

SEPTEMBER 1988

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# AQUARIST

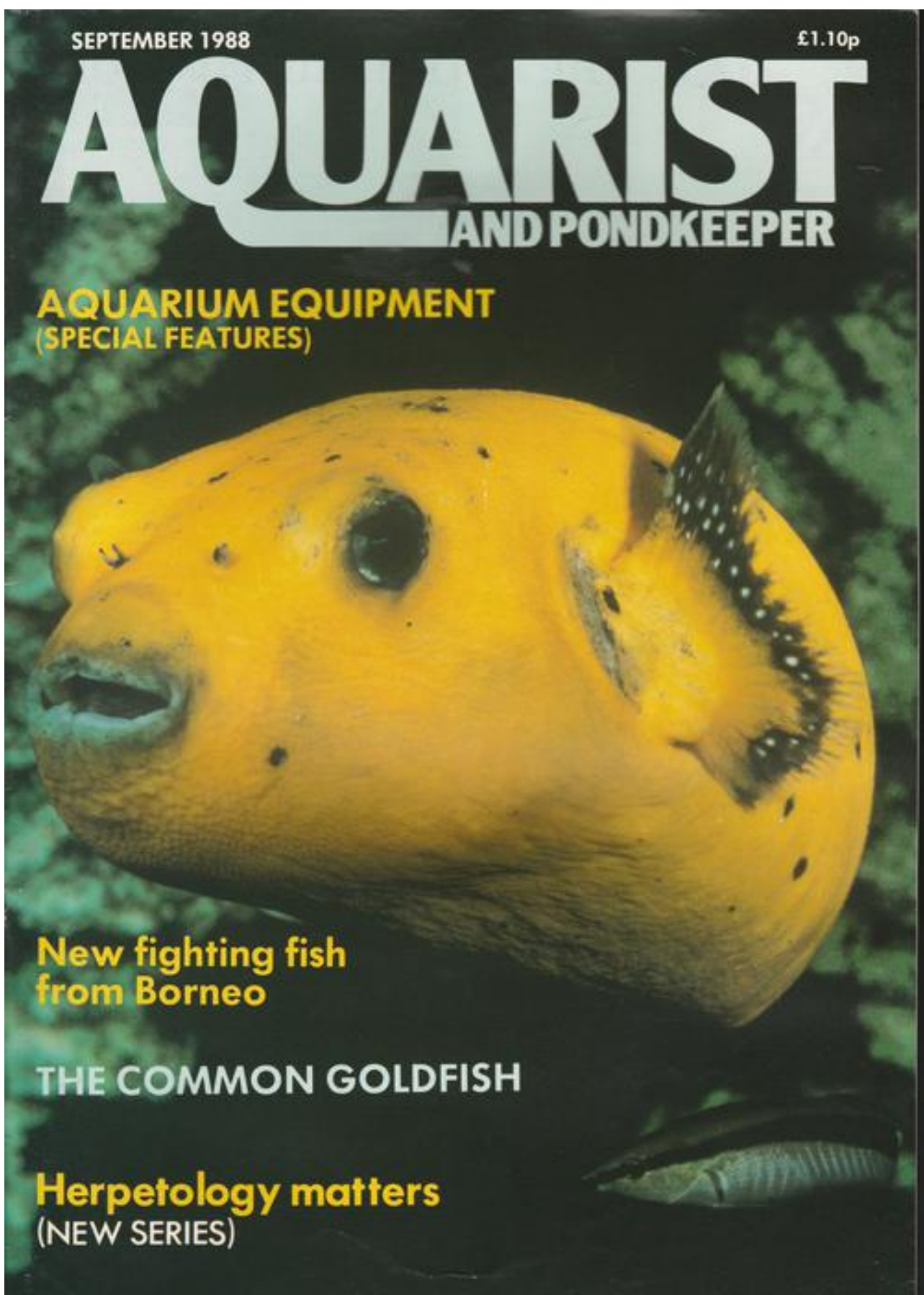
## AND PONDKEEPER

**AQUARIUM EQUIPMENT**  
(SPECIAL FEATURES)

**New fighting fish**  
**from Borneo**

**THE COMMON GOLDFISH**

**Herpetology matters**  
(NEW SERIES)



# AQUARIST AND PONDKEEPER

SEPTEMBER 1988  
VOL. 53 NO. 6

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## COVER STORY

(Photograph: *Arend van den Nieuwenhuizen*)

*Arothron nigropunctatus*, the Black-spotted Puffer, is a fish of many faces. Specimens can be virtually all yellow (as the one in our cover photo — sometimes referred to in the literature as *A. citrinellus*), yellow with numerous black spots, grey with virtually no spots, grey with spots (with or without a dark muzzle-like patch), half yellow/half grey ... or any one of numerous other combinations.

No doubt, the wide distribution which the species enjoys in tropical seas must have been a major contributing factor influencing the evolution of so many forms. Whatever the colour, *A. nigropunctatus* is an interesting fish better suited to the experienced marine aquarist.



Herpetology matters ... to some more than others. What's your view? (Photograph: John Dawes)

## HERPETOLOGY MATTERS ... TO DIFFERENT PEOPLE IN DIFFERENT WAYS

Great news! At last! Can't wait! These, and other similarly encouraging comments followed the announcement in our July editorial that we were launching a regular series for reptile and amphibian fans, starting this month (see the first installment of *Herpetology Matters* from Julian Sims, inside).

Still, you can't please all the people, all of the time, as they say, and one letter reflected this in no uncertain manner. The writer complained that the *Aquarist & Pondkeeper* was a fishkeeping magazine, not a herpetological one. He went on to say that he didn't cherish the idea of buying an *A & P* which had 30% of its editorial pages dedicated to herpetology. He was using our July issue as his example.

The truth of the matter is that *A & P* will not be made up of 30% herpetology and 70% ichthyology. The July issue, which carried a substantial herpetological content, was something exceptional in that it focussed on amphibians and reptiles ... in exactly the same way as other issues have carried several *Focus* articles on, say, invertebrates, Goldfish, health and other subjects ... or this one, with its *Focus* features on aquarium equipment (see below).

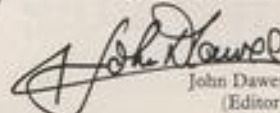
Nevertheless, there will be more herpetological articles than in the past — something that appears to be welcomed by all of those readers (minus one) who have expressed their views. It would be a mistake, though, to think that this will lead to a reduction in our "fish" content. In fact, our larger editorial package means that there will actually be an increase in the number of fish articles ... along with a corresponding increase in other types of articles as well. After all, despite what some people think (or wish), there are other aquatic organisms around (including plants and invertebrates, to name but two) ... as well as other aquatic topics that warrant our attention.

Take, for instance, our *Focus* features this month. Written by leading writers, Dick Mills, Dr David Ford ('Aquarian') and Dr David Pool (Tetra), they deal with the principles behind those all-important subjects: aeration, filtration, heating and lighting. So, if you want to know what CRI (Colour Rendering Index) means, or how a thermostat works, or what is meant by reverse-flow filtration, take a look at these articles ... they contain the answers to these, and many other, fundamental questions.

And, before anyone begins thinking that three articles on equipment means that we've cut down on our fish component, a glance down our contents list should prove otherwise.

Some of the features we are carrying, such as Stephen Smith's piece on the Common Goldfish, have arisen directly from requests from readers. The same goes for Andy Horton's native marine article on British Anemones ... and for *Herpetology Matters*, of course. Not only does herpetology matter ... so do the views of our readers. Keep them coming!

See you at the British Aquarist Festival, at G-Mex, Manchester, on 10-11 of this month.

  
John Dawes  
(Editor)

## CONTENTS

### MARBLES ARE A MUST?

Murder, mystery and suspense in Amanda Grimes' aquarium. **5**

### UNUSUAL PLANTS FOR THE AQUARIUM

An out-of-the-ordinary selection from Barry James. **12**

### SPOTLIGHT: ANGELFISH

Most people love them — some hate them — David Sands believes they are great. **18**

### THE COMMON GOLDFISH — NEVER SO HUMBLE

Stephen Smith takes a personal look at the world's best-known pet. **26**

### INTRODUCING: THE AUSTRALIAN DESERT GOBY OR GUDGEON

Bill Tomey's personal experiences with this small and easy-to-keep newcomer. **30**

### FOCUS ON AQUARIUM EQUIPMENT

#### LIGHTING UP

Dr. David Pool puts forward some switched-on illuminating thoughts on this huge topic. **40**

#### A BREATH OF CLEAN WATER

Dick Mills sieves through the dirty water. **45**

#### HEAT THAT WATER

A revealing insight into aquarium heating methods from Dr. David Ford. **49**

#### EDITH'S FIGHTING FISH

An introduction to this exciting mouthbrooder — courtesy of Stephen Clark. **55**

#### A FRESHWATER ANEMONE CALLED HYDRA

Andrew Grant is a Hydra fan ... are you? **60**

#### SEA ANEMONES OF THE BRITISH SHORE (PART I)

Andy Horton presents the best of British coelenterates for native marine aquaria. **62**

*Herpetology Matters* (NEW SERIES): 7. Books, 9. Letters, 15. News, 21. Seaview, 29. News from the Societies, 33. Diary Dates, 33. Your Questions Answered, 36. Out & About (Show Reports), 52. Koi Talk, 67. Product Round-up, 70. Coldwater Jottings, 74. Next Month, 24. Cartoons: Derek, 66. Fred the Piranha, 67.



# MARBLES ARE A MUST?

It started with marbles . . . and ended with a monster attached to the tip of a forefinger! Intrigued? Well, perhaps — but not surprised, going by Amanda Grimes' earlier experiences!

**T**his is a story of murder, mystery and suspense . . . It did not begin as such, but as one of my straightforward attempts to breed fish. Well, as straightforward as any of my attempts are . . .

Perversely, the story starts with suspense. We had ensconced a pair of Kribensis in a two-foot breeding tank. When they failed to lay eggs, we added some Rosy Barbs, having read that a small shoal of fish would help them settle. After about a week, it became obvious that this was not having the required effect and we removed the Kribensis. Why the Kribensis? Because the Barbs were showing all the signs of imminent spawning!

Once more referring to our Encyclopaedia, we were advised that egg-scatterers should be bred in a tank furnished with either lots of fine-leaved plants or marbles! The latter were for the base of the tank, so that the eggs would drop among, thereby ensuring that their cannibalistic parents could not finish their spawning with an instant meal.

Transferring the fish to a bucket, I removed all the gravel while Colin went out to find either *Cabomba* or marbles. He returned to say there was no *Cabomba* around at the moment, but here were some marbles . . .

Three hours — and about £6 later — we had still failed to cover the base of the two-foot tank with marbles! You might at this point wonder why we didn't use a smaller tank. Fair enough comment — but our smaller tank was occupied.

Our faith in marbles was, by now, at a very low ebb. All the local shops had had an unprecedented run on marbles and we gave up the idea. Colin went further afield to find *Cabomba*. By the time he triumphantly returned with a large bunch, the Barbs had spawned in the bucket and eaten the eggs . . .

As we wearily replaced the second of our breeding failures in the community tank, we noticed that our pair of Dwarf Gouramis were showing a great deal of interest in each other. The male had always been a jerry-builder of the first order and we glanced from him to the *Cabomba* and back again. Third time lucky?



A Dragonfly nymph — was this the evil monster that attacked Colin's finger?

Once more the tank was set up — out came the marbles, in went gravel and *Cabomba* — and a pair of Gouramis.

The male, inspired by the fine leaves of the *Cabomba*, became so flamboyant in his building that he had covered about a third of the surface with a deep bubble nest before the lights went out for the night. The next day, I watched an enthusiastic pair of fish produce a large batch of eggs. As soon as the female lost interest, I was in with the net, gently removing her from any danger.

Over the next few days, I watched his antics with great interest. He fussed about the nest, puffing and blowing, pushing and shaping. The eggs finally hatched and the fine plant was soon infested with tiny black

fry.

I have never read of male Gouramis eating their young and it therefore came as a shock when Colin pointed out that the number of fry was dropping — his eyes are better than mine. We wondered whether he had been disturbed by my lowering the water level in the tank, to accommodate the youngsters. So out he came.

Another day passed — by now we could almost count the fry. They were disappearing. We looked out a magnifying glass and scanned the gravel and surface for bodies — nothing. The water was sweet and unpolluted; there was only a very gentle sponge filter in the tank and the temperature was correct. So what was going wrong?

Within two days the fry were no more. Resigned to yet another failure, I was busying myself with the community tank when a very colourful cry went up from Colin, who was still investigating the breeding tank. I looked round to find him staring at the tank in horror.

"What on earth is the matter with you?" I asked, somewhat impatiently. "Look, I don't really relish doing this, but come over here a minute and watch carefully," he said. "There's something in there and I want to know if you see what I saw". He bent over the tank and very gingerly poked a finger just beneath the water. He didn't look at all happy . . . And in the next second, I could see why.

It wasn't that this vicious predator was big — it was no more than an inch long, very thin (like a new twig) and green. What was so horrific was the speed with which it appeared . . . and homed in on its target, Colin's finger. It was like a torpedo. Sick with such blind ferocity, I stood back. And while I stood back, Colin wrenched his hand from the tank, with the evil still attached and demolished the monster so efficiently that there was nothing left to identify. I would be very interested if anyone knows what this was from the above, rather ineffectual, description. We can only presume that it was introduced with the *Cabomba*. Was it a dragonfly larva? One final word — those expensive marbles are a must . . . They make a terrific coarse medium for filters!



# Herpetology matters



By Julian Sims

I was delighted to be asked by John Dawes if I would write a regular monthly series devoted solely to a subject I have been enthusiastic about for nearly thirty years — reptiles and amphibians. I had no hesitation in accepting his invitation. What an exciting project: **Herpetology Matters**. A page which will include practical information on how to maintain reptiles and amphibians successfully, tips to encourage captive breeding, and details about biology, conservation and legislation — national and international.

This last point is an area of particularly rapid change. Species which have been imported throughout the 60's, 70's and early 80's are no longer available as "wild caught" animals. Individual countries, including Australia, Greece and Colombia have for many years totally restricted the legal exportation of their native reptiles and amphibians. However, international agreement between signatory countries of the Washington Convention on International Trade in Endangered Species (CITES) now strictly limit the availability of a great many species, especially from Europe.

Lack of "wild caught" specimens emphasises at least one of the important reasons for breeding animals in captivity. Without the availability of suitable species of reptiles and amphibians for indoor or outdoor

collections, interest in herpetology will not continue to develop — especially without the recruitment of questing teenagers or dedicated aquarists. I wonder how many cold-water specialists, tropical enthusiasts, or marine experts have started a tank of North American terrapins, European salamanders or aquatic toads from Africa, only to become so enthralled that a parallel fascination for herpetology has developed.

As "wild caught" specimens become less readily available, captive-bred animals offer many advantages including (i) hardy, disease-free stock, already adapted to captivity, (ii) lack of stress imposed by a long journey during importation (perhaps halfway around the world), and (iii) no problem as to the depletion of wild populations.

With such a broad spectrum of topics to report on, I hope that everyone, from experienced herpetologists to absolute beginners, will find something of interest in this and future pages of **Herpetology Matters**. Your participation is also most important. Please write in to *Aquarist and Pondkeeper* with your questions, anecdotes and experiences.

## Village Life

Isolated tortoise populations in the Mediterranean countries of Europe are in real danger of extinction. The reason for this problem — habitat destruction, mainly caused by changes in agricultural practice and forest fires.

In 1981, the International Union for the Conservation of Nature/Species Survival Commission (IUCN/SSC) Tortoise Group began a two-year survey of Hermann's tortoise (*Testudo hermanni robertmertensi*) in southern France, particularly in the forested hills of the Massif des Maures.

This field work drew attention to the plight of "the French tortue" and enthusiastic local residents, regional government and conservation groups all helped in the development of SOPTOM (the Station d'Observation et de Protection des

Tortues des Maures). Since its formation in May 1985, SOPTOM has been given land by the town council of Gonfaren and, with financial assistance from the World Wildlife Fund, France, and other donations, a "tortoise village" has been built with the help of volunteers and is now open to the public.

It is intended that the village will become an education centre — a focal point of interest and information for local residents with displays for school children and research opportunities for visiting herpetologists.



Hatchling *Testudo hermanni* in a greenhouse. Tomatoes are a favourite food.

The tortoise village has been built in open oak woodland and has incubating facilities for eggs, nurseries for juveniles and day and night enclosures to complete the captive breeding arrangements for adults.

It is thought that there are probably more tortoises living in private gardens in southern France than currently survive in the wild. Most of these tortoises have been collected individually by day-trippers picnicking in the hills of the Massif. Hopefully, as the reputation of the village increases, people will be induced to return their "pet" tortoise. SOPTOM's captive breeding project will use these "returns", if genetic tests of blood samples confirm they are definitely of French origin. Certainly, breeding tortoises in captivity is a relatively easy process (see *A & P* August 1987).

Sponsorship details (either for tortoises or for village buildings) can be obtained from: SOPTOM, c/o 84 Westbourne Park Villas, Bayswater, London W2 5EB. Please enclose a stamped addressed envelope.

The success of this project should lead to similar ventures being organised to have other isolated tortoise populations in eastern Spain, western Italy and on Sardinia.

## Autotomy

The majority of herpetologists who keep lizards will have, at some stage, tried to catch one of their reptiles which was rather more agile than they had anticipated. The lizard starts to run away; thus, instead of being picked up by the main part of the body, the tail is held. The result — a demonstration of the lizard's escape mechanism, AUTOTOMY.

The term means self-mutilation; in this example, the self-amputation of the tail. In particular, most geckos are very good autotomisers. Autotomy in lizards greatly increases their chances of survival when attacked by a predator in their natural environment. The lost tail continues to squirm and distract the enemy while the lizard makes good its escape. In some species of lizard the tail is more brightly coloured than the rest of the body so as to confuse a predator further. Examples have even been observed where a frightened lizard will lose its tail before being seized by an aggressor.

Autotomy is brought about by contraction of the muscles in the tail. The contraction actually snaps a bone of the tail (a vertebra) along a line of weakness known as a fracture plane. Yes, fracture planes nearly always pass through the bones of the tail and not between them. The tail breaks off just in front of the point of seizure.

The lost tail is usually regenerated. However, the degree of replacement differs from species to species, and the regenerate is never as good as the original.

Some groups of lizards are not active autotomisers and use their tails for other purposes. For instance, Monitors use their tails for defence by thrashing them from side to side aggressively if threatened, while Chameleons use their tails for anchorage, the tail being flexible enough to allow it to be coiled around a twig or branch.

# Books

## An Introduction to Marine Ecology (Second Edition)

By: R. S. K. Barnes and R. N. Hughes  
Published by: Blackwell Scientific Publications

ISBN: 0-632-02049-0 (Clothbound)  
0-632-02047-4 (Paperback)  
Price: £30.00 (Clothbound)  
£14.95 (Paperback)

More and more marine aquarists are becoming interested in the "science behind the hobby". Consequently, an ever-increasing number are becoming conversant with the principles regarding predator/prey relationships, ecological balance, planktonic organisms (including larval stages of fish and invertebrates) and so on.

To these aquarists, *An Introduction to Marine Ecology* will prove an extremely useful publication. This excellent book is written by two academics, both of whom possess the rare gift of being able to present sound scientific information in an extremely readable form.

Don't expect a picture book — if you do, you'll be disappointed. In fact, the few black and white photographs featured are not particularly brilliant (though important). However, there are numerous well-designed and presented line drawings which convey their particular bits of information much better than any photograph can.

The main chapter headings are:

1. The Nature and Global Distribution of Marine Organisms, Habitats and Productivity.
2. The Planktonic System of Surface Waters.
3. The Benthos of Continental Shelf and Littoral Sediments.
4. Salt-marshes, Mangrove-swamps and Sea-grass Meadows.
5. Rocky Shores and Kelp Forests
6. Coral Reefs
7. Pelagic and Benthic Systems of the Deep Sea
8. Fish and Other Nekton
9. Ecology of Life Histories
10. Speciation and Biogeography
11. The Marine Ecosystem as a Functional Whole
12. Human Exploitation and Interference

While Chapters 5 and 6 jump out as appearing to be the most relevant from the aquarists' point of view, it is worth remembering that this is not an "aquarium-type" book. We are dealing with concepts and principles which, directly or indirectly, impinge on the hobby. As the title to Chapter 11 so aptly illustrates, we are dealing with a "functional whole". And this "whole" is a fascinating one which all aquarists, in my opinion, should be familiar with.

