at the Isle of Wight AS.)

Contact Paul Corbett, The Orchard, Gatcombe, Isle of Wight PO30 3EF. Tel: 0983 721246 evenings.

## Lakeside '94

The Mini-Reef Society is organising a major event to boost funds for London Zoo Aquarium (see also this month's News Desk).

The exhibition, entitled 'Lakeside '94', will take place on 27-30 May 1994 at the Canal Suite Exhibition Hall, Frimley Green, Camberley, Surrey. The organisers promise a fun weekend for all to enjoy, covering the range of fishkeeping, from ponds to marines, as well as reptiles.

It will also include seminars in a 100-seater suite, fish exhibits, and sales of fish in a specially-constructed marquee by the lake, together with craft fairs, fashion shows, celebrities and a stand from London Zoo.

Facilities at Lakeside include a 90-bedroom luxury hotel and free car parking for 1,000 cars. Admission to the event will be £1.50 for adults, 75p for children and OAPs. Three-day tickets will also be available at £3.00 and £1.50.

For information, contact: Peter Newman, The Mini-Reef Society, 55 Burrell Road, Frimley, Camberley, Surrey GU16 5EA. Tel: 0276 23728.

## Welsh exhibition and show

The Newport Centre, Newport, Gwent, was the venue of this year's Welsh Fishkeeping

# SOCIETY WORLD

Exhibition and Welsh Open Show, the first in Wales for over 15 years and organised by delegates of clubs affiliated to the Cymru National Aquarists Association, from Aberdare, Cardiff, Llantwit Major, Merthyr, Selective, Valley and Port Talbot.

Over 800 people attended the show, which was supported by 'Aquarian', whose senior consultant Dr David Ford presented lectures on Fish Nutrition and Fishkeeping Around the World. A talk on the Dutch Aquarium was also presented by

Shaun Yallup of Ocean Aquatics; while FBAS presented their 'water garden' display and information stand, and Clive Palfrey and Richard Perkins provided information on setting up an aquarium, supplemented with a display of antique fish-keeping apparatus.

Over 400 fish were exhibited, and the major winners were as follows:

### FBAS Championship Class

**F:** J. Hill, Salisbury, *Corydoras triseriatus*.

### CNAA Championship Class

**F:** J. Hill, Salisbury, *Pseudacanthicus leopardus*.

**Best Coldwater Fish:** Paul Corbett, Isle of Wight, Fantail Goldfish.

**Best Fish in Show:** S. Hunter, Nailsea, *Pseudacanthicus spinosus*.

## Speaker offer

BioPlast (UK) has offered aquatic societies throughout the UK support for their local shows. Bert Gesting, chairman of BioPlast (UK), commented: "Clubs are the backbone of our hobby and, sadly, are very often much underfunded. We have, on many occasions, donated a variety of our products for raffle prizes and so on against advertising, and this helps to boost club funds."

"I would also suggest that more local aquarium shops become actively involved as members of the clubs and hand out membership forms with every new aquarium set-up they sell. I am convinced that every newcomer to the hobby would benefit greatly by attending club meetings, or by simply talking to experienced fellow members. This is far better than being isolated in the wilderness and making costly mistakes."

For further information, contact: Bert Gesting, BioPlast (UK) Ltd, Unit 1, Old Railway Goods Yard, Kildwick Crossing, Crosshills, Keighley, West Yorks. BD20 7DA. Tel: 0535 630230; Fax: 0535 633690.

## BCA President dies

Dr Ethelwyn Trewavas, long-standing president of the British Cichlid Association and authority on African Cichlids, has died, aged 92.

She was affectionately known as 'ET' by her friends and colleagues — long before Spielberg was ever heard of — and she will be best remembered for her books and papers on African Cichlids, and her work on tropical marine fishes.

Dr Trewavas was born in Penzance, Cornwall, at the turn of the century. In 1917 she entered Reading University College and, after graduating, moved to Kensington, where she pursued a career as a science teacher. She regularly visited the British Museum (Natural History) to further her studies and thus came to the attention of its director, another famous taxonomist, Dr Charles Tate Regan, whose assistant she became.

Thus began a career in ichthyology which lasted officially until her retirement in 1961. She produced no less than two major books after her 80th birthday and, despite falling eyesight, continued to work and to make occasional visits to Africa to study cichlids.

She was well-known for the encouragement she offered to colleagues and associates; she was the first ichthyologist to recognise that serious aquarists have a major contribution to make to scientific knowledge in that they are able to make detailed observations of the coloration and behaviour of living fishes, whereas taxonomists deal largely with discoloured preserved material.

Dr Trewavas was president of the British Cichlid Association from its early years until her death, attending its meetings and contributing to its publications, as well as befriending any member who showed any inclination towards scientific study.



Ian Watson, chairman of the British Cichlid Association, presents Dr Ethelwyn Trewavas with a bouquet to celebrate her 90th birthday in 1990. MARY BAILEY

## Diary date

### SUNDAY 5

Northern Area Catfish Group (CAGB) — Grand Auction at the Boys Brigade HQ, Bryn Road, Bryn, Nr. Wigan. Booking: 1.30pm; start: 2pm. Raffle, refreshments, information stand, etc. Details from J.T. Morris: 0942 42385 or S. Pyle: 0942 861521.

Aerial view of the Witt River valley in the Baviaanskloof wilderness area.

# SOUTH AFRICAN KURPERS AND ROCKIES PART I *A Special Wilderness*

David Armitage visits South Africa in the latest leg of his long-running search for African Labyrinthfishes.

Photographs by the author.

The Cape is renowned for its endemic fauna and flora. All kinds of species have got cut off here. The Cape floral kingdom usually springs to mind first, but there are equally unique fish, including two of the least-known Anabantoids (Labyrinthfishes), of the genus *Sandelia*, which gets its name from a former chief of the Gaika branch of the Xhosa, Sandile.

After many years of wondering about these fish, I decided that the only thing to do was to tackle them in their own habitat, so in February 1992, I set off for the Cape. Cape Town was cool, 14°C (57°F), cloudy and damp when I arrived after the 12-hour flight, and I hurriedly transferred planes for the one-hour hop to Port Elizabeth.

I landed at midday, with the temperature already climbing into the high 20s°C (80s°F). The following morning, my air-conditioned Toyota Corolla was delivered and I drove down the excellent N2 to meet Dr Jim Cambray, my long-time correspondent at the Albany Museum, Grahamstown.

I found it difficult to concentrate on the road, what with the rows of Glossy Starlings on the telegraph wires, a Black-headed Heron in the grass verge and, at the top of one rocky rise, a troop of baboons striding across the road in a very leisurely manner.

At the Albany Museum, I met Jim at last and, in his laboratory, there was a display of the two endemic species. I had come to see *Sandelia capensis* (the Cape Kurper) and *S.*

*baixii* (the East Province Rocky), as well as *Ctenopoma intermedium* (the Blackspot Climbing Perch) from the Okavango, plus some of the endemic minnows.

Jim very quickly had my itinerary organised, suggesting a three-day camping trip to *S. capensis* country first, followed by a trip to East London to see a local variant of *S. baixii*, leaving a trip to the Blaauwkrantz reserve of *S. baixii* last, so that there would be less chance of me spreading the South American Fairy Moss floating pest weed, *Anolla filiculoides*, to unaffected areas.

Because of its vulnerable status, it was forbidden for me or other aquarists to export or even fish for *S. baixii*, but I was more than grateful just to be given the opportunity to see it in the flesh.

## Witt Valley idyll

Early the next day, we headed back down the N2, past Port Elizabeth, before turning right towards Loerie. Our destination was the Baviaanskloof Wilderness area where Jim intended to show me a pristine habitat of the Cape Kurper. Here, there are six types of veld: fynbos, valley bushveld, spekboomveld, grassland, Karoo shrubland and evergreen forest remnants. En route, we visited the Nature Conservation Offices to gain our permit.