I therefore warmly recommend this interesting, educational and comprehensive book ... if not for every individual hobbyist to have in his/her possession, then certainly for every society to have in its reference library.

John Dawes

## An Interpet Guide to Tropical Aquarium Fishes

Compiled by: Dick Mills (with David Sands and Dr. Peter W. Scott)  
Published by: Salamander Books Ltd.  
ISBN: 0 86101 387 5  
Price: £8.95

Part of the first *Interpet Guide* series, which is still going as strong as ever and is, in fact, expanding, will welcome this first "second-generation" Guide. So will a lot of other people.

As far as value for money is concerned, this latest publication is certainly every bit as good as the smaller guides and, at £8.95 for 100,000 words, 320 pages, 350 colour photographs and 75 practical diagrams, you'd be hard pushed to find a better bargain anywhere.

*Tropical Aquarium Fishes* is partly based on earlier successful Salamander titles, has been compiled by Dick Mills, and

includes material from two other well-known authors, David Sands and Peter Scott.

The text is divided into six parts: Practical Section, Popular Aquarium Fishes, Central American Cichlids, African and Asian Catfishes, South American Catfishes, and Live-bearing Fishes.

The somewhat confusing (and incorrect) text on water hardness (p.36) notwithstanding, the Practical Section is, as expected from Dick Mills, full of useful, important advice, presented in a highly professional and digestible manner.

Elsewhere, the book also lives up to most expectations, with a few exceptions. The text is generally sound, the layout attractive and the photographs, almost invariably, of a very high quality, making the book a delight to read, look at, and handle.

As ever, there are a few niggling things here and there. For instance, *Pseudotropheus auratus*, the Malawi Golden Cichlid, should be *Melanochromis auratus*; *Chirodon axelrodi*, the Cardinal, should be *Parachanna axelrodi* (NOT mistakes from the author... I've checked! — merely a case of using already-existing film); Odessa Barbs are not newcomers (I saw my first one over ten years ago); the Platy on page 193 is not a *Xiphophorus maculatus* but, rather, a *X. variatus*; the eyes of young Blind Cave Fish don't "fade away" — they become covered by fatty tissue; nowadays, livebearer classification should include (in my opinion) consideration of the "now-a-few-years-old" and "progressively-more-widely-accepted" classification put forward by Lynne Parenti.

As a co-author of the original description of the Flier, *Pterichthys scullii*, a Mexican livebearer named in honour of John Scull (one of the original collectors of this fish), I was, obviously, delighted to see a colour photograph of this species in print (p.301). However, seeing as no specimens are available within the UK or, possibly, Europe or (even) U.S.A., I cannot, in all honesty, see how the publishers can justify its inclusion in a book of this type.

I would also question the decision to include a section on Central American Cichlids, while leaving out corresponding ones on African Cichlids or Anabantoids. Granted, both these groups are dealt with, to a limited extent, within the chapter on Popular Aquarium Fishes, but I would have thought that they warrant the same status as Central American Cichlids, or African and Asian Catfishes for that matter.

In spite of these quibbles, I take my hat off (yet again — having done so so many times in the past) both to Salamander and Dick Mills. They have, once more, joined forces to produce what promises to be yet another success in an already highly successful partnership... but they could have done even better.

John Dawes







BARRY JAMES

The African Tiger Lotus (*Nymphaea maculata*).



BARRY JAMES

*Cryptocoryne pontederifolia* from Java and Sumatra.

## UNUSUAL PLANTS FOR THE AQUARIUM

Tired of growing (or attempting to grow!) *Cabomba* and *Vallisneria*? If so, Barry James has a few alternatives worthy of attention

**T**here are currently on offer throughout Europe well over 150 species of aquatic plants available for aquarium decoration. In spite of this, many British aquarists use perhaps only half a dozen different types — normally because these are the only ones available to them from their regular local suppliers. I seldom use any of these to decorate my own aquaria, but instead use a selection of more unusual species, which are spectacularly different in appearance and have proved themselves as long-lived and reliable. I am therefore constantly quizzed by hobbyists for information on them.

### African Tiger Lotus

Perhaps the most outstanding of these is the African Tiger Lotus (*Nymphaea*

*maculata*). Hailing from Nigeria and the Cameroons, this species belongs to the water lily family. However, unlike most other water lilies, this species seldom produces floating leaves, which makes it ideal for aquarium work. Like other tropical water lilies it grows from a small irregularly shaped tuber. These are produced by the plant when the dry season comes in West Africa. The tubers remain dormant in the dried up bed of the pool for several months until the rains return. These (the tubers) are then collected and shipped to Europe.

When placed in water at the right temperature they quickly sprout, and in a month, the foliage is well developed. In tanks 15in (37cm) or more in depth, the tubers are best planted in the middleground. The plant reaches a height of 12in (30cm) or more in

ideal conditions. The leaves are circular with a cleft where the petiole joins the underside of the leaf. The upper surfaces of the leaves are bright apple-green in color and covered in red or purple blotches and spots. Underneath the colour ranges from light-green to purple. The small white flowers are occasionally produced in aquaria, and, on occasion, produce viable seed. The leaves reach a diameter of 2½-3½ (6.4-9.0cm). There is a second variety known as the Red Tiger Lotus in which the upperside of the leaves may be dark-bronze through to purple, with various shades of red in between. The underside is violet-purple.

Cultivation from tubers is easy. Place tuber so that the rough side is uppermost just below the surface of the gravel. Fer-



Melon Sword (*Echinodorus macrophyllus*), one of the most attractive of the Amazon Swords.

sation will produce a really luxuriant specimen for larger tanks. The Tiger Lotus demands a high level of illumination, and a temperature of at least 78°F (25.5°C). A pH of between 6.8-7.2 will be suitable. These lotusses do not object to moderate levels of calcium salts. Unlike most tuberous aquatics, this plant does not need to be rested outside the aquarium although, periodically, it will die back. After a couple of months, however, it will reappear and grow away strongly once more.

#### **Cryptocoryne pontederifolia**

A *Cryptocoryne* species which has become a firm favourite of mine since its introduction some five years ago is *Cryptocoryne pontederifolia*. Collected in Java and Sumatra, this species is now freely available. This hardy plant grows freely in hard water, which is the condition most mains water supplies show in the British Isles.

Although imported specimens are always collected in the emerged state, they quickly adapt to submerged growth, and seldom shed their older leaves as is common with most other members of the genus. The emerged form is 3-5in (7.6-12.8cm) in height, with ovate-acute leaves on short



ANUBIAS AFZELII

petioles. The colour is light green with a pinkish tinge to the underside of the leaves. The rootstock is stout and vigorous — freely producing runners in the emerged state, but much more slowly underwater.

When submerged, the leaves lengthen and broaden, and take on a slightly bullate appearance which is most attractive. In this state, a height of 10in (25.5cm) can be attained. *C. pontederifolia* requires a well-lit position and is suitable for the background or middleground, depending on the height of the tank. Temperature should be between 75-78°F (24-25.5°C).

#### **Melon swords**

Of the *Echinodorus* — or Amazon Swords — the Melon Sword (*Echinodorus macrophyllus*) is one of the most attractive of the group which, itself, contains a host of glorious aquatics. Often erroneously referred to as *E. grandiflorus* or *E. muricatus*, most suppliers nowadays supply the correctly named species.

Melon Swordplants are found from Eastern Brazil to the temperate zones of Argentina and are therefore suitable for both tropical and coldwater aquaria. Normally supplied in the emerged form, the leaves are cordate or ovate 12-16in (30-40cm) in length and 10-12in (25-30cm) wide. They are borne on petioles up to 31.5in (80cm) long.

When submerged, the true beauty of the plant can really be appreciated. The leaves elongate and become very lush, while the petioles become much shorter. *E. macrophyllus* is best cultivated in pure gravel in deeper tanks to prevent the leaves reaching the surface. Heavy fertilisation is undesirable. The species is seemingly indifferent to water chemistry and will thrive in a variety of waters.

#### **Anubias afzelii**

Africa is not well endowed with good aquarium plants, but it does have a number of exciting species which are now available. I am sure that there are many more waiting to be discovered in such areas as the Congo and Angola. Among the Aroids, plants belonging to the genus *Anubias* make very useful subjects. One of my most treasured species is *Anubias afzelii*. Found in the rainforests of West Africa, around Sierra Leone, it grows by the sides of streams and rivers which frequently overflow their banks. The plant is therefore used to prolonged submersion, and so, does well in aquaria.

From a strong creeping rootstock arise spear-shaped leaves, which grow to a height of 10in (25cm). The leaves are dark-green and glossy, with darker nervation. *A. afzelii* grows well underwater, which contradicts the experience of other authors when writing about this plant. It is capable of tolerating a wide range of water conditions but prefers a temperature around 80°F (26.5°C). Propagation is by division of the tuber. *Anubias afzelii* is best placed to the rear of the aquarium.

#### **NOTE**

For further information on aquatic plants contact the International Society for the Study of Aquatic Plants, c/o Mrs P. James (Secretary), Everglades Aquatic Nurseries, Baunton, Nr. Cirencester, Gloucestershire. Tel: (0285) 4656.



# Letters

## Salt solution

(Letter received following Jerzy Gawor's article, **The Healthy Pond**, in June *A & P*)

Most books, magazines and articles (including your own interesting fish health articles) refer to cooking salt, rock salt and pure salt for "salt baths" and "Brine Shrimp hatching".

At one time I was able to purchase "Cut Lump Salt" from a local supermarket, but it seems, like many things these days, the firm (Thompsons of Cheshire) ceased trading a couple of years ago. I have been advised by British Salt, also in Cheshire, that there is no company now in the UK manufacturing and packing lump/block salt. As you will appreciate, the salt I am referring to is completely free from chemical and artificial additives.

I would be grateful if you would advise what type of salt is used by the profession; also the type of outlet where the salt is available.

Incidentally, it is possible to use the average cooking salt, with the appropriate chemical and artificial additives included, for the purpose of Brine Shrimp hatching?

Ron Wixon,  
Bristol

## Jerzy Gawor Replies

Thank you for your letter which was passed on to me recently by John Dawes, Editor of *A & P*. Thank you also for your kind comments regarding my articles.

Salt is a frequently talked-about product, but is also much misunderstood.

Its "curative" value in fish-keeping has been known for many years, where it is particularly effective against many protozoan parasites (actually causing them to swell and burst through osmotic pressure differences) as well as against fungi. It has a "narcotising" effect on external flukes, causing them to lose their grip on the fish's tissues, and it also strips excess mucus from the fish's body and gills helping to de-congest the system — very useful in cases where the gills are badly affected by a mucus build-up.

The common treatments involve using long or short term baths, with varying concentrations of salt (dosages available in books/past articles).

The type of salt to use is, in fact, ONE product, available under a variety of names — that is, PURE VACUUM DRIED SALT. This is available, believe it or not, as cooking salt, dishwasher salt, aquatic tonic salt, water softener salt and indeed, is used in delicate operations involving human saline drips and kidney patients.

This salt contains a product required to prevent the salt from "caking" (a hexafluoro-cyanate-based chemical). This product is present as a very tiny fraction and has absolutely no toxic, ill or other effect on fish. If it's good enough for saline-drips, it must be O.K. for fish salt baths!

If you want absolute purity of salt for your needs, then BDH Ltd of Poole in Dorset will supply you 100 grams of "ARISTAR" Grade salt for around £20.00 (such "pure" products find use in very specialised industrial, chemical and biochemical laboratories).

Salt products that should not be used for fish are Table Salt which may be "iodised", Rock Salt which may contain free-lime and Sea Salt (as for marine aquaria) which contains many other mineral salts in high proportions, preventing you from achieving the correct therapeutic level of actual salt (sodium chloride).

As to suppliers, well, most aquatic shops will stock Tonic Salt, most supermarkets will have cooking and dishwasher salt, and Koi specialists, such as In-filtration of Goldborne, Warrington, Cheshire, will have bulk packs of vacuum-dried salt in stock. Use salt for baths only; I am not an advocate of maintaining constant salt levels in the pond.

Goldfish, Koi etc are not marine or brackish water fish, and do not require this product for long-term maintenance and health. Also, I wonder how many fishkeepers are using salt in the water and zeolite in their filters? The two are mutually exclusive as far as ammonia adsorption goes.

As a final note, the salt I've

discussed is suitable for hatching Brine Shrimps, either the whole eggs, such as San Francisco Bay Brand, or the shell-less variety, as produced by New Technology Products. But, if you wish to grow the Brine Shrimps, then you must use a complete "Sea salt" (e.g. Tropic Marin, Instant Ocean) and the appropriate Brine Shrimp food to feed them with.

I hope this letter goes some way towards putting you on the right path with regards to salt; its additives, its uses and its suppliers.

Best wishes  
Jerzy Gawor  
Director — Aquality Ltd

## Minireef Competition Winner Celebrates

### Editor's Note

Following our highly successful Minireef Competition (*A & P* January '88), the lucky winner, P. Włodarczyk, duly received his prize from our sponsors. As the following excerpts from his recently-received letter show, it made a fundamental change to his hobby. Thank you again, Minireef for a great competition.

John Dawes

I have been a fishkeeper for just under a year and have two four-foot tanks in which I keep cichlids.

I am 38 years old and, during the past eighteen months or so, have won a number of competitions.

I am very pleased with my

Getting ready to go — our lucky Minireef Competition winner with his newly-arrived prize.



Minireef tank — it was an incredibly lovely win for me. Without it, I think it unlikely that I would ever have kept marine fish.

I set up the tank as soon as I received it and after a long six-week wait for the right conditions to develop, started introducing my fish in early June. Now that there is some life in the tank, it was well worth the wait.

Thank you Minireef Aquarium Systems and *A & P* for a wonderful prize.  
P. S. Włodarczyk  
Hemel Hempstead, Herts.

## Thanks from Plymouth

Would you please pass on my thanks to all the members of staff who were present on the *A & P* stand at Fishworld '88 for the very helpful advice they gave me? Nothing was too much trouble for them.

I also hope that my ideas for the magazine will help in formulating future editions.

Graham Seddon  
Plymouth, A.S.

P.S. We are advertising *A & P* at our Open Show this month.

### Editor's Note

Thank you, Graham, for your flattering comments. As they say, we aim to please! Thank you also for publicising *A & P* at your show. For our part, we are advertising your show in this issue of *A & P* (see **Diary Dates** for further details). Your article suggestions have been noted (did you, for instance, see the plant Spotlight last month?)

John Dawes



# Spotlight

## ANGELFISH

*Pterophyllum scalare*

Love them or hate them, call them saints or sinners, Angelfish, as David Sands explains, are just doing what comes naturally. (Photograph by the author).

**W**hat community tropical aquarium would be complete without a few Angelfishes? Those long-finned good, bad and ugly... (the correct nickname would depend on how the fishkeeper viewed the behaviour of a rampant Angelfish which is trying to demote all other aquarium inhabitants)... are loved and sometimes hated...

The Angelfish is a cichlid (pronounced sicklid) from the family Cichlidae, which includes hundreds of species from the Amazon Basin, African rivers, Rift Valley Lakes and Asian waters. Angelfishes are the most widely kept cichlids (according to general research and my own experience) and are in the top ten of all tropical fishes kept by fishkeepers around the globe.

### Angel species and varieties

According to some authors there are three species of wild Angelfishes in the genus *Pterophyllum*.

*Pterophyllum altum* Pellegrin 1903. From the Venezuelan Orinoco River and the Brazilian Rio Negro. *Pt. scalare* Lichtenstein 1823 and *Pt. dumerilii* Castelnau 1855. Both widespread in middle and Northern South America and especially 'scalare' in Peruvian, Guyanan and Brazilian waters.

All widely available commercial forms have been developed by fish breeders from the wild *Pt. scalare* which is a very difficult fish to spawn in captivity, perhaps hard to believe when fishkeepers relate how easy it is to spawn the domesticated strains.

The development of farm-raised Angelfish is not unlike the development of the many dog breeds which share a common, wild ancestor. *Pt. dumerilii* is the most obscurely known and is thought by many to be a form of *Pt. scalare*.

In the local aquarium shop, the Common Angelfish 'scalare' will be available as one- to two-inch tall individuals, unless some tank-raised fish have been brought in by a fishkeeper; then they can be as large as the palm of your hand. At that size they will spawn quite easily.

*Pt. altum* is not commercially raised and can be distinguished from the Common Angel by its superbly elongated anal and dorsal fins which can measure almost a foot from tip to tip! This rare species is kept

almost totally through wild imported specimens, although some years ago, Belgian and French aquarists informed me that they had successfully spawned and raised them.

The Golden Angelfish pictured is one of many commercially-farmed or bred forms available from the Far East and Florida fish farmers. Contrary to some popular literature, such colour forms as the Golden Angel, have been available from Singapore fish exporters for a couple of decades. There are black, blushing, half-black, lace, marble, silver, zebra, leopard, and others, as well as the gold colour form, available through commercial breeders.

### Basic requirements

Commercial or tank-raised specimens are not too fussy about water chemistry and they will live in soft to hard, acidic to alkaline waters (pH 6.1 to 7.7), although wild-caught specimens thrive in soft neutral to slightly acidic waters (pH 6.2 to 7.2). Both wild and tank-raised strains prefer a warm temperature range between 78 to 85°F (25.5-29.5°C).

Angelfishes are voracious predators, and hungry adults can be inclined to consume your favourite Neon Tetras, so beware... Young tank-raised Angels are often the first up for food and will certainly take flake food from your fingers if you dunk a pinch just under the surface.

Wild Angels, by sharp contrast, are finicky feeders and survive in aquaria on live foods such as *Tubifex* and Bloodworms. Commercial specimens, on the other hand, thrive on prepared foods such as flake, tablet and small pellets.

### Aquarium breeding

Both wild and tank forms can be brought into breeding condition with an extra part to the diet such as finely shredded earthworms and shrimps.

Sexing young immature Angelfishes is downright impossible, and sexing adult specimens is very hit and miss. Experienced fishkeepers look for length differences in finnage (females can have slightly shorter fins) and males sometimes display a slightly humpy head, but this is not a perfect indicator of sex.

If you have a 30-inch (75cm) long aquarium, or larger, then the best method

to ensure you have a pair is to select four to six individuals, preferably from different shops. They should be of a similar size to reduce bullying, and should be allowed to grow up together. If you prefer a particular strain then, obviously, stick to that; any spawnings which occur will run true. Fishkeepers have said that some colour forms are harder than others, but I have not found this to be true. Some also say that Black Angels are more aggressive...

One day a dominant male will choose a mate from your initial group and then the other specimens will be chased away from the area where the pair will spawn. With tank-raised Angelfishes this is likely to be the most convenient vertical surface available, such as an Amazon Sword leaf or the undergravel filter uplift pipe. Inexperienced pairs will sometimes consume the first few batches of eggs but, eventually, they will get it right.

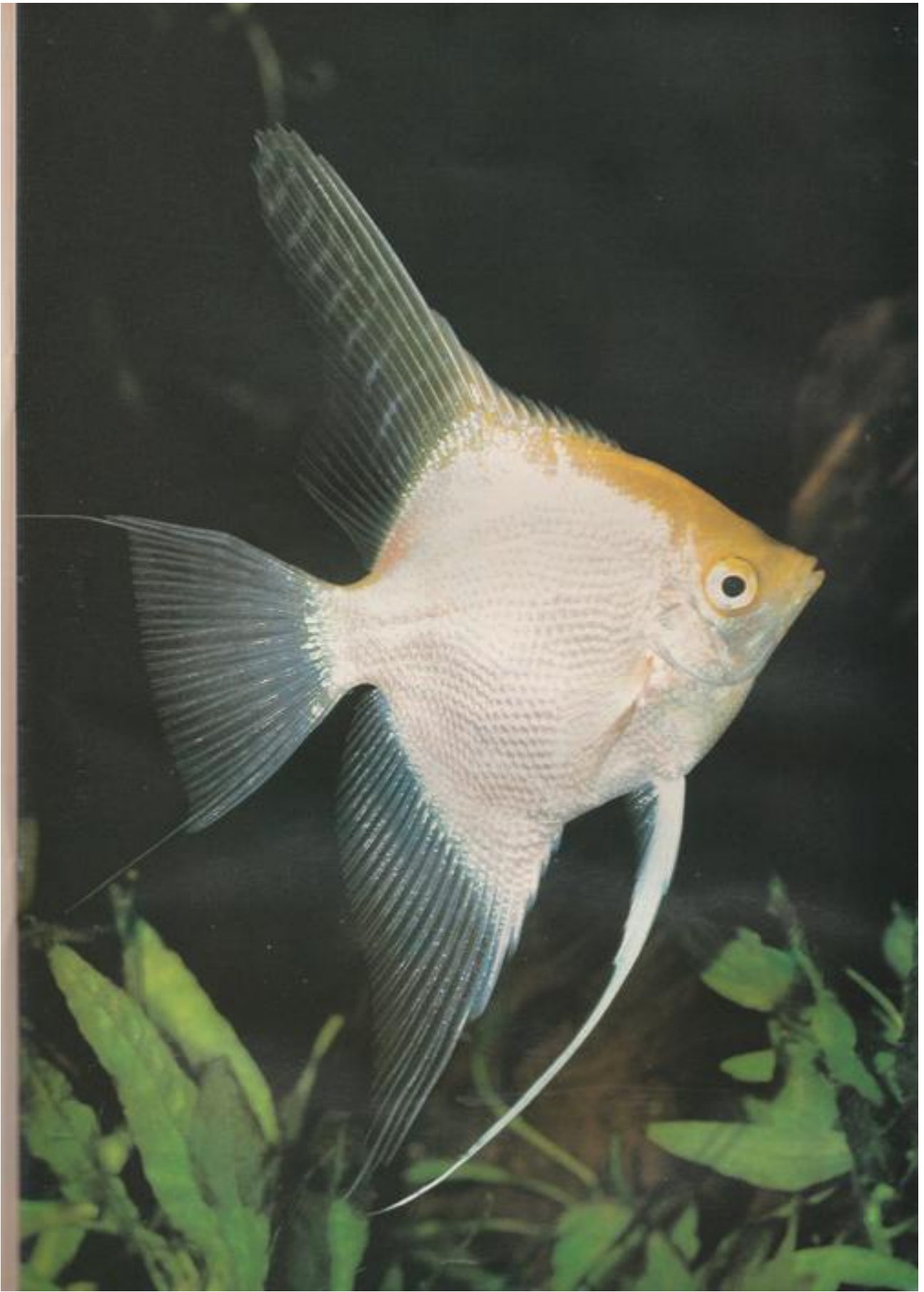
The pair will clean the chosen spawning surface by pecking at and rubbing it. Then the female will proceed to place lines of tiny eggs down on the surface. Each time this happens, the male follows through and fertilises them.

Like most cichlids, Angelfishes are very good parents. They will aggressively protect the eggs from fishes wishing to make a meal of them, and they will continually clean the viable eggs and pick off the infertile ones.

In temperatures of 78 to 84°F (25.5-29°C) the emerging fry will be helped out of their egg cases by the doting parents after 36 to 48 hours. The tiny wriggling fry are then kept together by the parents and sometimes moved to various places of safety until, in less than a week after the spawning, they are free-swimming. Some enthusiasts do not take pleasure in this slow and careful cichlid routine and simply place a long, thin strip of slate against the inside aquarium glass, let the pair spawn, whip the eggs out and hatch them, on the slate, in a glass bottle. More fry are raised this way, but a great deal of fun is sidestepped.

I have a few wild *Pterophyllum scalare* and a couple of tank-raised Marble Angelfishes in my home aquarium and top of the pecking order is a large Marbled Angel.

I think Angelfishes typify cichlids, and a group of them provides an interesting and graceful display in aquaria. They charge and stop inches from each other... they back up and off and then sneak back again... No wonder Angelfishes have been one of the most popular fishes in the tropical freshwater aquarium for as long as the hobby has been in existence.





# News

## S.V.C. "Under Control" — Thanks to Responsible Traders

By  
Stephen Smith

The close co-operation of responsible traders with Government departments would appear to have resulted in the apparent containment of the recent outbreak of Spring Viraemia of Carp (S.V.C.).

The outbreak has, understandably, caused some alarm throughout all aspects of the hobby since it came to light at the beginning of the summer. "However," said ichthyologist **Bernice Brewster**, "no-one can be sure how well the virus has been contained until the summer, or even next spring, when fish are most susceptible

### Aquatic Bio-filtration Booklet

Bio-filtration (or should it be bio-purification?) is often confusing, particularly when equations involving void space, ammonia removal efficiency, specific surface area ... and the like, are thrown in to liven up(!) the conversation.

Nigel Green, a postgraduate student hoping to specialise in Aquaculture, has produced a booklet which "gives a comprehensive study of bio-filtration" and which, he states, "goes into great detail concerning the factors affecting ammonia removal, pond recycle rate, hydraulic loading, reaction rate constant, minimum (filter) recirculation rate", plus all other aspects of bio-filtration. "It also includes a worked example which, I hope, will clarify any problems one might have with the calculations."

For further details of the booklet (£3.50, including postage), contact: Nigel Green, 150B Cummoor Hill, Oxford OX2 5PJ. Tel: (0865) 863936.

to infection."

Bernice was speaking at a meeting of BAND, the **British Association of Nishikigoi Dealers**, at a Midlands hotel, to discuss the implications of S.V.C. to both the trade and the hobby.

An ichthyologist at **Kent Koi Ko** and a fellow of the Linnean Society, Bernice presented information about all aspects of the virus, including its biological make-up and its distribution and symptoms of the disease.

She praised responsible traders for their co-operation with Government departments in dealing with the outbreak, which, she said, would appear to have been, largely, contained.

The majority of retailers apparently check their sources thoroughly with guidance from the Ministry of Agriculture, Fisheries and Food; and are aware of the fact that traders with traces of the virus in their

establishments — whether or not on a fish — would be closed for a minimum of 30 days.

During the BAND meeting, several traders were, understandably, concerned about undue public alarm, and about unscrupulous traders who were more interested in money than the hobby.

However, the association wished to assure the buying public that every effort would be maintained by responsible traders to protect the interests of all coldwater enthusiasts, and that constructive pressure would be placed upon the unscrupulous minority.

The seven-point guide issued by the Ministry of Agriculture, Fisheries and Food is intended to help importers to reduce the risk of inadvertently obtaining infected stock.

The questions which importers are advised to ask apply just

as well to the hobbyist, and are:

a) Are regular examinations for disease carried out on fish stocks held in your supplier's establishment?

b) Are all new consignments of fish introduced into your supplier's establishment examined for disease?

c) Who carries out these examinations (own employee, private veterinarian, state veterinarian)?

d) Are only sick fish examined, or are random samples of apparently healthy fish also examined as a matter of routine?

e) Are samples taken for laboratory tests for bacteria, viruses, parasites? If yes, which laboratory carries out the tests?

f) Can your supplier provide lists and results of tests carried out at his/her establishment?

g) What steps does your supplier take to ensure high standards of health in his/her own suppliers' stocks?

## The new-style Brighton Festival of Fishkeeping

The UK's first major educational aquatic event is to be staged this autumn at the Corn Exchange in Brighton.

The 'Brighton Festival of Fishkeeping' has been put together by a consortium of aquatic product manufacturers, led by **Interpet Ltd**, with the common aim of organising a festival which presents fishkeeping as a hobby for everyone to enjoy.

A superb selection of fish will be on display as the festival is host to the **Federation of British Aquarist Societies' Supreme Championship Show**. The 'Supreme' is, in some ways, the Crafts of the fish world, with fish qualifying from countrywide regional shows in order to compete for

the top accolade of **Supreme Champion 1988**. The local **Mid-Sussex Aquarist Society** will also hold their annual Open Show at the festival.

Apart from the display of prize fishes, there will be plenty to see and take part in for every type of fishkeeper, whether complete novice, or experienced aquarist. Leading fishkeeping experts are attending the festival to discuss problems and answer any queries you may like to raise. There will also be a number of talks, and slide shows going on throughout the day.

Top aquatic companies will be displaying a wide range of the latest fishkeeping products, with an emphasis on demonstra-

tions and practical advice, rather than sales. Local aquatic retailers are being encouraged to open for the day of the festival, and a guide to their whereabouts will be available for those who wish to make purchases.

The Brighton Festival of Fishkeeping will take place on **Sunday 30 October from 10.00am to 5.00pm at the Corn Exchange, Church Street, Brighton**.

Tickets will be available at the door.

For further press information contact: **Clare Spice**. Tel: (0306) 881033.

Further information concerning the show can be obtained by contacting: **Mike Clarke**. Tel: (0306) 881033.

# News

## New OFI President

Jack Ruijsbroek of M. B. Ruijsbroek b.v. of Holland, is the new President of Ornamental Fish International.

Elected at the Nuremberg Assembly, Jack Ruijsbroek succeeds Keith Barraclough who decided not to stand for election, having served four years as President.

Jack Ruijsbroek is 33 and is the youngest-ever President of the organisation.

In a letter to the members of OFI he sent the following message: "For those of you who attended the Nuremberg Assembly, you will know that my fellow Directors on the newly-appointed OFI Board, bestowed upon me the great honour of becoming your President for the next two years.

As the President of OFI, there are many jobs which I would like the organisation to tackle over the coming years, not least of which is to continue the outstanding work of my predecessor Keith Barraclough.

Keith served the Association for four years as its Chairman



Jack Ruijsbroek — marketing mission.

and a subsequent four years as President. He was also a founder member of the Organisation when first it was created 11 years ago. On behalf of all members, I would like to thank Keith for his commitment,

loyalty and strong leadership during the difficult years when OFI was growing up.

"We now have an organisation that is destined to grow even more rapidly and take its rightful place in the International Aquatic Industry.

"A new marketing programme is currently being initiated and we should see the benefits emerging from the

work of the Secretariat in the coming months.

"To everyone in OFI and to those associations closely associated with us, I hereby give you my pledge to ensure that OFI truly represents the interests of our entire Industry and that, above all, we remain wholly committed to the fish-keeping hobby across the five continents of the world".

Globalcustom Ltd., the newly-established Winchester-based company, have secured two major UK distributorships:

1. **Aquarium Munster** have appointed Globalcustom as their sole UK distributor for their complete range of health and water conditioning products, including treatments for parasitic, bacterial and fungal diseases, algal control remedies and others. Further additions to the range are also planned.

2. **HSP — Gamma-irradiated Foods** will also come under Globalcustom's sole distribution. The range currently con-

sists of around 20 separate items, including special Discus and Cichlid diets — all in self-contained "mini-blocks" (with the exception of Whole-Fish).

Globalcustom are also offering glass-fronted freezer units for attractive and ice-free in-store display of the foods (available on lease or purchase terms).

For further details contact **Globalcustom Ltd., Barton Stacey, Winchester, Hants. Tel. (0962) 760515.**

*Editor's Note: Look out for a review of the above products in a forthcoming instalment of Product Round-up.*

## NEXT MONTH

● Calling all marine aquarists — the October issue of *A & P* will carry the next in our series of much-sought-after **Supplements** — on **Tropical Marine Aquaria** (timed to coincide with the British Marine Aquarists' Association autumn seminar at London Zoo).

● Seaweeds, compatible fish species, breeding, ozonisers, UV sterilisers, protein skimmers, and even the nature of seawater itself, will all come under close scrutiny from the **Supplement** team of writers.

● For non-marine aquarists, we have illustrated features on all manner of fascinating subjects, from breeding Silver Dollars (Kevyn Wilson), to Cryptocoryns in Sri Lanka (Arie de Graaf), to Nigel Caddock's trials and tribulations in **Evolution of a Koi-keeper**.

● We also kick off with yet another **BRAND NEW SERIES: First Steps** — aimed firmly at anyone in the throes of learning about one aspect



or other of the aquatic hobby. On this occasion, Tetra's **Dr. David Pool** will deal with **Basic Aquarium Maintenance** — follow his guidelines, and you can't go wrong.

● And, to cap it all, we have an absolutely fantastic £1000 Eheim pump, filter, taps and couplings competitions sponsored by **John Allan Aquariums Ltd.**

Don't miss October's exciting issue of *A & P* — Book your copy now!



# THE COMMON GOLDFISH

Stephen Smith takes a closer-than-normal look at the ever-popular, but probably misleadingly named, Common Goldfish.

**T**he Goldfish is described as the world's most popular pet — and I have every suspicion that few could dispute such a standing.

In the past twenty years or so, the popularity of the Goldfish has increased at a remarkable rate: helped by the introduction and development of any number (some say over 100) recognised varieties of Fancy Goldfish, ranging from the Bristol Shubunkin to the Hamanishiki... and beyond.

But, it is without doubt that a vast majority of fishkeepers first succumbed to the hobby with the acquisition of a Common (or, perhaps, garden) Goldfish.

Despite this, few publications provide more than a passing mention of the fish which is not only at the root of our own interests in the hobby, but, in my own opinion, also holds an undeniable place at the very genesis of this most pleasurable pursuit of fishkeeping.

## History

It is from the rivers and streams of China that the Goldfish is thought to have originated, at least 1500 years ago, though probably more. Such fish were as common then as the Stickleback in a British brook, though their dull olive-brown appearance at that time gave no hint of the popularity, nor the diverse range of forms, which the species was to achieve.

It is thought that such fish were caught, and possibly bred, specifically, as food; but it was not until the Tang Dynasty (618-917) that the first references are known to exist of domesticated Goldfish in China.

No-one can tell when the first "golden" fish were kept as domestic pets or "living ornaments". However, it would be safe to assume that, occasionally, some brightly-coloured fish would result from natural

spawnings. Such fish would be doomed to a short life, however, falling easy prey to birds, larger fish, or other predators.

It is not difficult to imagine such a freak catching the eye of any native of China at that time, ending up as a prize possession; or even revered as holding mystic powers.

Consequently, such fish became an intrinsic part of Chinese lore, and, it would appear, such fish, when inter-bred, produced further coloured "gems" and exhibited remarkable variations in finnage, body-shape, and colour.

By the end of the thirteenth century Goldfish (termed *Chi*) of many types were sold in profitable numbers as domestic pets at Chinese markets, while a parallel development of Carp (*Li*) had also reached popularity.

*Chi* were kept in shallow bowls which were highly decorated on the outside yet white inside. Being viewed from above, the fish was developed with eyes which looked upwards at the viewer — the beginnings of the "Celestial" and "Bubble-eye" variations (and probably the beginnings of the Fancy Goldfish hobby we know today).

The Goldfish found its way to neighbouring Japan about two centuries later and had become widespread throughout the East by the end of the 17th century.

By then, even England had seen the first of the Goldfish, and the fish had spread across to Europe by the end of the 18th century.

It is believed that, by the end of the 19th century, the Goldfish had reached America and, by the beginning of the present century, most of the popular breeds were known to American aquarists.

At this point, the development of Fancy Goldfish was widespread, resulting in the extensive interest of the hobby today, and

in the development of the exotic and specialised varieties now available. But that is a different story.

## Name and Shape

The Common Goldfish is sometimes confused with its pond- or tank-mate, the Carp. I have even seen small Koi labelled for sale as Goldfish; or uncoloured Goldfish have sometimes been wrongly identified as Koi.

Although a common mistake, it is fairly easy to distinguish Goldfish from young Koi by the distinctive barbels which the latter exhibit in pairs either side of the mouth. (These barbels are also found, incidentally, on the Common Carp and its offshoots, the Mirror and Leather Carps.)

The scientific name for the Goldfish is *Carassius auratus auratus* (Linnaeus). The word *auratus* refers to the golden colouring of the species, while Linnaeus is the person responsible for the name tag. The nearest excusable confusion with the Common Goldfish could arise from the Gibel, or Prussian Carp, *Carassius auratus gibelio* (Bloch), while further confusion could arise from occasional indiscriminate inter-breeding between the species.

Perhaps the appeal of the Goldfish — apart from its vivid red coloration — is the fact that it is fish-shaped! Among its various diverse offshoots, its form is clearly seen as one of natural beauty, displaying a robust sleekness just as nature intended.

The form of the Common Goldfish is best described by means of the Show Standard set by the Goldfish Society of Great Britain. Obviously, you should not worry if your Goldfish does not match exactly the standard, but it does serve as a useful guide for selection when breeding Goldfish.

The depth of the body should be between three-sevenths and three-eighths of the body length (ie: from the tip of the nose to the root of the tail). The caudal (tail) fin should be single and no greater than one-and-a-quarter times the body depth; while the lobes should be no greater than one-third body length and slightly rounded at the ends.

The dorsal and anal fins are single, while the pectoral and pelvic fins should be evenly paired.

A similar standard applies to a variation of the Common Goldfish, the London Shubunkin, which is, in fact, a calico

The Common Goldfish's closest relative is the rarely seen Gibel or Prussian Carp (*Carassius auratus gibelio*).



# SH — NEVER SO HUMBLE

Goldfish — not to be confused with the Bristol Shubunkin, which is a highly-specialised single-tail Goldfish variety.

## Scaling and pigmentation

Surely the main appeal of the Common Goldfish must be its bright red colouring. What is any ornamental pond without a fine specimen of a Common Goldfish patrolling its waters?

The scales of the fish should be entirely metallic — i.e. shiny. And of course, the distinctive red colouring should, ideally, extend from the tip of its nose to the ends of its fins.

However, it is not unusual to see Goldfish with an attractive red-and-white, or *Sarasa*, colouring. This has traditionally been the popular colouring of the Comet (a further single-tailed variation) and is a perfectly accepted and attractive feature.

One of the most fascinating aspects of raising Goldfish is the colour change which the fish undergoes as a youngster.

When, as a fry, the scales are first visible, the Goldfish is, in fact, the dull green-brown of its ancestors. However, under favourable conditions this begins to fade from the underbelly upwards.

As the fading begins to take place, the overall colour of the body itself becomes darker and, gradually, the fading — a light yellow — creeps up the sides of the body.

Eventually, the yellow turns to the familiar golden-red; but not before a brief interlude when the fish displays a black margin along its dorsal region and on its fins.

Ironically, this is often the very feature which attracts a first-time fancier, who becomes most disappointed, even concerned, when the black disappears!

Normally, the Goldfish will remain its traditional colour throughout its life, which is thought to be up to around 25 years in ideal conditions. However, some specimens lose their colour completely, turning almost transparent, while others revert to their ancestral colouring. Incidence of either of these is fairly rare, though, and should not give rise to concern.

## The Goldfish bowl

It was mentioned in passing, earlier in this feature, that Goldfish were kept by the Chinese in shallow round bowls. This, in my opinion, is the reason why the Goldfish came, in our "civilised" society, to be commonly kept in round glass bowls.

Evidently, the Chinese had not yet turned their attention to inventing the all-glass aquarium... If only they had! In my opinion, the Goldfish bowl is not the ideal accommodation for an animal which really deserves the very best treatment. It is testimony to the hardiness of the Goldfish that so many survive for so long in such



This is a superb example of a Common Goldfish, slightly fore-shortened by the camera angle, but exhibiting perfectly formed finnage and body shape. The caudal fin here is fully flexed, giving it the appearance

of being more forked than it actually is; while the white pimples on the gill plates and leading edges of the pectoral fins indicate that this is a healthy male specimen in breeding condition.



The use of a round bowl for Goldfish originates, in my opinion, with the Chinese who, during the early history of Goldfish-keeping, used round shallow porcelain bowls and viewed the fish from above. This led to the popularity of "Celestial" types such as the Bubbie-eye and the Celestial itself.

If you must keep your fish in a bowl, please use one which provides a large surface area in relation to water volume, such as this elliptical glass bowl. Goldfish bowl filters are also available.



"torture chambers"... as badly-maintained bowls can become.

If you do wish to use a bowl, go for one of the larger conical plastic or elliptical glass versions, which provide a more reasonable ratio of surface area to water volume. But

The London Shubunkin has exactly the same shape as the Common Goldfish but has Calico colouration.