Afterwards, the tarmac road soon ran into

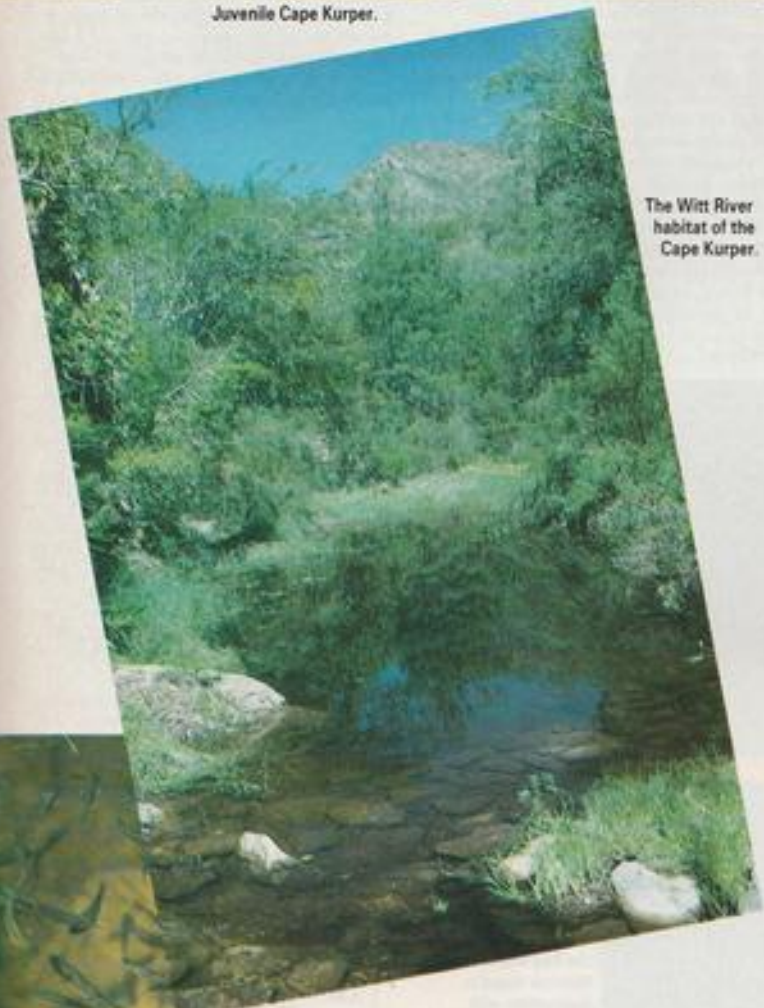
a gravelled surface and, before long, more baboons were glimpsed crossing the track. Just below a weir, in the river below, Jim instructed me to pull cautiously in and we had a glimpse of the wary Hammerkop Stork. In the cliffs above, were the collapsed remnants of their mammoth nest.

Now we began to drive slowly along by the river, catching a glimpse of a pair of Pied Kingfishers, before we pulled over into a shady area where Jim showed me my first *S. capensis*, holding station in the clear water, in





Juvenile Cape Kurper.



The Witt River habitat of the Cape Kurper.



Cape Kurpers and Red-finned Minnow photographed in our 'lunch-side' stream.

## THE CAPE KURPER FACT FILE

### 1 VITAL STATISTICS

*S. capensis* is known as the Cape Kurper. It is found from just south of the Olifants River (north of Cape Town), in the coastal drainages of the Cape as far as Port Elizabeth. The largest reported specimen is 215mm (8.5in), but they start breeding at a size of 52mm (2in).

The body colour and pattern can vary somewhat, so that the well-marked variant from Port Elizabeth was erroneously described as *S. vicinus*. The shape of specimens also varies, and larger specimens from some localities may develop a blunt, rounded snout. This may be correlated with lesser body depth and be more noticeable in alkaline waters, while fish from acid waters may have deeper bodies and pointed snouts.

### 2 DIET

The Cape Kurper feeds along the edges of both rivers and lakes and, although it mainly eats aquatic insects, it can also be a voracious predator, or browse on vegetation and detritus. Unfortunately, it can also form the diet of introduced fish such as Large- and Small-mouthed Bass and Tilapia.

### 3 SPAWNING

In the de Hoop Lake, spawning occurs in two distinct periods; mid-spring and mid-summer when the temperature is 20.5°C (69°F) or above, with older fish spawning earlier than yearlings. In the western area of their distribution, they may spawn in the spring, after the floods abate, while otherwise, they may spawn when the winter rains restore suitable conditions. Other observations in the east, describe continual spawning throughout the summer.

When spawning, the males become dark-coloured and they appear to hold territories. The female is much lighter and the pair circle and apparently embrace about 15cm (6in) from the base.

After spawning, the males become light-coloured and guard the scattered, adhesive eggs where they have fallen, sometimes among roots, or otherwise, on the bare gravel bottom. They also continue to defend the fry, which have adhesive head patches and hatch after 40 hours at 22-24°C (71.5-75°F), for a period.

There is no evidence that males mouth or fan the eggs or do anything but deter fry predators by their presence. It is at this time that the guarding males are especially vulnerable to large, introduced predators, such as Bass, which have eradicated them from several habitats.

contrast with the Red-finned Minnows, which swarmed everywhere. It was sad to see the dreaded Fairy Moss (*Azolla*) occupying a restricted area of the stream in an area sheltered by large boulders. Even in this nutrient-poor water, they gain nourishment by putting roots in to the substrate.

Our 'camp-site' was a little further on, well back from the track and by the side of one sunlit pool of the stream. As we pulled in, a Water Monitor (Leguam) rushed noisily away up the almost vertical slope, while a large water buck moved more cautiously

## NEAR-RELATIVE COMPARISONS

The main difference between the Bushfish (*Ctenopoma*) and the Kurpers and Rockies (*Sandelia*) is that the latter have a very simple labyrinth organ, the simplest of all the Anabantoids, in fact — although this doesn't necessarily imply the most primitive.