The world's most popular pet — the Common Goldfish (*Carassius auratus auratus*).

do justice to the fish, the hobby, and yourself by obtaining at least an eighteen-inch to two-foot aquarium — keeping no more than two to three fish at most.

Finally, who said the Goldfish was common? Popular — yes, but never so humble!



# Seaview

by Gordon Kay

## To quarantine or not . . .

To quarantine or not to quarantine — that is the question. Whether it is better to add fishes straight into the display tank and risk the outrageous loss of a fortune through diseases, or make use of a quarantine tank for two or three weeks, provokes almost as much argument among hobbyists as the question of lighting (although nowhere near as much as the filter argument!)

Many eminent people, who know far more than I, advocate the use of quarantine tanks, but I'm afraid that this is one topic on which I'm still undecided. Of course, I can see the merits in quarantining, but I can't help thinking that you get a fish home — sometimes after a long journey — acclimatise it, etc. in a small aquarium until it feels safe and happy, and then go through the same process a fortnight afterwards in a bigger tank. I also think that fishing a sick fish out and dumping it in isolation can do more harm than the disease itself. I can hear your minds from here — Shock! Horror! Personally, I stick to the same routine I always have had and, except for one instance (which you already know about), it's never let me down.

I try to buy from the same dealer all the time and, in any event, only buy from dealers who sell guaranteed quarantined fish. I reserve the fish but leave it in the dealer's tank for another week or so; then, if it breaks out in White Spot or dies, it doesn't do it in my tank. I take it home and introduce it slowly to a darkened tank and then cover the aquarium with a blanket for 24 hours. I never get problems with bullying — although I take great care when choosing tank inhabitants, and usually only buy Butterflies anyway, so maybe this has got some bearing on the thing — and all seem to be feeding and happy when the lights go on again.

I'm not saying that you should follow my example; I'm just putting my thoughts into print to see if this stirs anyone to take me to task.

Further to the above, I think



CORAL WORLD ELAT

I should tell you that I only keep fish, and so, it is easier to treat diseases, should they occur. I do like invertebrates — I find them as beautiful and fascinating as anyone else; it's just that I am a conservationist and, while I can see nothing basically wrong with catching fishes for the aquarium trade (so long as it is done on a sensible, sustainable level), I don't want any part of keeping things which have been caught by means which (inevitably) lead to habitat destruction. Before anyone points to the catching of fish with cyanide, well that's despicable too, but I've preached about that for long enough. Anyway, invertebrates are best left in the sea as far as I'm concerned — I won't even have coral skeletons in my tanks.

This is starting to get heavy. Let's have some SNIPPETS:

1. Did you know that the 'Jellyfish' known as the Portuguese Man-of-War (*Physalia physalia*) is not strictly speaking a jellyfish but a colony of polyps supported by a gas-filled float which can be 12in (30cm) long? Stinging tentacles up to 66ft (20m) long (!) paralyse prey and are painful to humans.

2. The Phosphorescent Squid (*Histioteuthis bonelliana*) is a strange deepwater species which is 5in (14cm) long and which has one eye much larger than the other. Its body is covered with light-producing organs which cause it to glow in the dark depths to attract the small invertebrates on which it feeds.

3. The spawning process of the Cardinalfish (*Apogon cyanosoma*) goes something like this. The male and female (who love each other very much!) pair off

and perform a courtship dance which can last anything between 30 minutes and several hours. After all that effort, the actual spawning takes a mere two or three minutes (hardly surprising) and the male incubates the eggs for about a week. The resultant fry are approximately 0.1in (2.5mm) long but grow very rapidly and, after six months, are already sexually mature and ready to spawn themselves.

4. The females of most species of Octopus starve themselves to death after spawning. They secrete hormones with a pair of endocrine glands which inhibit feeding. Could this be to ensure availability of sufficient food?

5. The head of a fish is made up of two parts: the neurocranium and the branchiocranium. The neurocranium is the part which surrounds and protects the braincase and sense organ capsules, while the branchiocranium (below it) includes the various parts of the skeleton concerned with feeding and breathing functions.

6. The last fish to be discovered by Roger Lubbock — the British ichthyologist who died in a car accident in Brazil in 1982, aged 29 — was a Butterfly, *Chaetodon obliquus*, from the St. Pauls group of islands in the Atlantic Ocean.

7. The fry of the Common Eel — leptocephalus larvae — are born in the Sargasso Sea and drift in the Gulf Stream for 26 years before finding their way up the rivers of Britain.

8. Blennies of the genus *Eciennius* do not have a fully developed

swim bladder, so they have to move their caudal fin constantly when in open water, otherwise they would sink! Their teeth aren't in their jaws either — their hundreds of fine teeth are in their lips — hence their popular name in some parts of the world of Combtooth Blennies.

## Steve Preston — tragic loss

Finally, a mention of the tragic and untimely death of Steve Preston who died of a heart attack in June, still in his early thirties.

Steve was a well-known and much-respected figure within the hobby, especially in his native West Yorkshire, where he spent much of his time travelling around local societies giving talks on marine aquaria, fund raising for local charities and, generally, getting involved.

For as long as I knew Steve, he never enjoyed good health and, yet, that never stopped him. His enthusiasm was boundless and his contribution immeasurable. For many years he was a leading light in the



B.M.A.A. and, indeed, was one of two or three who held the thing together a few years ago when it seemed to be collapsing. Steve was also something of a pioneer when he formed the West Yorkshire Marine Aquarists Group, long before the days when there were local specialist groups.

Steve Preston will be sorely missed by all his friends in the hobby, and our sincere good wishes go out to his wife, Nabby, and his family.

# INTRODUCING THE AUSTRALIA

Following "The Challenge of the Long-rayed Glassfish" (*A & P*—May '88), Dutch UN consultant **Bill Tomey** introduces another exciting and, as yet, rare newcomer — a small and interesting goby from Australia.

**Scientific name** *Chlamydogobius eremius* (Zietz, 1896):

or Gudgeon.

**Common name** Australian Desert Goby

**Origin:** This very interesting little fish (family Gobiidae) finds its origin in the

small rivers and rivulets locally crossing the dry Australian desert. It is also found in the sources and wells which keep the Lake Eyre Basins permanently filled with water.

**Year of Import:** Imported for the first time into the European Continent (Denmark) in the second half of 1987, from where it was re-exported to the Netherlands.

A nice male *Chlamydogobius eremius* displaying his yellow head and white-rimmed blue fins.



Below left, a mature female, inspecting the future brood-cave entrance between two rocks. Below right, *C. eremius* pairs prefer a cave-like hole with an overhang or a kind of ceiling on which they

attach their eggs. The eggs in the photograph show the first signs of development of the embryos.





# N DESERT GOBY OR GUDGEON

**Sex Differences:** However small (not exceeding 6cm — 2.4in), the male is usually somewhat larger than the female, and his body is strongly coloured in yellow with cobalt-blue fins. The female is much more simply coloured and is sometimes adorned with a grey-black chequered pattern. Apparently, this depends on temperature, sexual maturity and the ripening of eggs.

**Behaviour in the Aquarium:** From what is known, the males seem to develop very aggressive behaviour towards each other, resulting in heavy fighting, ravaging "skin and fin"! My experience, however, is completely different; even breeding males didn't attack other males, nor did I observe any aggressive behaviour, except playing and small body-to-body fights, leading to no harm at all! Should we come to the conclusion that the literature is wrong? No, absolutely not, but the observations must have been carried out in a (for the purpose) wrongly furnished aquarium. If there are enough and adequate hiding places, there is no such thing as aggression. *C. eremius* also behave very friendly towards other species, though they establish a small territory around the caves where the male cares for the brood.

**Biological Aquarium Arrangements:** The bottom layer should consist of coarse rivers and (grain size 2-3 mm). A collection of small-sized rocks or pebbles placed

directly behind the front glass will create an opportunity to observe these Gudgeons, the proper way. Between those rocks, the male will dig small holes, which they will come to for mating. This digging behaviour is a biological condition stimulating the reproductive cycle.

**Water Conditions and Temperature:** *Chlamydogobius eremius* doesn't require very special conditions. However, water that is too soft — e.g., under 12° dGH — is not advisable. Somewhat alkaline conditions, between 7 and 7.6 pH are preferred. The temperature of the water should be kept at 25-26°C (77-79°F).

**Breeding:** Provided the fish have matured to full-grown size under well-fed conditions with live food (since they refuse to eat anything else, with the exception of minced cow/beef heart) they will easily come into breeding condition. One just has to see the display of the male's colours, seeking the favours of a female, thick with ripe eggs, or the fin flapping in rivalry between males — a fantastic show! Eventually, the couple disappears for mating in the brood-hole, where they spawn. The number of eggs varies from 60 to 150, depending on the maturity and size of the female. The eggs are pear-shaped and suspended on the wall or roof of the cave, where they usually hang down on a tiny filamentous thread, sometimes even connected to each other with a kind of string.

The eggs are large (3 mm) and crystal-clear allowing one to observe the day-to-day development of the embryos very easily with the naked eye. During development, the male takes care of the brood until the eggs hatch. The whole process takes at least 12-16 days at a constant temperature of 25°C (77°F).

**Fry Food and Growth:** Just one day after hatching, the fry of *Chlamydogobius eremius* start feeding on newly-hatched nauplii of *Artemia* with no difficulties at all. Make sure the nauplii are clean and completely without any of the *Artemia* cysts, because these are indigestible, causing obstruction in the digestive system. Later on a mix of livefood — *Daphnia*, *Cyclops*, etc. will boost growth and it is amazing to observe that the fry can reach a size of 2 cm (0.8 in) in length in the space of 3½ weeks. However, it will take a period of six to eight months for them to reach full maturity.

**Additional Information:** *Chlamydogobius eremius* seems to be sensitive to a drop in temperature. Most seem to be at their very best at a temperature of 25-26°C (77-79°F). In the protected surroundings of an aquarium their lifespan could be estimated at about two years, an age they could seemingly not reach in their own habitat. During its lifecycle *Chlamydogobius eremius* is a very productive little dwarf, doing excellently among other small fish in the tropical marine aquarium.

Left, even at full development the fry seem light sensitive (not an uncommon feature among eggs of cave-dwellers) and fungus will develop quickly after the eggs are exposed to too much light.



Right, a few hours before hatching. Almost fully-developed fry can be seen in most of the eggs.



# News from the societies

## Romford & Becontree Aquarist Society

The Romford and Becontree A.S. held their Open Show on **Sunday 26 June**. There were 616 entries. The **Best Fish in Show** was awarded to Mr S. Jackson for a *Geophagus steindachneri*.

R.B.A.S. would like to thank the companies that donated prizes, the judges, the entrants and everybody who helped to

make the show the great success it was. For further details of R.B.A.S., contact: B. Brown, Show Secretary, 12 Tiptree Crescent, Clayhall Avenue, Ilford, Essex, IG5 0SZ.

## Tongham Aquarists Society

Tongham Aquarists Society, which has been in existence for approximately 15 years, meets twice each month at 8.00 p.m. on the first and third Thursday

at the Victoria Hall, Ash Hill Road, Ash, Nr. Aldershot. Both novice and experienced aquarists are welcome to attend.

Competitive table shows are held at all meetings — judging is to "A of A" standards — and there is always an informative talk, slide show or quiz during the evening.

There is an additional table show class arranged from time to time which allows **Any Variety of Fish** to be shown, but with judging taking no account of size. This class is intended to encourage novices

and juniors to gain experience with their favourite fish on the show bench, as well as bring out the more unusual and interesting fish that some members own, but which (due to their size) are not usually shown.

Some of the forthcoming events are: 1 September: Talk — Carry on up the Amazon. 6 October: Practical — Fish photography.

Further details from Bob Gardner, Public Relations Officer, Stoneleigh, Busbridge Lane, Godalming, Surrey GU7 1PU.

# Diary dates

## Cardiff & District Fishkeepers Society

The second C.D.F.S. Open Show will be held at the Star Leisure & Recreation Centre, Splott Road, Cardiff, on **Sunday 4 September**. Dr David Ford of the 'Aquarian' Advisory Service will be available for discussions throughout the day, and will give a number of mini-lectures. Trade stands will also be open for business throughout the show. Doors open: 10.00 a.m. - 6.00 p.m. Details from J. Wiltshire, 320 Ball Road, Llanrumney, Cardiff. Tel: (0222) 778 629.

## Huddersfield Tropical Fish Society

The H.T.F.S. 1988 Open Show will take place on **Sunday 4 September** at the Slaithwaite Civic Hall, Slaithwaite, Huddersfield. Further information: Pamela Town (Show Secretary), 187 Abbey Road, Shepley, Huddersfield, HD8 8DY.

## Bristol Aquarists' Society

The 1988 B.A.S. Coldwater Fish Show will be held at its usual venue, St. Ambrose Church Hall, Stretford Road, Whitehall, Bristol, on **Saturday 10 September**. B.A.S. are also hosts for this year's Nationwide Trophy which, on this occasion, will be awarded to the winning entry in the Veiltail class. For further information, contact the Show Secretary, Shaun Peacock, 13

Cuffington Avenue, Brington, Bristol, BS24 3QY. Tel: (0272) 772665.

## Plymouth Aquarists & Pondkeepers Society

P.A.P.S. are holding their 40th anniversary and 17th Annual Open Show on **Saturday 17 September** at the Trinity United Reformed Church Hall, Toer Lane, Hartly, Plymouth. Further details from P. Smith, 5 Beech Avenue, Cattedown, Plymouth, PL4 0QQ. Tel: (0752) 266321.

## Northampton & District Aquarist Society

The above society's Open Show will be held on **Sunday 18 September** at the Gladstone Centre, Northampton. For further details, contact Mrs Sue Stevens, 8 Ringway, Northampton, NN4 9SQ. Tel: (0604) 774 907.

## East London Aquarists & Pondkeepers Association

The 40th Annual Breeders Open Show held by E.L.A.P.A. will be staged on **24 September** at the Catterall Hall, Cecil Road, Chadwell Heath, Romford, Essex. For further details, ring Hazel on 01-590 1824.

E.L.A.P.A. meet on the first and third Thursday of the month at Catterall Hall. Information from K. Stannard (P.R.O.), 135 Marks Road, Romford, Essex RM7 7AF.

## Darwen Aquarist Society

The D.A.S. annual Open Show will be held on **25 September** at the Library Theatre, Darwen (Union Street). Details from D. J. Milner (Show Secretary), "Rusland", 4 Marsham Grove, Darwen, Lancs., BB3 3JN.

## Preston & District Aquarist Society

P.D.A.S. are holding an Auction on **9 October** at Lancashire Polytechnic Students Union, Fylde Road, Preston. Booking in: 12.00 noon - 1.15 p.m. Sale commences: 1.30 p.m. Further details from Temporary Secretary, Nicholas Caunt. Tel: (0772) 634 616.

## Boston Aquarist Society

The Open Show of the Boston Aquarist Society is scheduled for **Sunday 9 October**. Venue: The Drill Hall, Main Ridge West, Boston, Lincs. Benching: 10.00 a.m. - 1.00 p.m. Judging: 1.30 p.m. Contact: K. Smith (0205) 67379.

## Ilford & District Aquarist's & Pondkeepers' Society

Ilford's Annual Exhibition of Fish will be held on **15 October** at Ilford Town Hall, Ilford, Essex. Doors open: 11.00 a.m. I.D.A.P.S. meetings are held every second Monday of the month at Wanstead Library Hall, Spruth Hall Road, Wanstead, starting at 8.00 p.m. Further details from R. Downer, 93 Brian Road, Chadwell Heath, Romford, Essex, RM6 5BT.

## West Cornwall Fishkeepers

The W.C.F. fourth Open Show will be held at Holman's Sports Club, "Blaythorne" Pendarves Road, Camborne, in conjunction with an Inter Club Show, with all clubs from Cornwall and Devon participating. Date: **Sunday 23 October**. For full details, contact Brian Sell (Show Manager), 'Westwoods', Illogan, Redruth, Cornwall. Tel: (0209) 842902.

## Catfish Association of Great Britain

The autumn Convention of the G.A.G.B. will be held on **Saturday, 19 November**, at Amersham Community Centre, Amersham-on-the-Hill, Bucks. Guest speakers: Heiko Bleher, Mike and Gina Sandford. Contact Gina Sandford, 5 Sparrow's Mead, Redhill, Surrey RH1 2EJ, for further details. Tel: (0737) 769339.

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end of a mature female Anchor Worm. Its head is buried in the body of your Koi. These parasites can attach themselves to any convenient place on a fish's body, particularly (I have found) around the base of all the fins.

Newly-purchased fish should be checked very closely to make sure no Anchor Worms can be found before they are released into the pool as they can be quite difficult to spot once the fish are actually in the pool.

The usual treatment for *Lernaea* is carefully to remove the parasite with tweezers and then swab the area with one of the usual disinfectants, such as Mercurochrome or Malachite Green. Care should be taken in removing the parasite in order not to snap off the head of the animal, thus leaving it embedded in the fish. Having gripped the Anchor Worm with the tweezers, gently pull in the direction of the tail keeping the head of the tweezers as close to the body of the fish as possible. On small Koi this is easy to do, as you can control the fish, but on larger specimens, it would pay to have one person hold the fish while another removes the parasite.

## Tropical Sexing and breeding Kribis

*Would you please tell me how to sex Kribensis? Will they breed in my community tank?*

Kribensis (*Pelvicachromis pulcher*) make good parents and will breed readily in the aquarium. The sexes are easily differentiated — the male is slimmer, larger, and has more pointed fins; the female is fatter (with eggs) and is more brightly coloured.

You will not successfully breed these fish in the community tank, because they will fight the other species and the fry will get eaten. Set up a separate breeding tank — 24in x 12in x 12in is best. Use mature water from the main tank and isolate a potential pair. Add a plant pot on its side as a 'cave' and leave them to it. The fry are quite large and easily fed on crumbled flake food.

When the pair develop breed-



A pair of Kribis with their young. The larger, slimmer fish in the foreground is the male.

ing colours again, remove the fry or they could be killed by the parents' efforts to make room for the new family.

## Breeding Neons

*Would you please advise me on the best way to breed Neons?*

The Neon Tetra was recently voted the tropical hobbyists' most popular fish, displacing

the Angel fish. It is often called the Hong Kong Tetra because so many millions are produced by fish farms in that area.

In fact, the Neon is a South American fish from soft, acid Amazonian waters. So there is the secret of breeding. Use rainwater made slightly acid by pre-soaking in peat. The best "breeding" age is 9 months; choose a female from a shoal (obviously fat with eggs) plus a vigorous male in good colour.

Isolate the pair and feed on live foods (Brine Shrimp, *Daphnia*, White Worm, etc.) Include some bushy plants and a little rock salt (1 teaspoon for each 2 litres). After chasing among the plants, the pair should shed around 100 eggs. Remove the spent fish and cover the tank to exclude light (the eggs are light-sensitive). Slowly remove the cover at day 5 when the fry should be free-swimming. Feed on hard-boiled egg yolk squeezed through mesh, freshly hatched Brine Shrimp and then, crumbled flake food.

The adults are easy to keep in any type of community aquarium. For more information, look up *Paracheirodon innesi* in any fish book.

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## FOCUS ON AQUARIUM EQUIPMENT

# LIGHTING UP

Dr David Pool of the Tetra Information Centre unravels some of the mystery surrounding aquarium lighting and its relation to plant growth.

**L**ighting in the aquarium is important for two main reasons: firstly, to encourage plants or algae to grow and, secondly, to enable us to view the fish and other occupants. Sunlight is, by far, the best source of light. It has been around for millions of years and the plants have evolved to make maximum use of it.

Unfortunately, sunlight is too unreliable, particularly in the UK, and cannot easily be controlled; therefore we have to use artificial means of lighting. Artificial lights come in many shapes and sizes, and it is important to choose the correct form if your plants and algae are to remain healthy. In this article I hope to give some indication of

what the plants require so that you can choose the correct form of lighting for your tank.

### What is it?

Before going any further, it is important to understand what light is. Light is formed by electromagnetic waves. These waves come in a wide range of lengths, and if the wavelength is between 380 and 750 nanometres (= billionths of a metre) it can be seen as visible light. The actual wavelength determines the colour of the light. Sunlight, and the light from many bulbs, appears white, owing to it containing a mixture of colours. The relative amounts of each of these colours determines its suitability for plant growth or the "quality" of the light, whereas the total amount of light determines its intensity.

### Quality of light for aquarium use

In the aquarium we should aim to provide the plants and algae with light which is as close as possible to sunlight in terms of the relative amounts of each colour. By doing so, the plants and algae will grow well and the fish will appear natural.

The similarity of the light emitted by a particular bulb to sunlight is given by its **Colour Rendering Index (CRI)**. The CRI ranges from 0 to 100, with 0 being totally different to sunlight and 100 being identical. This value may be given as a scale from 1 to 4 in the bulb specifications. A level of 1 indicates a CRI of 85-100; 2=70-84; 3=40-69 and 4=1-39. Therefore, by reading the information about a bulb, you can tell at a glance how close to sunlight, and therefore how suitable for plant growth, it will be.

Plants use certain coloured light more efficiently than others. This is determined by chlorophyll, the green pigment which occurs in all plants. Chlorophyll is used by the plants to carry out a process known as photosynthesis — the combination of carbon dioxide and water, in the presence of light

to form oxygen and carbohydrates. The carbohydrates provide the energy and building blocks for plant growth.

Chlorophyll is most efficient in red and blue light and, by providing just these colours, good plant growth can be achieved. Unfortunately, an aquarium will look very unnatural with just this lighting.

### Quantity of light required for plant growth

As well as having the correct quality of light for an aquarium, it is also important to have enough of it for the plants to thrive. The quantity of light (= intensity) required for different plants varies slightly (see Table 1).

However, all of these plants could be kept in the same aquarium by carefully planning where each should be positioned. By doing this, plants which require intense light can be positioned immediately underneath the light, whereas others requiring dimmer conditions can be positioned at the front, or in the shade of larger specimens.

The light output of a bulb is measured in lumens and is related to its power (in watts). The actual relationship varies depending on the bulb in question. Some examples for commonly used fluorescent tubes are shown in Table 2.

The amount of light falling onto the water surface is measured in lumens per square meter (= lux), and it is this value which is usually quoted as the light requirement for a plant. This can simply be obtained by dividing the light output of the bulb (in lumens) by the surface area of the water (in square metres).

While discussing light intensity it is also important to mention sources of loss. The water itself is a major source of light loss. As an example, the light intensity at the water surface on an overcast day would be 15,000 to 20,000 lux, but this falls to 700 to 3,000 lux at a depth of 12m (30cm). If the water is dirty, or contains algae, the loss is even greater. Other sources of loss are the coverglass or condensation tray which absorbs or reflects 7-9% of the light (more, if dirty); the water surface which reflects approximately 5%, and the surface above the bulbs which can absorb up to 50% of the light, if not reflective. As you can see, the aquarium hood can be a major source of light loss and it is advisable to cover it with a smooth layer of tinfoil or a non-toxic reflective paint.

### Choice of lighting

What does all of this mean in terms of choosing a light for an aquarium? When selecting a suitable means of lighting one

**TABLE 1: LIGHT REQUIREMENTS OF CERTAIN POPULAR AQUARIUM PLANTS**

Lighting	Species of plant
Dim ( $<1500$ lux)*	Most <i>Cryptocoryne</i> species <i>Vesicularia dubyana</i>
Medium (500 to 1000 lux)	<i>Anubias</i> species <i>Sagittaria</i> species <i>Aponogeton madagascariensis</i>
Bright (1000 to 1500 lux)	<i>Ceratopteris thalictroides</i> <i>Bacopa caroliniana</i> <i>Ludwigia</i> species
Very Bright ( $>1500$ lux)*	<i>Aponogeton</i> species <i>Cabomba</i> species <i>Hygrophila polysperma</i> <i>Myriophyllum</i> species <i>Riccia fluitans</i> <i>Vallisneria</i> species

\*  $<$  = less than     $>$  = more than

**TABLE 2: LIGHT OUTPUT IN LUMENS OF SELECTED FLUORESCENT TUBES**

Fluorescent Tubes Type of Tube	Wattage (+ length in cm)			
	40 (120cm)	30 (90cm)	20 (60cm)	15 (45cm)
White	3100	2400	1200	900
Natural	2300	1800	900	700
Northlight	1900	1400	800	550
Grolux	900	600	400	230

The above values are for new tubes. After approximately six months they will be 10-20% less intense.



needs to choose a bulb (or bulbs) which will provide light with the correct combination of colours, and that is powerful enough to provide sufficient light intensity for the plants you require at the depth of your aquarium.

There are many different types of lighting available which can be used for illuminating your aquarium. The following are perhaps the most popular.

### 1 Fluorescent tubes

Fluorescent tubes contain mercury vapour which glows as it becomes electrically charged. The light given off by the mercury vapour is all ultra violet (UV) light which cannot be seen by the human eye. However, by coating the tube with a fluorescent coating, the UV light can be used to make this layer fluoresce and give off visible light. By using different materials to coat the tube with, it is possible to have different quality light (hence the wide range of fluorescent tubes available). Additionally, some tubes are twisted. This provides a greater surface area for the fluorescent material, and consequently, the bulb is more powerful (= brighter).

Fluorescent lighting is generally very good for plant growth as it closely resembles natural light (high CRI). Additionally, some tubes have been specially developed for horticulture and have a light spectrum close to that required for photosynthesis by chlorophyll (eg Gro-lux). These bulbs are best not used on their own due to them giving the aquarium a very red or blue appearance. However, they are excellent when used in combination with other bulbs.

One disadvantage with fluorescent tubes is their relatively low light intensity. To achieve the required intensity for plant growth it is often necessary to use more than one tube, which involves purchasing several starter units, etc. These bulbs do not last for ever, and, as they age, so the light intensity decreases. In general, it is necessary to replace the bulb every 9-12 months to maintain a suitable intensity. On the subject of replacement bulbs, plants do not respond well to sudden changes in light intensity. Therefore, if your tank uses more than one bulb, stagger their replacement to avoid such changes.

### 2 Tungsten lighting

Tungsten lights are those commonly used for household lighting. They have a light spectrum which is close to that of natural light, but lack blue light. Therefore, if used, it is advisable to combine tungsten bulbs with a light form giving blue light.

Tungsten lighting used to be very popular but, because of the relatively short lifespan of each bulb, and the large amounts of heat generated, they are less suited to an enclosed aquarium lid.

### 3 Metal halide lamps

Metal halide lamps provide a very intense light source which does not closely resemble natural light, or that used for photosynthesis. Instead, the bulbs provide a wide range of wavelengths of light at a sufficiently high intensity to ensure that the plants receive their required light.



Luxuriant plant growth such as this requires optimal lighting conditions.

## THE DISTRIBUTION OF COLOURED LIGHT WITHIN SUNLIGHT SHOWING THE LIGHT USED FOR PHOTOSYNTHESIS



Metal halide lamps are used suspended (from the ceiling or attached to wall brackets) or, as from very recently, in "tube" form housed within an integral hood. It is important to have a reflector to protect your eyes from the light source.

These lights are becoming increasingly popular for aquarists with deep tanks or for marine aquarists keeping corals. The intense light ensures that even the bottom of the aquarium receives sufficient illumination. To give some indication, a 150 watt unit will illuminate 2.5 square feet (1800cm<sup>2</sup>) to a depth of 24in (60cm), if sited 12in (30cm) above the water surface.

### 4. Mercury vapour lamps

As with fluorescent tubes, mercury vapour lamps use mercury vapour to provide a light source. Unlike the fluorescent tubes, the mercury is at a high pressure; therefore more light is produced.

Mercury vapour lamps provide light with a wide range of wavelengths and, because of the high intensity, provide sufficient for good plant growth.

As with the metal halide lighting, the mercury vapour lamps are suspended or wall mounted so that they are approximately 12in (30cm) above the water surface.

### Lighting pattern

Having covered the requirements of the plants in terms of light intensity and quality, and how to achieve this artificially, the final area to consider is the lighting

pattern.

Most plants used in the tropical aquarium originate from the Tropics where they have 12-13 hours of daylight and a very short dawn and dusk. In the aquarium it is advisable to copy this, particularly for sensitive or "difficult-to-grow" species. By maintaining a regular pattern of lighting, plant growth is often considerably better than in aquaria in which the lights are switched on and off at different times. If necessary, this can be achieved by using electrical timing equipment.

### Further reading

I hope that this article has given some understanding of what is required in terms of aquarium lighting, and why. By understanding the plants' requirements one will be in a better position to select the correct type of lighting for a particular tank, and, hopefully, see the benefits in terms of lush plant or algal growth.

Aquarists requiring more information on the subject of aquarium lighting are advised to consult the following texts.

*An Interpret Guide to Aquarium Plants* by B. James. Published by Salamander.

*The Complete Book of Aquarium Plants* by R. Allgayer and J. Teton. Published by Ward Lock.

*Light in the Aquarium* by R. Kübler. Published by TFH.

*The Aquarium Technology Handbook: Fundamentals, Equipment and Practice* by A. Jenno. Published by David and Charles.



## FOCUS ON AQUARIUM EQUIPMENT

# A BREATH OF CLEAN WATER

Without clean, aerated water, a healthy tank will soon turn into a death trap. Dick Mills examines some of the main ways in which this kind of disaster can be avoided.

**V**ery soon after the beginning aquarist has bought the first tank, he or she will be faced with what to buy next in the way of 'necessary equipment'. It is surprising how many novices assume it is absolutely obligatory to have a column of bubbles ascending through the water or to have an apparently cotton-wool filled plastic box hanging on the end of the tank. Just as you might do a little research into what fishes you want to keep, you should also learn a little about aeration and filtration (their truths and myths) before parting with your money.

### Aeration

This does not actually force oxygen into the water by the column of bubbles, but encourages oxygen to enter the water more easily by creating surface turbulence; by also creating currents of water throughout the tank, the bottom layers of the water are brought to the surface and cooler pockets of water are dispersed in tropical aquariums. This water movement also encourages the expelling of carbon dioxide gas (although there are other methods of dealing with the removal of this gas, through the use of plants, etc).

Aeration is easily arranged, connecting a diffuser block (either of sintered glass or porous wood) to the airline tubing from a diaphragm vibrator airpump is all that is required. The volume of air sent to the stone is controlled by a simple clamp on the airline, a plastic airvalve, or a rotary control on the pump itself. Aeration is also provided quite automatically by the bubbles emerging from air-operated internal box filters, a fact often overlooked by newcomers.

Power filters, electrical submerged pumps, and powerheads with spraybar and/or venturi attachments can also be used very effectively for water aeration.

Aeration is beneficial without a doubt, especially where the tendency might be to overcrowd the tank; it is almost essential in coldwater aquariums during warm or thundery weather. Although it may be seen to increase the apparent water-surface area of the tank and maintain good dissolved oxygen levels effectively, this should not be taken as a licence to overstock with fish, as any failure on the part of the airpump could

result in asphyxiation occurring. Aeration should be provided whenever medication is used in the aquarium or treatment tank (many medications lower the oxygen level in the water and additional aeration helps to restore the balance).

### Maintaining a good air supply

Keep the airpump's filter clean. This is often neglected, although it is a simple matter periodically to remove and rinse through the small felt pad found underneath the airpump body. Airstones and diffusers often clog up through algae or, more likely, through hard calcium deposits, especially in hard water areas. Although boiling the 'stones' often gives a new lease of life, it is usually easier simply to replace them.

Always safeguard the airpump against water damage by fitting a non-return check-valve in the airline near to the pump: good alternatives are to site the airpump above the aquarium if possible, or make a 'higher than the aquarium' anti-siphon loop in the airline before it reaches the airvalves or aquarium devices.

Although keeping the airpump in a foam-filled box may help to cut down any annoying buzzing, it needs some ventilation to prevent overheating occurring.

### Filtration

If somebody offered you a box of concentrated dirt to attach to your aquarium, and



told you that all the aquarium water would pass through it continuously, then you wouldn't be too interested, would you? Yet, that is precisely what a filtration system is, unless it is regularly maintained.

Once living organisms are kept in a body of water, its quality begins to deteriorate. A filtration system helps to keep the water pure for a longer period of time. (Modern aquarium writers are increasingly using the word 'purification' to describe the action of filters instead of 'filtration').

The waste materials to be removed from the aquarium water may be *visible* (suspended dirt, cloudy water) or *invisible* (dissolved wastes, such as urine, ammonia, nitrites, etc). To remove them completely requires a very comprehensive and efficient system, but the hobbyist with tanks fitted with more modest filtration equipment can assist in keeping waste levels in the water down to a safe, minimum level by replacing some of the aquarium water periodically. This dilutes the levels of dissolved wastes, but only if water is removed and replaced; topping up evaporation losses alone with ordinary tap water, for instance, will increase the hardness of the water, especially in very hard water districts.

Most box and canister filters, for either internal or external use, primarily work in a mechanical and chemical way: man-made fibres trap the suspended wastes from the water and ammonia-absorbing materials such as zeolite (or Interpet's Nitrex) will extract this dangerous compound.

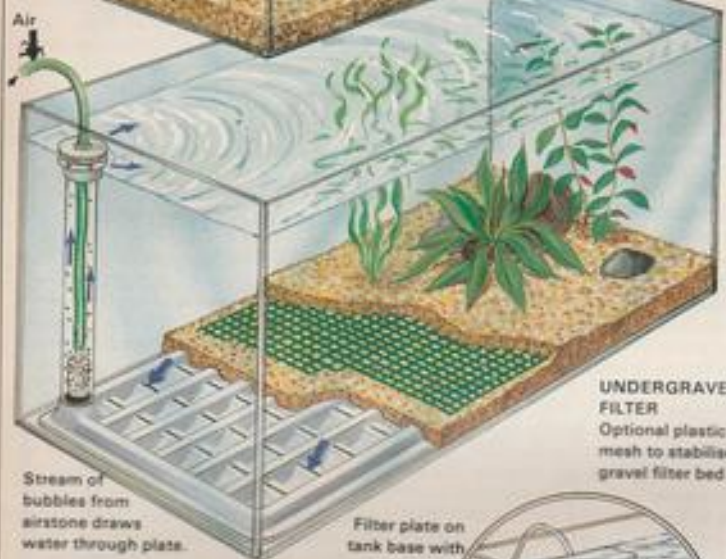
Activated carbon has an extremely large surface area (equal to several football pitches) onto which other waste products, such as urine, are absorbed. Unfortunately, activated carbon is so efficient at extracting materials from the water that it should not be used in the filter whenever medications are added to the aquarium — it will remove those as well!

In addition to the above straightforward mechanical and chemical removal of wastes, there is another type of filtration encountered in aquariums which makes use of bacterial activity to reduce the level of harmful compounds. Most solid waste products from the fish, together with uneaten food and rotting plant matter, etc., are all broken down by bacteria to form toxic ammonium-based compounds. Two further distinct types of bacteria (first *Nitrosomonas*, and then *Nitrobacter*) progressively break down these compounds into less harmful nitrite and nitrate.

Cultivating the necessary bacterial colony is achieved by utilising the **biological**, or undergravel, filter. Water is passed through the substrate by an airlift or electric impeller 'power head' (it matters little to the bacteria in which direction the water flows) and the flow of oxygen-rich water supports the bacterial colony which gradually develops on the surface of each particle of gravel.

A certain period of time must elapse before the bacterial bed 'matures' and becomes capable of handling the level of ammonium-based waste produced by the fishes. Consequently, the stocks of fish levels in a biologically-filtered aquarium must be built up slowly so that the filter can





Stream of bubbles from airstone draws water through plate.

**UNDERGRAVEL FILTER**  
Optional plastic mesh to stabilise gravel filter bed



Spray bar

Filter plate on tank base with gravel layer on top

**EXTERNAL POWER FILTER**

Water taken in near bottom of the tank, through filter medium in the canister and returned through a spray bar to tank.

## FOCUS ON AQUARIUM EQUIPMENT

cope. Differences of opinion are quite polarised within the hobby as to the virtues of such filtration systems, especially where plant growth is concerned. However, there is no doubt as to the efficiency of the system to maintain water purity (and this system is pretty well mandatory for marine aquariums).

Canister-type external power filters can be partially converted to 'biological action' by using pieces of ceramic pipe, terracotta mouldings or even plastic pot-scoopers or hair-curlers as media which bacteria can colonise. Neglected, or otherwise operationally-longstanding, box filters will additionally (and quite naturally) act as biological filters as long as the medium is washed out in aquarium water and not tapwater; this will preserve the bacterial colony.

### Choosing the correct type, and size, of filter

Internal sponge and box filters are best used in small tanks or in bare fry-raising tanks where they may be serviced easily. Internal power filters may be too powerful for small tanks (who wants plants permanently leaning over?) unless their strong returning water flow is directed into the corner or dispersed by a spraybar (which also provides aeration). When using an undergravel type, use a protective gravel tidy to stop foraging or digging fishes actually uncovering the filter plate and so 'short-circuiting' its performance.

Choose an external power filter to suit the size of the tank so that the water is filtered, say three or four times an hour. Each filter has its flow rate printed on it somewhere, but this is calculated without there being any filter medium in the filter. Once this is put in and begins to clog up with removed dirt, then the flow rate will be reduced. To allow for this, select a correspondingly larger and more powerful filter, around one-third larger than the quoted flow rate.

### Maintaining the filter's efficiency

Clean the filter medium regularly. Any diminishing flow-rate from the filter return indicates a clogging of the filter medium (don't pack it in too tightly either). The substrate should be gently raked over periodically to prevent it packing down where 'down-flow' biological filtration is used. Two advantages of the 'reverse-flow' (or up-flow) biological filtration method are: that a power-filter pushes pre-cleaned water through the substrate so that little dirt accumulates in the substrate; and that the upward water current also keeps any dirt from settling, this being automatically removed again by the external filter.

Keep your filters in good order and, in return, they will continue to keep the aquarium clean.

ARTWORK REPRODUCED WITH THANKS FROM "AN INTERPRET GUIDE TO FANCY GOLDFISHES" BY DR CHRIS ANDREWS PUBLISHED BY SALAMANDER BOOKS



## FOCUS ON AQUARIUM EQUIPMENT

# HEAT THAT WATER

Dr David Ford, Head of the 'Aquarian' Advisory Service reviews the various methods by which aquaria can be heated.

**T**he community tropical aquarium requires a temperature of 24°C (75°F), plus or minus a degree Celsius, to average the varying needs of a wide variety of fishes.

The marine aquarium should be slightly higher, but absolutely constant, for coral fishes to thrive. (In practice, the 'Aquarian' Laboratory has found 27°C (80°F) to be the preferred temperature for most marine fishes and invertebrates).

Coldwater fish (Common and Fancy Goldfish, Orfe, small Koi, Bitterling and Minnows) do well at room temperature if the water is well oxygenated. Therefore, these fish do not require heating. However, if such fish are to be bred and the fry encouraged to grow rapidly, some heating may be required, especially in fish houses, which may be an external hut or garage, etc. Breeders of Fancy Goldfish can simulate springtime by controlling the lighting and



Above left, some species of tropical fish, such as Rosy Barbs (*Barbus conchonus*) benefit from lower temperatures during the winter months. Modern-day heating equipment allows for such adjustments to be carried out accurately and easily.

Top left, like all other coral reef species, *Pomacanthus maculosus*, the Half/Purple Moon Angel, needs to be kept at a high (upper 70's°F — mid-upper 20's°C), but

constant, temperature. Today's heater/stats are usually sensitive enough, and dependable enough, to ensure that fluctuations are minimal.

Above right, a heating element embedded in silica sand (plus silvered thermostat contacts) has been found to be about the best arrangement for even distribution of heat... and prolonged life of a heater/stat.

including a small heater to raise the temperature from a cool 10°C (50°F) to the ideal 18°C (65°F).

Coolwater fish include the temperate zone species such as the North American fishes and some tropical species that live in water cooled by mountain snows. Most tolerate 20°C (68°F), so the modern centrally heated home is ideal for this type of aquarium and supplemental heating is not required.