This may be because the accessory respiratory function is not so important in their habitats, although they can live in acid, stagnant waters similar to those of their Asian or Central African relations. Perhaps to compensate for the loss of buoyancy, *Sandelias* have prolongations of the air bladder in comparison with *Ctenopoma*. They have a non-serrated sub-operculum ('inferior' gill cover) with only two opercular spines, while *Ctenopoma* has many more. The scales of *Ctenopoma* are ctenoid, while those of *Sandelia* are cycloid.

away, at a right angle, through the brush.

We lunched by the pool which turned out to have a high density of *S. capensis*, along with *Pseudobarbus afer*, a Red-finned Minnow. Both were happy to take pieces of lunch-time sandwich crumbs, which drew out even larger specimens from their hiding places under the stones, although only the juveniles fed at the surface.

The water was crystal clear, which allowed us to see the fish perfectly, the light catching the flanks of the minnows as they picked at

the stones. However, Jim pointed out that the base of the pool was covered with red dust, washed down from the road, instead of the white quartz gravel. This may interfere with the development of the fish eggs, which develop in well-oxygenated water between the stones. Above the stream, a Half-collared Kingfisher flew busily back and forth, intent on its own business.

After lunch, Jim strode up the stream, toward the source, while I laboured behind, wheezing noisily. Jim was horrified to note that one previously-deep, open pool had been almost completely silted up with a huge bank of red sand from the road. On the way up, I found a *Streptocarpus* (relative of the African Violet) growing in the woody shade, but was relieved to find a beautiful 'mermaids' pool' at the end of our walk. I needed no persuasion to strip off and dive in!

Back at our campsite, we found there was just enough room for two detached canvas dwellings, pitched tent and enjoyed our chops, barbecued over wood with a few bottles of Castle Lager to help them down. I greeted the morning with my usual bronchitic wheezing and was answered in kind by baboons sitting high on the rock face above, where they doubtless lodged for the night.

After a breakfast of rusks, dunked in coffee, I set up my photographic tank, which had survived the air journey, and considered the fishes' habitat. The descending stream ran quite swiftly in parts, often between large boulders, but the flow was very slow where it broadened out to form a pool; at the side,

there were floating 'lily' pads and grasses growing into the water. The temperature was 19.5°C (67.1°F), the pH 6, and Jim assured me that the hardness was negligible.

A few crumbs brought a group of greedy fish to the surface and the first dip of the net procured some Cape Kurpers and a minnow, which were photographed at great length, by both of us, before being returned to the pool, none the worse for wear. Just one Bass in the pool, Jim warned, and there would soon be none of these lively, indigenous species.

## Paintings and ladders

With tents packed, we then continued on up the valley, out of the forest and into the rocky Fynbos with Proteas (Sugar Bush) and giant Cape heathers. On the plateau, we passed under the watchful eyes of Jackal Buzzards perched on the telegraph lines.

As we descended, Jim asked me if I was interested in Bushman (San) art and after a couple of fruitless scrambles, we found the site, previously located by an archaeologist colleague of Jim's, under a rocky overhang with one beautifully detailed (and explicit!) human figure and some more obscure marks. I photographed these warily, as a large swarm of wild African bees was buzzing angrily overhead, rather too close for comfort.

After a few more ascents and descents, the track eventually ran level across the flood plain, which Jim cheerily informed me could easily cut us off for several days in the unlikely event of a storm. As if to prove the point, the river crossed the road at several points, as did a couple more baboon troops and my first Vervet Monkeys.

We stopped briefly to photograph the fully open flowers of the Cape Water-lily, *Nymphaea capensis*. Sadly, only alien *Tilapia* swam here. The end of the day saw us safely ensconced in the huts at Geelhoudbos, with beds, electricity, tapwater and a fridge!

Here, there is a small fish ladder, constructed for the minnows, which otherwise would have been cut off by the dam built to supply the camp with water.

Thus ended my first and only camping trip to the no-longer-quite-pristine, but nevertheless idyllic, isolation of *S. capensis* habitat in the forested highland stream habitat of the Witt River in the East Cape. It's a memory that I will cherish and I hope that the habitat, as well as the memory, will remain.

(TO BE CONTINUED)

For further information on Anabantoids, send an SAE to T Groom, AAGB, 12 Pinfield Road, Barnby, Doncaster DN3 1QT.

## COMING UP NEXT TIME

In the next instalment, I will be looking at the Eastern Province Rocky and the attempts being made to save it from extinction.



Adult Cape Kurper photographed at the Jonkershoek Aquarium, Stellenbosch, in the company of a much larger Whitefish (*Barbus andrewii*).



*Pseudobarbus afer*, the Red-finned Minnow found in association with the Cape Kurper.