Brackish water tropicals (Scots, Monos, Black Mollies, etc) prefer 22°C (72°F) but a wide tolerance (plus or minus 2°C) is accepted, so heating is needed, except in a living room that is always kept warm.

The breeding tank for tropical species will certainly need heating; many species will not spawn at their normal temperature, and a rise of 5°C (9°F) is often required. The fry grow better too at such elevated temperatures.

### HEATING METHODS

Methods of heating have changed over the

### HEATING FORMULA FOR FISH-HOUSES

$P = f \times A \times dT$  where

P = wattage required for traditional heater/stat

f = heat loss (0.03 for bare glass tanks, 0.06 for insulated tanks)

A = total surface area (exclude base) in dm<sup>2</sup> (note: 1 dm = 100 cm<sup>2</sup>)

dT = temperature difference in °C between the lowest expected temperature and the required tank temperature.

years. Early aquarists used slate bottomed tanks with a paraffin flame underneath. Even when I was a lad, aquarists used 60 or 100 watt light bulbs under the tank to maintain temperature. They were housed in a light-proof box, usually filled with sand to help dissipate the heat, with the tank placed on the top. When a light bulb failed (falling tank temperatures) replacement meant moving the whole aquarium!

Nowadays, modern technology has made water heating a simple and reliable task... there are electrical mains driven bi-metal strip heater/stats, electronic controlled heaters, low voltage cable heaters and under-tank plate heaters, all by many different manufacturers, giving a bewildering choice for beginners.

The most popular choice is the combined heater/stat based on a bi-metal strip contact. This is because it is reliable and cheap, and although it can suffer from aging (usually the electrical contact points become pitted, or water enters via old plastic seals), it is cheap enough to have a spare standing by. The modern version of this unit developed from the separate heater and thermostat. These early models were not separate for technical reasons, but to avoid purchase tax! The static heater did not attract the tax, like the 'moving' thermostat, and so, the separate



ATLANTIS



## FOCUS ON AQUARIUM EQUIPMENT

units were cheaper than the combined model.

The latest versions contain silica sand to dissipate the heat from the heater coil, which considerably lengthens its life. Further, silvered contact points show less tendency to form pits or stick together. Many models include a neon light to show when they are working, which helps adjustment, of course.

The heart of the unit is the bi-metal strip. This consists of Nichrome (Nickel and Chromium) wire pressed into a strip such that each face has a different layer. As a metal warms up, it expands at a rate that is unique to that particular metal. The difference in expansion between the two metal faces causes the strip to curl, and so, even a small rise in temperature will make the strip curl into the 'open' position i.e. no electrical contact. No current flows to the heater so the unit cools down and the strip uncurls. The problem then is that the electrical points will eventually almost close, allowing electricity to spark across the gap, giving almost welding conditions. To overcome this problem a permanent magnet is built into the points area so the metal strip snaps shut when the uncurling brings it close to the magnet. When curling as it heats up, the reverse happens; the magnet loses its grip and the strip springs open. Although an old principle, it is the modern powerful ceramic magnets that have improved this action.

### Double insulation

This traditional heater/stat uses glass in a 'test-tube' style because nothing has proved as watertight or resistant to the thermal shocks. When the UK Electrical Appliances (Safety) Regulations came into effect a few years ago, manufacturers found that they needed to double-insulate the internal wiring and contacts. Ingenious devices appeared ranging from double glass tubes to metal sheaths, but all failed for various reasons. Nothing proved as effective as the single glass tube. With EEC Regulations now replacing UK requirements, the traditional heater/stat is, again, that single tube, but made from hardened glass to protect you and the fish.

The most modern system available is the rather expensive, low voltage cable heater. These heaters use a 250 watt, 42 volt transformer that connects, via waterproof



While all Bitterlings (*Rhodeus* spp) require a cool spell prior to spawning, gentle heat in the spring can help achieve success.

joints, to a cable in various lengths to suit the size of the aquarium. The 42 volt cable is buried under the gravel (which is something one cannot do with glass heater/stats) where it cannot be seen, but it warms the whole base, giving a gentle and very uniform heating of the bulk of the water. It is claimed that the plants grow better in the warm gravel. A probe is necessary to monitor the water temperature with an electronic switch to operate the transformer. Such controls are precise to 0.1°C and the cable itself is never more than 2°C warmer than the aquarium. This is the best advantage over the glass heater/stat, because some of the larger fish can burn themselves on a traditional mains heater. (Specialist fish-keepers such as Cichlid owners, encase heater/stats in pipes or use glass dividers to avoid this problem.)

Heated pads are also available to base heat the tropical aquarium using mains electricity or low voltage systems. Among

the advantages possessed by these pads are that there is no actual contact between pad and water, and (being located) beneath the tank, they are also out of sight. The main problem with these devices is the great weight of the tank and water and the obtrusive design of some metal pads designed to withstand the weight. Some slim-line, unobtrusive models have, however, made an appearance recently and are becoming quite popular.

### Fish house heating

Space heating for fish houses allows other types of heating methods, from Butane gas heaters to electric fan heaters. When paraffin was cheap, many a fish house was heated with burners, but they were dangerous. Fumes were a problem (for the fish too), but the major drawback was that water was produced, giving condensation that dripped from the ceiling, shorting the lights and rotting the tank supports. The large breeding houses in some European countries use banks of tanks placed on centrally heated pipes. The heating bills are enormous and staff need to work in bikinis! For the home-based fish house, the modern electric fan heater coupled to an air thermostat (as sold for Greenhouses) is very effective, especially where good insulation prevents expensive heat loss.

Heat loss from water is always slower than from air, hence the best heating system remains the glass heater/stat within each individual tank. Occasionally, complex diagrams can be seen in articles on how to heat several tanks with only one thermostat... but these are fraught with danger and control is never as efficient as the individual tank heater/stat.

Whatever system is used, the temperature must be monitored, so a thermometer is an essential part of all aquarists' accessories. Here, again, technology has helped improve precision and lowered price, with the simple-to-apply-and-read digital thermometer strips. The latest versions have 'cling' backing rather than impact adhesive so they can be easily removed and re-used. "Traditional" thermometers are, of course, still around as well.

In fact, technology marches on, and even better, more reliable, longer life, precision control heater/stats are being developed by all the world's manufacturers... just watch this space!

### TEMPERATURE CONVERSION CHART

Celsius (Centigrade) value  $\times 1.8 + 32$   
= value in Fahrenheit  
Fahrenheit value  $- 32 \times 0.556$   
= value in Centigrade

### SUITABLE HEATER/STATS FOR THE HOME AQUARIUM

Aquarium size — inches (centimetres)	Wattage of Heater
18 x 10 x 10 (45 x 25 x 25)	30 to 60
24 x 12 x 12 (60 x 30 x 30)	75 to 100
36 x 15 x 12 (90 x 37 x 30)	100 to 150
48 x 15 x 12 (120 x 37 x 30)	150 to 200
72 x 18 x 18 (180 x 45 x 45)	200 to 300

Choose the smaller wattage for a warm room, the greater for one that gets cold at night.

### SIMPLER HEATING RULE OF THUMB METHOD

10 watts per gallon (4.5 litres) for small tanks (up to 2 feet — 60 cm)  
6 watts per gallon for medium tanks (up to 4 feet — 120 cm)  
4 watts per gallon for large tanks (over 4 feet — 120 cm)

# YORKSHIRE AQUARIST

Sun (well, perhaps not!), sea and sand ... plus all the fun of the fair ... plus the donkey rides, the ice creams, the promenade, the kaleidoscopic merry-go-round displays ... plus a major aquatic festival — that was Bridlington on 9-10 July.

Sounds like an ideal mix, doesn't it? Except that, sadly, it isn't.

I must admit that I have always had reservations concerning the staging of aquatic festivals at seaside resorts. It's not that I have anything against the resorts themselves. As resorts, they are fine; but, precisely because of this, they offer colourful, strong and expensive competition for any event staged within their boundaries.

Further, their location, by definition, means that the catchment area for any "non-seaside" event is considerably reduced — sometimes by 50%, or more. In other words, you can't draw a 50-mile circle around a seaside resort and call it your "local" catchment area ... a semicircle, perhaps ... a circle, never.

Then, again (taking this year's Y.A.F.), Bridlington is a long way away from some of the areas which, traditionally, provide large numbers of show visitors, e.g. Lancashire, Reading, Bracknell, Tongham and Basingstoke.

Combine all these factors together, and it is possible to see how you could stage a really good show and still run the risk of low attendance figures. In essence, this is what happened at this year's Y.A.F.

The venue, the Spa Royal Hall, was gorgeous; the support of the local council — superb (both the Mayor of East Yorkshire, Ms. Margaret Chapman, and the Mayoress, Mrs. Susan Thompson, attended and presented the prizes); the quality of the fish on show — excellent; the tableaux (see below) — exceptionally good. Yet, despite this, attendance figures over *To column 3, page 53.*



Steve King (D.H.S.S.) picks up yet another first from Mayoress Susan Thompson (nearest camera) and Mayoress Thompson's impressive tableaux was this third-placed huge boot (with tanks in-built round base).

## NORTHERN IRELAND HOLDS FIRST

Report received from Dr David Ford

The Irish Federation of Aquarist Societies is an affiliation of all Aquarist Clubs in Ireland (North and South). They have held occasional shows over the years, usually as part of pet or hobby exhibitions in Bangor. One active member of the Federation is the Antrim Aquarist Club, who this year decided to hold a fish-only exhibition in Belfast — the first such major show since 1978.

It was a one-day event (Saturday 25 June) at the Valley Leisure Centre, Whiteabbey, just north of Belfast City Centre. The rules of the Irish Federation of Aquarist Societies were applied to 27 classes of Tropical and Coldwater fishes and Furnished Aquaria. I.F.A.S. judges awarded the points.

The 10,000 square feet of the hall was ample space for the 18 display stands. These included the Antrim Aquarist Club, Bangor Aquarist and Breeders Society, Stranstown Breeders and Aquarist Society, Bray

Aquarist Society and North Dublin Aquarist Society. The Irish Federation of Aquarist Societies was also present, with the Irish Tropical Fish Society of Co. Dublin.

Other Aquatic Associations

which had stands, were the British Cichlid Association (with their Irish representative Dave McMenemy) the British Killifish Association (with Frank Cochrane) and the British Koi Keepers Association

"Mr T." Antrim's answer to England's "Rambo."



DAVID FORD



# FESTIVAL BY THE SEA



Member of East Yorkshire, Margaret Chapman. Among the prize-winning tableaux (see sides and back) from Wyke Show Society.



JOHN DAWES

From column 1, page 52

the two days were disappointing.

Those who did attend saw some of the best tableaux ever entered at Y.A.F. — my oft-expressed views on "relevance" notwithstanding. To quote from a letter I have just received from the Y.A.F. committee.

"There were 17 tableaux entries in total, most of which deserved first prize. The design and workmanship of the winning tableau (Gypsy Caravan from Bradford A.S.) was absolutely phenomenal... (we) do not remember a Festival anywhere, at anytime, where the standard of tableaux was so high."

On a different note, the committee members have asked me to pass on a few votes of thanks

on their behalf, which I gladly do — word for word:

"We cannot praise the societies who supported us highly enough, and words completely fail us to thank them for the quality of their tableaux. If we get the same quantity and quality of entries at next year's Festival, judging should be nigh on impossible.

Our special thanks to the traders who support us through thick and thin; we look forward to seeing you at the 1989 Yorkshire Aquarist Festival. We are already back at the drawing board with exciting ideas.

Lastly, we would like to comment on the help and assistance given to us by the staff of the Spa Royal Hall; this was second to none and was greatly appreciated.

On a personal note from the Y.A.F. Committee, 1988, we would like sincerely to thank all who helped and attended the Festival for the support given. The atmosphere was terrific; see you all next year."

Clearly, it's "thinking-cap" time for the Y.A.F. committee, but, knowing the enthusiasm and dedication they feel towards making their Festival the success it rightly deserves to be, I'm sure that they will come up with some refreshing and exciting ideas for 1989.

## BEST NATIONAL SHOW IN 10 YEARS

(with Roy Brown's large Koi on display).

Also there, was a "Barbs Species" Society, an exclusively Irish Club, devoted to *Barbus* species, run by Martin Carlisle who had an interesting tableau.

The Association of Aquarists have a strong Irish connection and Brian Kavanagh of the Irish Tropical Fish Society represented the A of A with a display of all their booklets and information leaflets.

Marine interests were met by a display of Irish seawater

fish and invertebrates from the Northern Ireland Aquarium of Portaferry in Co. Down.

Trade stands included the Pet and Aquatic Centre of Newtownards, Posh Pets and Grosvenor Tropicals of Belfast and Petworld of Newtownabbey. TFH, Hagen and King British were also represented by these traders.

I was on the largest stand at the show, the 'Aquarian' and 'Atlantis' one, represented by Northern Ireland distributors, J. Kilpatrick of Belfast, who

set up a large display of all their aquatic range.

The 'Aquarian' Advisory Service stand proved very popular and I was kept busy handing out advice and Beginners' Guides throughout the day, while alongside, Malcolm Elms of Thomas's Sales and Marketing Division was kept equally busy with the 'Atlantis' display.

Over 400 people visited the show, which meant the hall was busy but never crowded, so fish viewing and product buying was relaxed and easy. This sounds very few by mainland Britain's standards, but is a very good attendance record for the small population of Northern Ireland.

Some very good fish were displayed and the "Best in Show" was a *Theraps harrongi* called "Mr T", which must rival England's "Rambo" (the frequent winner of English awards). Mr T is owned by Sharon Green, who is show secretary of the Antrim Aquarist Club.

Space to move at the show.



DAVID FORBES

### MAJOR Y.A.F. '88

#### AWARDS

##### Tableaux

1. Gypsy Caravan — Bradford A.S.
2. Sand Castle — Hobbies Centre Aquarists Group
3. Boat — Wyke Show Society
4. Tudor House — Bridlington A.S.
5. Tool Box — Hull A.S.

##### Fish of the Year

*Brycinus imberi* — Mr & Mrs DaCosta (Ashby A.S.)

##### Best Fish in Show

*Caridina stuarti* — Bonny & Keith Myers (Wyke Show Society).

# EDITH'S FIGHTING FISH

Stephen Clark of the AAGB introduces a new and exciting mouthbrooding fighting fish from Borneo



An adult pair of *Betta edithae* (female below). The distinctive colour differences between the sexes are clearly visible.



Although this *B. edithae* male has subdued coloration, it is nevertheless a more spectacular fish than *B. picta*.



*B. picta* (this is a male) is a somewhat smaller and "duller" species than *B. edithae*.

Leaving your mark in the annals of time by having a fish named after you, is a rare honour indeed. To have actually discovered that fish in the first place is even better. Yet, this is precisely what was achieved by the late Mrs Edith Koerthaus, one-time Editor of the West German magazine, "Das Aquarium", who, with the aid of fellow countryman, Dr Walter Foersch, discovered the fish we now know as *Betta edithae*. In a partially flooded small river in Southern-Borneo, Edith Koerthaus found a small mouthbrooding fighting fish which appeared similar to a species imported from Southern Thailand several years earlier and named, for convenience, *Betta* species aff. *taeniata*, pending further studies. Captured specimens of the Borneo fish were sent to Dr Jorg Vierke, who later described the new species as *Betta edithae* Vierke 1984.

## Distinguishing characteristics

Edith's fighting fish is distinguished from other mouthbrooding Bettas by its sturdy deep body, short fins and impressively rounded caudal (tail) fin. In comparison with other Bettas it has a large snout and a smaller eye. Vierke also noted its higher tail stem and concave forehead line.

Both sexes have three horizontal lines on the body which originate at the caudal root and run to the head, where the middle line goes through the eye. However, not all fish show these stripes (especially males). The ground colour is beige, embossed with turquoise spots on the scales and fins. The dark flecks between the rays of the fins merge with the colour to produce a honey-comb effect which is less pronounced in the female.

*Betta edithae* has been confused with *B. taeniata*, for no apparent reason, as the former reaches only 3.2-3.5in (8-9cm) in the aquarium while the latter reaches 5.5in (14cm) and has longer fins and a more tapered body. The nearest species to *B. edithae* is the widespread *B. picta* which is slightly smaller, at 2in (5cm). The pastel coloured *B. picta* lacks the brilliance of *B. edithae* and has a somewhat smaller anal fin ray count. *B. edithae* = 25-28, *B. picta* = 18-21.

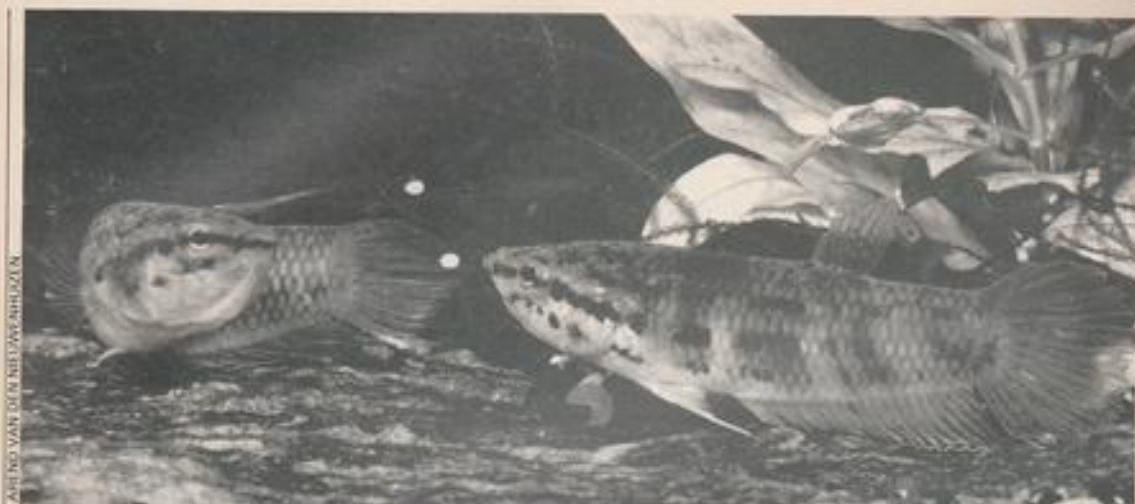
The first specimens of *B. edithae* were caught in Borneo 250 to 300km north west of Banjarmasin.

## Aquarium requirements

To keep this species in good condition a large tank, about 36 x 15 x 12in (90 x 37 x 30cm) is needed, particularly if several specimens are to be kept together. Although most of the mouthbrooders are good-natured in comparison with the fiery *B. splendens*, the occasional split fin can occur in cramped quarters.

Normal aquarium plants and decorations, along with a few caves, can be added to give these timid fish more confidence. As with most mouthbrooders, well-filtered water is a necessity, preferably with a pH of about 6.5-7.5 and a hardness of about 20° dGH, which is medium hard.





ART BY VANCE DEERHART/AMERICAN

Egg-collecting, as exhibited by this pair of *B. picta* (male with extended oral "brood pouch") is typical of most mouthbrooding species, including *B. edithae*.

*B. edithae* jump well out of the water, so a tight-fitting lid is also required.

### Aquarium breeding

For breeding purposes a suitable pair should be chosen; the female should have a well-swollen belly indicating she is full of eggs. The pair can be housed in a smaller-than-usual tank containing 4.5gal (20l) of well matured slightly soft water. A polyfilter

can be added to give good filtration without undue water movement. The temperature should then be raised a few degrees to about 82°F (28°C).

Soon, a dramatic change takes place in the colours of the breeding pair. The male's already colourful scales turn a striking green on the darker background of the body and fins; the pelvic (ventral) fins become olive green/yellow and the chin becomes spectacularly gold. The female's colours are not

so intense and show the indistinct sharp black-spotted lines laterally on a milky white body, with turquoise flecks in the fins.

The pair circle each other and, finally, the male enfolds the female with his body. She responds by releasing eggs from the ovipositor in her swollen abdomen and the male promptly fertilises them. The female, once released from this embrace, then picks up the eggs in her mouth and spits them out towards the male, once he has recovered. This process continues until all the eggs have been released. 40-125 fry emerge from the male's mouth about 12 days later. Unfortunately, in my experience, the male usually swallows the eggs after only 1-3 days.

*B. edithae* becomes sexually mature at approximately 1.8in (4.5cm), but as the males become older, they also tend to complete the period of oral incubation. The fry emerge from the mouth at a size of about 0.2in (4mm) and can be immediately fed Microworm or newly-hatched Brine Shrimp.

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 Vierke, J 1986 *Labyrinthfische* 87-88 Kosmos Verlag.

### Notes

1. The above text is based on an article by Stephen Clark first published in *Labyrinth* No. 37 (*Labyrinth* is the official journal of the Anabantoid Association of Great Britain).
2. For further details on Anabantoids contact: Anabantoid Association of Great Britain, c/o Tim Groom (Secretary), 44 Springwell Gardens, Balby, Doncaster, South Yorkshire.



# A FRESHWATER ANEMONE CALLED HYDRA

It was the second of twelve labours imposed on Hercules to kill the terrible monster called the Hydra, a many-headed beast whose breath was so strong, a mere whiff of it could kill a man. Upon confronting the Hydra, Hercules proceeded to cut off the creature's many heads. The hero soon found, however, that whenever one head was cut off, two grew in its place, but Hercules discovered that if each severed neck was burned, no new heads would appear. So Hercules cauterised the necks and finally destroyed the Hydra.

Thankfully, the real *Hydra* is not as horrific as the mythological monster with halitosis! However, it is just as difficult to kill, as many frustrated aquarists have discovered.

*Hydra* are often introduced into the aquarium on plants, and soon establish themselves by feeding on uneaten food, water fleas, or more seriously, small fish fry, and can soon become a problem in any fry tank within a matter of days.

## Control methods

Fortunately, some methods of controlling *Hydra* have been developed over the years.

A drastic but effective method is the use of ammonium nitrate. Before any treatment is carried out, the fish must be removed. For water with a pH of over 7.5, 0.5 grams of ammonium nitrate should be added to every 10 litres (2.2 gallons) of aquarium water. About 1g per 10 litres can be added to water with a pH value between 6.5 and 7.5. For acidic water (pH less than 7), 1.5g of ammonium nitrate can be added to every 10 litres of water. Once treatment is complete, one can carry out a 50% water change, and reintroduce the fish when the water has matured.

A less extreme way of killing *Hydra* is the copper wire method. Two pieces of copper wire are connected to a six-volt battery, one to each terminal, and the other end of each wire is hung in the tank water. After about five hours (or earlier if the *Hydra* are all dead), the wire is removed and a 30% water change is carried out. It should be noted that for this, and the previous treatment, no chemicals should be added to the aquarium water for at least a week prior to treatment.

The least harmful method is that of biological control, employing fish as the controlling agents. Gouramis, especially those of the genus *Trichogaster*, will prey upon *Hydra* if they are hungry.

## An amazing organism

It seems a shame, however, that the *Hydra* is a focus of so much hatred from aquarists, for it is a truly amazing organism.

The *Hydra* is a very simple creature. Indeed, it is one of the simplest kinds of

multicellular organisms known. It consists of a tube of cells with a hole at one end, surrounded by tentacles covered with tiny stinging cells (nematocysts) which it uses to catch and kill its prey. Although it has no brain, *Hydra* possesses a network of nerves, running throughout its body, so that responses can be co-ordinated (e.g. when tentacles are being contracted, or when the mouth is being dilated). These, and other, characteristics are also found in sea anemones, jellyfish and corals, to which *Hydra* is closely related.

Most species of *Hydra* can be found in weedy ponds and ditches, and are more numerous in the spring and summer months. They can be quite difficult to spot, as they contract into a tiny blob of jelly when disturbed; but, if left alone, a *Hydra* will extend its tentacles once again in anticipation of prey. If a small water flea or fish happens to touch a tentacle, it is embraced and paralysed before it is manoeuvred through the mouth into the gut cavity where it is digested.

One species, the Green Hydra (*Chlorohydra viridissima*), has a symbiotic relationship with a tiny, single-celled alga (*Chlorella*), which is found in the inner cells of the Green Hydra, giving it the characteristic colour.

More common is the Brown Hydra (*Hydra oligactis*) which has the ability to catch prey many times its own size, owing to its extremely elastic tentacles, which can measure up to 25mm (1 inch) in length.

## Reproduction

In favourable conditions (mostly in spring and summer), the *Hydra* will reproduce asexually (ie no exchange of sex cells). A bud forms on the side of the adult, and develops, over a matter of days, into a replica of its parent. It then falls away, to begin a new independent life.

Not content with reproducing asexually, *Hydra* has found another way to procreate.

In reproducing sexually (where sexual products are exchanged), small buds appear on the Hydra's body, one containing an egg, and the rest harbouring many thousands of sperm which are released to fertilise the ovum. The fertilised egg then falls off and hatches out in the spring.

Some of the most remarkable characteristics exhibited by the *Hydra* are its amazing powers of regeneration. If one individual is cut into many tiny pieces, each fragment will form one complete, new organism, tentacles and all.

So, the next time you see one of these tiny, plant-like animals hanging from the tank wall, save a few specimens and keep them in a jam jar on the windowill, and contemplate the amazing qualities of the *Hydra*.

Andrew Grant of Stirling University  
unlike most other aquarists!



Three stages in the capture and ingestion of a *Daphnia* water flea by a *Hydra*. The *Hydra* has developed four juveniles by the time the prey is fully digested.



# RA

University is a *Hydra* fan,



L. E. PERKINS

*Chlorohydra viridissima* enjoys a symbiotic relationship with the green alga. The individual in the top left photograph is undergoing asexual reproduction called budding.

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# SEA ANEMONES OF THE BRITISH SHORE

Part 1.

British Anemones are colourful and hardy — and make excellent native marine aquarium occupants, according to Andy Horton  
(Photographs by the author)

**W**ith the lounge light extinguished, the reds, greens and browns of the Beadlet Anemones look splendidly surreal and attractive under the solitary 25 watt bulb. Wrasse and Blennies have been fed on boiled mussel. In the furious commotion, pieces of the soft flesh of this mollusc have been broken into even smaller fragments. The isolated sense cells within the anemone have detected the presence of food in the water. The tentacles expand in an active search for prey and nourishment.

Sea Anemones are not plants, but primitive invertebrates and carnivorous animals. Their beauty, and the ease with which they can be kept, ensures their popularity among aquarists. They also represent the most noticeable source of colour in the native marine tank.

Seventy-five species of Anthozoa are found on the shore and in the shallow seas around the British Isles. This subphylum includes gorgonians, sea-pens and colonial corals, all compatible with most forms of life of interest to the aquarist. Predation of sea anemones occurs by the Grey Sea Slug, *Aeolidia papillosa*, and, to a lesser extent, by the Spider Crab, *Pisa armata* (Personal communication from Chris Tan — verified later through my own observations).

Reproduction is both instructive and interesting. Three different methods can be observed in the common British shore species.

## **Beadlet Anemone** *Actinia equina*

Our own shores constitute rich hunting ground where this anemone can be found at low tide on rocky shores the length of the British coast, and even, on groynes (timber "walls" used to prevent drifting of sand on beaches) in some sandy areas. It will adhere to the underside of stones, in rock pools, submarine caves, and among mussel beds in fully saline creeks. It is plentiful in all stable habitats anywhere in the littoral zone. Usually, the principal location is midway

between the low and high water marks.

Specimens for the aquaria should be removed by carefully inserting a fingernail underneath the base, and peeling the anemone from its attachment. The tentacles will feel slightly tacky to the touch. Out of the water, the tentacles retract, and the anemone looks like nothing more than a featureless blob of jelly.

Colours vary considerably. In adult anemones (base diameter exceeding 25mm — 1in), I have identified four major colour varieties. The colour of the columns are red, green, and brown; and the 'strawberry' variant (red, with distinct green spots). Tentacles are usually the same colour as the column. In juveniles considerable colour variations will occur. Beadlet Anemones frequently reach 40mm (1.6in) and occasionally 60mm (2.4in). The column will vary in size and shape according to the amount of food in the water, and how much the animal has eaten. In winter, when food is scarce, it will often dwindle to a fraction of its former dimensions.

Found both in Arctic and tropical waters, this wide tolerance of temperature conditions augurs well for its success in aquaria (the Beadlet Anemone is absent in the Baltic and brackish waters elsewhere).

Even the largest Beadlet will not catch anything more substantial than a small isopod or sandhopper, or perhaps, a freshly-moulted prawn. Small fish accustomed to swimming in mid-water over sand may become distressed if they are unable to avoid the stinging tentacles.

Food in the wild consists of planktonic animals, small crustaceans, larvae and small worms. In aquaria they will feed readily on boiled mussel fragments, prawn or winkle meat and raw fish. The larger anemones may need to be fed individually, catching larger chunks of mussel on their tentacles and gradually working the food towards the single opening in the centre of the body.

The popular name of this species is derived from the blue beads (acrorhagi) that are arranged in a ring near the parapet at the top of the body column, and which are

normally hidden from sight.

The final stage of reproduction is frequently observed in captivity. In freshly-caught anemones, or captive specimens that remain with their tentacles retracted, up to a dozen, possibly many more, miniature counterparts emerge to settle on rocks and shells nearby. These juveniles will invariably be identical in colour to the adults. Both male and female brood the young.

## **Strawberry Anemone** *(Actinia fragacea)*

This anemone is not nearly as widespread as *Actinia equina*. Often found in company with the red form, it will grow much larger, frequently 65mm (2.6in), possibly 80mm (3.2in) across the base. It is sometimes regarded as a different species. It has not been recorded brooding offspring, whereas 80% of the more common *Actinia equina* have been found to contain young. The 'Strawberry' anemone is not found on the east coast of Britain.

The tentacles are likely to be red or a paler pink.

## **Dahlia Anemone** *(Urticina felina formerly* *Tealia felina)*

Even more splendid than the most colourful Beadlet, this large and splendid anemone rivals the colours of tropical counterparts. Even more surprising, this anemone forms part of the Arctic-Boreal fauna, with only the smaller specimens likely to inhabit the shore. It reaches the southerly limit of distribution in the Bay of Biscay. Preferring cold water, no more than 18°C (64.5°F), this anemone is not so easy as the almost indestructible Beadlet.

Only small specimens should be attempted. A Dahlia Anemone of 80mm (3.2in) will readily consume a soft Shore Crab of three-quarters of its bulk. Like most anemones it will consume mussel and the staples: cockles, winkles, prawns, raw whitefish in large chunks. It will also capture small crabs, and injured or unwary fish. It is best suited to the larger tank, where its excessive food





Above left, a young Snakelocks Anemone (*Anemonia viridis*). This species tends to be found in the larger rock pools. Left, Beadlet Anemone (Green) *Actinia equina*. Above, Sea Anemones. On the central rock, the anemone with the brown column and cream flowing tentacles is *Sagartiogeton undatus*, with the Dahlia Anemone underneath. The others are Beadlet Anemones in a variety of greens, reds and browns.



Dahlia Anemone, *Urticina felina*. A decorative species with relatively few (up to 160) blunt tentacles.



Beadlet 'Strawberry' Anemone, *Actinia fragacea*.

demands will not pollute the water.

Despite its size and brilliance, the Dahlia Anemone is easily overlooked on rocky shores. Specimens are difficult to detach and this should not be attempted from a difficult cranny. Often, the animal will be disguised by a gravel covering adhering to its column. Do not collect more than one, as these anemones are not a common sight between the tide marks.

Sublitorally, they will attain a base diameter of 120mm (4.7in), or more. In northern offshore waters, a larger species, *Urticina equis*, up to 375mm (14.8in), could be caught in trawls.

#### **Snakelocks Anemone (*Anemonia viridis* — formerly *Anemonia sulcata*)**

In dramatic contrast to the previous species, this anemone possesses long flowing tentacles that it only rarely retracts. Comprising part of the Lusitanian or Mediterranean fauna, in Britain it will only be found on the south and west coasts. In the English Channel it is only rarely present further east

than the Isle of Wight. Typically it is a shore form that will choose a well-lit position, and is likely to be discovered in the larger rock pools where it is easily spotted. In aquaria both the Snakelocks and Beadlet Anemones show their powers of movement across rocks and the glass sides

#### **NOTE**

Part 2 of British Sea Anemones will include Plumose Anemones, *Sagartia* species, *Sagartiogeton* species, Daisy Anemones, and a small note about the predator: the Grey Sea Slug, *Aeolidia papillona*.

#### **Further Reading:**

British Anthozoa by Richard L. Manuel (*Academic Press 1981*) I.S.B.N. 0.12.470050.0.

Snakelocks Anemone. Reproduction by Scissiparity. by Alain Breitenstein. *Aquarist & Pondkeeper* October 1983.

of the tank.

To maintain its usual green colour, the Snakelocks Anemone requires the presence of a symbiotic alga and high natural light levels. In Public Aquaria they often become a bleached white colour. Sometimes this anemone will be found coloured a reddish brown. It is easy to keep and long-lived in temperatures above 10°C (50°F).

Asexual reproduction, by a method known as scissiparity, or longitudinal fission, is frequently observed in home aquaria. The anemone literally tears itself into two equal parts in a process taking about 1½ hours.

#### **Gem Anemone (*Bundodactis verrucosa*)**

This anemone is not frequently kept because of its restricted range on British shores. Found only in the extreme south-west, reports from correspondents state that this anemone is an attractive and valuable addition in their aquaria. I would like to hear from anyone who has kept this anemone, and the small JEWEL ANEMONE, *Corynactis viridis*.



# Koi Talk

by John Cuvelier

## S.V.C. warning

One problem with writing consecutive articles such as "Koi Talk", is the fact that when anything of a serious nature occurs which could pose a threat to hobbies such as ours, by the time your comments appear the worst of the threat is probably over. I can only hope that in this instance that is true!

I am, of course, referring to the outbreak of Spring Viraemia of Carp which, at the time of writing has prompted the M.A.F.F. to impose a movement prohibition order on carp in some 30 areas. Better known as S.V.C., this is a notifiable disease and, as such, when reported and confirmed, results in the mandatory slaughter of all stocks.

There is only one reasonably certain preventative. Do not introduce new fish or plants to your pool, whatever or wherever their source, without adequate and lengthy quarantine. You have been warned!

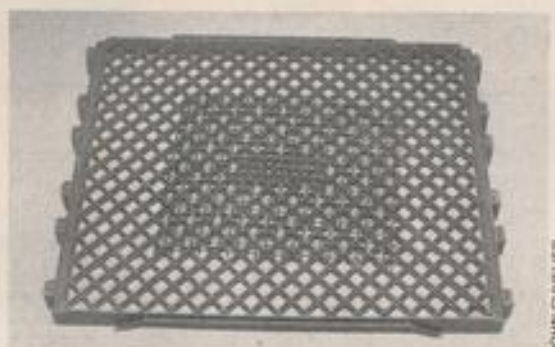
No doubt, everyone in the trade will want me shot at dawn for saying this, but by referring to the Reichenbach-Klinke book "Fish Pathology" page 75, one can read that, in instances of "cures" in "Dropsy"-like illnesses, the cures have been proved only temporary, with the viruses remaining resistant to antibiotic treatment. Rather do without that extra fish than lose all you already have. These diseases do appear to come in cycles (not the two-wheeled variety!).

Older readers may remember the panic which ensued quite a number of years ago with the onset of Ulcerative Dermal Necrosis (UDN), in Salmonids which resulted in the decimation of salmon and trout stocks. That, too, passed, as I am sure the present unpleasantness will, nature being what it is.

## Support your filter media

Among the many questions asked by readers (yes, there are some!), a favourite is "What do I use to support my filter media?"

Should you be richly



Base section of bread delivery tray and sample of "alternative" plastic netting — see item entitled "Support for filter media".

endowed with funds, you could do a lot worse than purchase some perforated PVC sheeting from the larger Koi dealers, this being quite excellent. The more normal among us will need to look elsewhere.

Personally, I always plump for a roll of plastic mesh from a garden centre, the type normally used for reinforcing a well trod patch of lawn. Mounted upon a hardwood frame (untreated with preservative), this will give many years of good service and has the advantage of offering virtually no resistance to water flow.

Another alternative is to use the base of a baker's plastic delivery tray, if you can come by one honestly! Should you be considering the use of "solid" media (gravel etc), then, obviously, some finer plastic netting will need placing on top of the latter alternative to prevent media "drop through".

Go on, be a devil and use a ring medium. It's a lot less trouble! On no account use galvanised chicken wire! Galvanising is another name for zinc plating, and zinc and fish simply do not mix. In fact,

anything remotely connected with zinc must NOT be used in your pool or filter. This includes brass, of course.

The zinc content of any alloy containing it will leach out of the metal over a period of time and will slowly poison your fish. The leaching process accelerates rapidly with a lowering of pH below the pH 7 level.

I am often also asked about the effect of household copper plumbing with regard to topping up, etc., copper being known to be toxic to fish. Traces of copper will leach out over a period of time but, provided the water is moving, the amount is not significant. So, the easy answer is simply to run off a little water before topping up, thus clearing any water which may have been static in the house pipes overnight.

## Brush progress report

As reported in a previous edition, a set of filter brushes have been fitted to my new filter and they really do work! A great deal of gunge of a quite

revolting nature gathers remarkably quickly, all of which would otherwise end up in the filter. I very rapidly learned that before attempting any cleaning, the pump required shutting down in order to prevent the disturbed gunge from disappearing into the system. Having lifted the brushes out for cleaning presents a golden opportunity for a fast "hoovering" session around the filter bays; all clever stuff.

## Flag plague and watercress soup

This summer has seen the appearance of a hitherto unknown phenomenon, for me at any rate — vast numbers of self seeded Yellow Irises (Flags) sprouting all over the place. Having seen the cost of these plants around the dealers, I could do nothing else but place these shoots into pots for passing onto friends in the area. So, should any of you happen to call, please leave room in your car for some of these "freebies". I might add that, among them, could well be some of other colours but that's all part of the game!

While on the subject of plants, our watercress beds have gone mad this year after a late start. During the last "cull", one clump measured three feet in length, which must be a record. There is so much "animal" life in the root systems that I now throw clumps into the pool for a couple of hours and my Koi really have a ball! We have a lady friend who takes a dustbin liner full of watercress which she makes into soup, which then goes into the freezer. How's that for profiting from one's hobby?

## FRED THE PIRANHA.



©88 PETER M. GEORGE



**D**espite the purists' belief that nature's way is best, there is a large range of artificial 'ornaments' that can be used in the aquarium to beautify or add a novelty touch (you must have noticed how many public aquariums decorate their Piranha tanks with miniature human skulls or skeletons). Obviously, these man-made items cannot serve the same function as natural ones (plastic plants won't photosynthesise, nor help remove carbon dioxide), but many will provide shade, safe retreats and even spawning surfaces.

However artistically you decorate the tank internally, nothing quite destroys the picture as much as a good view of the wall behind the tank. Painting the outside of the rear glass is one quick answer, but how much better to cover the glass with a photographic representation of a genuine underwater (fresh- or salt-water) scene? Most are available in a double design, printed on two sides, on a continuous roll so that you can get just the right size, and design, for your tank without too much expenditure.

### Aquarium backgrounds

High quality photographic material was used to produce aquarium backgrounds from Atlantis and three designs are available — stone, plants or coral subjects.

**THOMAS'S, Oakwell Way, Birstall, Batley, West Yorkshire WF17 9LU (Tel: 0924 474373).**

There is no sense of "artist's" impression about the exterior aquarium backgrounds from **John Allan**, as photographic material of actual plants is used in the design. The plasticised film is available on a continuous roll, in two widths: 12in and 18in, for convenient use.

Cork bark has been a favourite for many years as an in-tank background, and **John Allan** have produced a non-toxic plastic replica to fit standard sizes of aquariums: 24 x 15in to 48 x 15in, and 48 x 18in and 60 x 18in. For shallower tanks, some easy trimming will be required, but do make sure that all edges are flat against the rear glass to prevent fish becoming trapped.

Full details from: **JOHN ALLAN AQUARIUMS LTD., Eastern Way Industrial Estate, Bury St.**

**Edmunds, Suffolk IP32 7AB. (Tel: 0284 755051).**

The very colourful **AQUARIUM PANORAMA** by **Sera** is, again, plastic to withstand damage from damp, and your dealer should have it on a roll up to 25 metres long — just for the more ambitious hobbyists among you! Details of Sera products and stockists available from: **BETTER WATER GARDEN PRODUCTS, Blagdon Water Garden Centre Ltd, Bath Road, Upper Langford, Avon BS18 7DN (Tel: 0934 852973).**

**AQUA-DECOR** by **Rolf C. Hagen** comes in 84in lengths and two widths, 12in and 19.3in, calibrated for easy measuring and cutting. Six scenes are featured — Plant scene, Rock and Plant, Marine, New Plant/New Rock Design, New Plant/New Saltwater Design, New Rock Design/New Saltwater Design. All are completely realistic and to scale, and won't be affected by the damp, humid atmosphere likely to be found around the aquarium or in fish houses. Although completely submersible, they are better mounted outside the tank where they can be changed more easily and where there is no danger of a fish becoming trapped behind them. **ROLF C. HAGEN (UK) LTD, 275 Kirkstall Road, Leeds, West Yorkshire LS4 2BZ (Tel: 0532 796566).** Merely cutting down a background to fit doesn't always result in the hoped-for result. To this end **Interpet** have produced two backgrounds suited to aquariums of 70 and 100cms respectively. Both are marked with a cutting guide on the reverse side. **INTERPET LTD., Vincent Lane, Dorking, Surrey RH4 3YX (Tel: 0306 881033).**

**King British** have taken the background technology a little further than most: their **3D DECOR BACKGROUNDS** are moulded to give both a three-dimensional and a hologram effect to your tank, the final effect not becoming truly apparent until the background is in place and seen through a filled aquarium. Available in Plants, Blue Discus, Rocks and Caves, Shipwreck, Shark Freshwater, Shark Seabed and French Angel Seabed designs, these backgrounds, in either 24in or 36in lengths have yet a further bonus effect — they also help insulate the tropical aquarium against heat losses.

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## PRODUCT

BY DICK

# AQUARIUM



A selection from Interpet's Log-ets range.



Penn Plax plastic plants come in 7 sizes and 26 styles.

**KING BRITISH, Haycliffe Lane, Bradford BD5 9ET, West Yorkshire (Tel: 0274 573551).**

Two-, three-dimensional and mirror-backed styled all add up to the large range of **Penn Plax** best-selling **AQUARIUM BACKGROUNDS**. Available in 20in and 12in wide rolls. **BRYAN SHARPLES MARKETING, 2a Post Office Avenue, Southport, Merseyside (Tel: 0704 44662).**

If you keep rock-dwelling Cichlids (or even reptiles), then **Shoreline's** Exterior/Interior rocky background will add to the finished effect of your aquarium or vivarium. Constructed from water-filled profiled resin, the background is available in 29.5in and 2 x 12in lengths.

Details from: **SHORELINE DECOR, Baker Street, Frome, Wilts BA11 3BL (Tel: 0373 61572).**

### In-tank ornaments

These artificial decorations may be divided into two types (no, not those you like and those you hate!) — natural designs and novelty, the latter often having a moving action maintained by air from the airpump.

Of the natural type, perhaps the most useful are the replicas of sunken logs, branches, rocks and models of individual species of plants. All of these look realistic and, when covered with algae, will soon blend in with the rest of the underwater scene. The larger pieces (all made, by the way, from harmless moulded resins) can be used to hide the aquarium hardware very effectively and, of course, provide the fish with natural sanctuaries.

The 'working models' may be more attractive to the more junior hobbyist but, even if they are not to your particular liking, they do provide (often as an unappreciated secondary action perhaps) useful aeration.

A word of warning — do closely inspect any artificial decoration for any unsuitable constructional materials (unsealed plaster or cement, bare wires or metal used in hinges, etc).

Gaining a name for 'why didn't I think of that?' useful items, **Algarde** have a decorative **AIRLIFT COVER** which clips on to the airlift tube of the biological filter. It resembles a tree trunk and, maybe with a little ingenuity, it could be



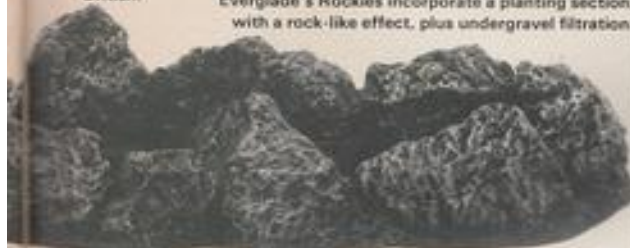
# ROUND-UP

## CK MILLS

# EQUIPMENT



The Shark (freshwater) three-dimensional background from King British.



Everglades' Rockies incorporate a planting section, with a rock-like effect, plus undergravel filtration.

adapted similarly to hide heater/stat units? **ALGARDE**, Enterprise House, Cranes Close, Basildon, Essex SS14 3JB.

The bright, but safely sealed-in, colours of **NEON CORALS** from Aqualabs will certainly brighten up the aquarium: there's even one design that glows in the dark! Details from **AQUALABS**, Red Lyons Farm, Burnham Road, Latchingdon, Essex (Tel: 0621 741966).

Perhaps first on the replications scene, **Batsford's SIMLAWOOD** quickly gained popularity with extremely realistic moulded sunken logs and branches. Since then, **SIMLAWOOD** has been added to the range, and the latest is a hollow-backed Ruined Castle, a handy 'equipment hider'. **BATSFORD PRODUCTS**, 15 Abeles Way, Holly Lane Industrial Estate, Atherstone, Warwickshire CV9 2HA.

**Everglades Aquatic Nurseries** have combined the artistic with the truly functional. Their **AQUASCAPE ROCKIES** are rocklike sculptures which, not only act as a convenient plant-

ers, (isolating plants from sub-gravel water currents) but also incorporate a biological filter. Details from: **EVERGLADES AQUATIC NURSERIES**, Baunton, nr Cirencester, Gloucestershire (Tel: 0285 4656).

Earthenware has long been a favourite material for horticultural containers and decorations. A wide range of decorative and humorous ornaments made from this safe material is featured in the **Hagen Catalogue**. Fluorescent Rocks, Icebergs, Caves, and other less-aquarium-likely subjects, will brighten up any aquarium, while Heart-shaped and Fish-shaped 'notices' and greeting mottoes will add a touch of humour when used either underwater or as desk-top paperweights. Details, and copy of catalogue from: **ROLF C. HAGEN (UK) LTD**, 275 Kirkstall Road, Leeds, West Yorkshire LS4 2BZ (Tel: 0532 796566).

The **Interpet** range of decorations include 20 different designs of **LOG-ETS** (sunken log branches) as well as air-releasing ornaments such as a Diver, Frogman, Pearl Mussel, Star-

fish and Water Wheel. On a non-functioning basis, the two halves of realistic Sunken Ship are very popular with junior aquarists and young fish alike (the latter finding its refuge very welcome). These ornaments are well illustrated in the **Interpet** all-colour **PRODUCT INFORMATION GUIDE** from: **INTERPET LTD**, Vincent Lane, Dorking, Surrey RH4 3YX (Tel: 0306 881033).

Recently reported as Best New Aquatic Product at Birmingham's Pet Trade '88 Exhibition, **JMC's** delicate **CRYSTAL FLOWERS** will add delicate touches of iridescent colour to the aquarium. As they move in the water, currents set up by aeration or the fishes' movements, the 'petals' (or are they leaves?) reflect many different colours. Details from: **JMC AQUATICS** 59 Stubble Lane, Dronfield, Sheffield S18 6PG (Tel: 0246 415275/410412).

The **Penn Plax** range covers everything, if you can imagine it, they've modelled it! From Neptune's Castle to brilliantly coloured **NEON AQUA PLANTS**, underwater 'action men' to tangled root and rock formations, they are all here. Many of the rocks, caves and terracing designs can be arranged in various stages of assembly to give endless permutations of design. All seem eminently suitable for terrarium and vivarium use too, and the driftwood branches can also be used as perches in birdcages: non-ceramic construction means indestructibility. Limitations of space prevent a listing of all the designs, but many full colour leaflets are available from: **BRYAN SHARPLES MARKETING** 2a Post Office Avenue, Southport, Merseyside (Tel: 0704 44662).

**Shoreline Decor** have just announced that they are now marketing their aquatic decorations retail. They are pinning their hopes on their increasingly-popular range of sunken log designs and rock designs. There are 16 different "wood" shapes, an individual set of 6, 13 stone objects, and a new introduction, a piece of coral which, being self-coloured, won't show colour differences if chipped. Each piece of decor is made from waterfilled resin, a completely non-toxic material.

If you have a favourite piece of wood or branch that isn't too safe for inclusion in your tank,

**Shoreline** will make an individual mould of it and cast a non-toxic replica for you. A full price list is available on receipt of a large SAE, and would-be purchasers and any club's evening outings are possible are very welcome at the factory, provided a prior appointment has been made. Details from: **SHORELINE DECOR**, Baker Street, Frome, Wilts BA11 3BL (Tel: 0373 61572).

### Plastic plants

Before closing, a few words should be included about plastic plants. Whatever your own personal views, there can be a justifiable case made for these (in aquariums containing herbivorous fishes, for spawning media, etc). Admiration must also be shown for the realism achieved, not only in the actual modelling, but in the thought behind the designs. Not only can you get individual species in various heights, but also in clumps of three or six. **AQUA-PLANTS** by Penn Plax come in 7 sizes and 26 styles and include **BOTTOM** and **NEON** versions.

A reasonable choice of designs, coupled with safe materials and ease-of-use, is provided by the 'Atlantis' range of plastic plants. Six individually packed, different species are available in **SMALL FOREGROUND**, **LARGE FOREGROUND**, plus 6in, 9in, 12in and 15in formats. Five further **PICK'N'MIX** models include 3/6in and 6in heights in assorted green colours, 10in ferns in green/red, 6in ferns in assorted two-tone colours and, for the marine aquarium, 6in brightly coloured anemones.

The small plants have a flat base for anchorage, while the larger specimens have deep, boat-shaped troughs for gravel-filling permanency. All are free from toxic metal wires and have passed the stringent 'Atlantis' safety checks.

Details from: **THOMAS'S**, Oakwell Way, Birstall, Batley, West Yorkshire WF17 9LU. (Tel: 0924 474373).

**Interpet's** **Flammaria** have eighteen varieties in five sizes, with an additional eight varieties being available in the new **FOREGROUND** range to complete the realism. Next time you see a fully-planted display aquarium, take a closer look at the plants — they could be fooling you!



## Ocean Filtration Systems' de-nitrifying filter

The addition of a final wet/dry filter system to convert nitrate back to atmospheric nitrogen is usually only to be found in top of the range 'total system' aquariums. Now, an all-acrylic clip-on extra unit is available for your existing aquarium. Suitable for tanks of up to 40 gallons, the OCEAN FILTRATION SYSTEM measures 31 inches high by 18 inches wide and only 3 inches front to back. Easily installed (no physical cutting or drilling holes in your tank are needed), all the unit needs is a driving force such as an external power filter, or simply a centrifugal type pump. It maintains a constant water level at all times and there is no reservoir overflow should the power supply fail — it even restarts itself.

Used on its own, the rated capacities are for new tanks; if used with an aquarium fitted with an existing established undergravel filtration system, then a much greater capacity than rated is produced. Said to be the greatest advance since the all-glass tank, the system is self-cleaning and virtually maintenance-free (except for periodic rinsing of the pre-filter medium). Retail price is £171.94 and component parts are available separately. Full details from: FORTY FATHOMS, 102 Coventry Street, Kidderminster, Worcestershire (Tel: 0562 515539).

## A guardian for the pond

Interpet have released their POND GUARDIAN TONIC SALT, a specially formulated physiological salt containing a balance of all the essential mineral salts, together with a built-in pH buffering action.

Active all the year round, POND GUARDIAN, reportedly, works at two levels: at the lower dosage, it acts as a general tonic, aids the osmo-regulatory



A tonic salt with many uses — Interpet's Pond Guardian.

# PRODUCT ROUND-UP NEW PRODUCTS

system of the fish and helps to combat disease by assisting the fish's immune system. The pH buffering action stabilises the water conditions against any drastic action, stabilises the water conditions against any drastic changes and maintains the pH level close to the neutral point.

At the higher dosage, POND GUARDIAN reduces the toxic effects of fish waste products, such as nitrite, and minimises the effects of stress on the fish. The efficacy of other Interpet Pond Water Treatments are, Interpet state, enhanced by the use of POND GUARDIAN. Available in 2.27kg bags from aquatic centres, pet shops, garden centres and hardware stores. Details from: INTERPET LTD, Vincent Lane, Dorking, Surrey RH4 3YX (Tel: 0306 881033).

## Aquaservice with a smile

Wouldn't it be nice to have someone to design, set up and maintain a nice new tank for you, doing all the messy bits and just leaving you to enjoy the end result? Not just a dream, such a service actually exists. Ian Pegram, of Aquaservice felt the Trade were not offering a complete service for prestigious aquarium systems, from initial concept to final installation and beyond, so he decided to provide it. Whether you want the 'complete works' or merely a maintenance contract on your existing system, then Ian (who has a number of years in fish and filtration systems businesses in the Trade) can arrange it. Details from: AQUASERVICE, 16 Torrens Square, Stratford, London E15 4NB (Tel: 01-534 0749).

## Koi food with a plus

Sera, one of the giants in fish nutrition names, has come up with a food to match those giants of the garden pond — Koi. KOI PLUS is an all-in-one floating foodstick containing all the basic essentials you would expect to find in a quality food, but with a number of Plusses: essential amino-acids, minerals, trace elements, Vitamins A, B and E, wheatgerm and colour

enhancer. Koi respond to this carefully balanced diet by being more vital, more colourful and particularly resistant to disease, it is claimed. The long-floating sticks will never cloud the water, even if they remain uneaten for a long time (which is quite unlikely!).

Two sizes are available, 1000ml and 3000ml, and you will find them at stockists of Better Water Garden Products. Details from: BETTER



Sera's Koi food with a plus.

WATER GARDEN PRODUCTS, Blagdon Water Garden Centre Ltd, Bath Road, Upper Langford, Avon BS18 7DN (Tel: 0934 852973).

## Stratford Filters' three-stage pool model

On the filter front comes news of Stratford Filters' POOL-SIDE MODEL. Based on the now familiar 'header tank' construction format, it has three stages of filtration. A plastic foam pre-filter supplies mechanical and biological actions, the upper layer of Filtrag provides moist biological filtration while the lower Filtrag layers employ wet biological action.

Each stage provides different types of cleansing organisms necessary for the complete cleaning of the pond water. It takes (of course) some time for the unit to become fully opera-

tional and biologically established. Despite being named a 'pool-side' unit, the fitting of an extension outlet pipe can allow the unit to be used remotely from the pond. The top of a rockery at the head of a waterfall course is a suggested idea. Price is £34.50. Details from: STRATFORD FILTERS, Hobby-Fish, Towcester Road, Old Stratford, Milton Keynes MK19 6BD. (Tel: 0908 542801).

## Babylon Arts — instant water features

Do you fancy a rockery, waterfalls and pool in under an hour? It can be done thanks to pre-fabrication in the manner of hand-sculptured fire-retardant polystyrene. Three models are available: the ATLANTIS model is designed for positioning against any flat surface and its cascade trickles through numerous small pools to the main five foot pool. A fountain falls over the rocky ledges of the AVALON, the ovoid, two tiered centrepiece design. The three-pooled BERMUDA is for corners and alcoves and has the longest (and fastest) flowing waterfall of the three.

A special process adds colour (Sandstone or Westmoreland) to the 'rock' and produces the tough and durable finish which guarantees them against weather damage for ten years. Ideal for use where weight or rock would cause problems, or where access is difficult, these 'water



The Atlantis water feature in Sandstone finish from Babylon Arts is designed for setting against any flat surface. Suitable for interiors and exteriors, it can be installed in under an hour and requires only a 13amp power point.

features' only require about an hour's work and a 13 amp socket to be up and running. Prices are from £750-£810 plus VAT. Details from: BABYLON ARTS, 72a Ballards Lane, Finchley, London N3 2BU. (Tel: 01-346 2198).



# Coldwater jottings



Stephen J. Smith

## Stick it!

The introduction of floating pond sticks for coldwater fish has proven extremely popular over recent years — that large green barrel is a familiar sight adjacent to the back door of many a pondkeeper.

It would appear that sticks designed for pond use have also become popular for feeding Fancy Goldfish and other coldwater species in the aquarium — for which this type of food was not designed.

However, recognising the need for a quality floating stick for aquarium use, aquatic food manufacturers Tetra have introduced a miniature version



Tetra's Eric Goodwin describes the benefits to coldwater fishkeepers of the company's recently-launched Goldfish floating food sticks.

## — Goldfish Floating Food Sticks.

These are specifically designed for use in the coldwater aquarium, and incorporate a natural colour enhancer as well as, apparently, all the essential dietary requirements of Goldfish.

While the majority of recognised brands of aquatic foods are to be recommended, I can assure you that my own Goldfish certainly found Tetra's new food sticks most acceptable.

But one suggestion I would like to make: the small size of Tetra's new floating Goldfish food sticks, and their high concentration of valuable dietary elements, make them ideal for rearing young Goldfish. So how about an economy size for breeders?

Perhaps the sight of a large red drum next to the green one will also become a common sight among coldwater fishkeepers...

## Survey winners

Having got that off my chest, congratulations to the staggering five societies who responded to the coldwater survey in April's *Jottings*.

Winner of the selection of *Interpet* coldwater guide books (*Fancy Goldfishes*, *Koi*, *Coldwater Fishes*, and *Garden Ponds*) is the **Middlesex and Surrey Border Section of the British Koi Keepers' Society**, which meets at Hampton Football Club at 8.00pm on the first Thursday of each month.

Further details of the section can be obtained from secretary Mrs Carole Pritchard at 22 Hazeltree Lane, Northolt, Middlesex UB5 6AA.

Warmest congratulations to Middlesex and Surrey Border section and their secretary, as well as to Association of Midland Goldfish Keepers, Bristol A.S., Goldfish Society of Great Britain, and South Park Aquatic (Study) Society, for their contributions, details of which will appear in next month's *Jottings*.

## Ornamental info

Surprisingly, little response has been received as a result of



Mike Hutton's plea for information on ornamental fish farming (*Coldwater Jottings*, May 1988).

So, come on, all you Koi and Goldfish breeders throughout the country (and abroad), both commercial and hobbyists: there is a new generation of fishkeepers bursting with enthusiasm to add something to the hobby, so why not give them the benefit of your experience.

Information should be addressed to Mike Hutton's home address: 509 Leads Road, Sutton, Hull, East Yorks HU7 4XT.

## Help yourself

Where have all the societies gone? *Coldwater Jottings* provides the perfect forum for societies to present themselves and their views and opinions about the hobby. Yet, only minimal information is received from coldwater societies about their activities — despite the fact that by far the most popular request I receive from readers is: "Where can I join a coldwater society?"

So, show secretaries, PRO's, and even members: let's see what your society or coldwater section is made of!

## Don't forget

One of the country's foremost Goldfish society shows, the **Bristol Aquarists' Society** open show, takes place this month (**Saturday, 10 September**) at St. Ambrose

Acknowledging 21 years' service to SPASS and the coldwater hobby, SPASS founder-member Marguerite Dudley receives a framed diploma on behalf of members from society president Bill Leach (left) and chairman Dave Brooks.

Hall, Stretford Road, Whitehall, Bristol. Benching for the show by 11.30am, auction at 12.30, and doors open to the public at 3.00pm.

## Long service recognised

Finally, I cannot conclude this month's *Jottings* without mention of a recent award presented by members of South Park Aquatic (Study) Society to their founder member **Marguerite Dudley**.

The award, a framed diploma, was presented to Marguerite in recognition of her dedication and contribution to the aquatic hobby over a period of 21 years.

Together with her late husband **Ron**, Marguerite founded the society in 1967 and served on the committee for 18 years until 1985, in positions ranging from chairman(?) to treasurer.

The presentation took place during the society's 21st anniversary celebrations at the beginning of the summer, which was attended by current members and former members from throughout the British Isles.

Here's to the next 21 years...!