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AQUARIST

AND PONDKEEPER

FISHKEEPING AT ITS VERY BEST. ESTABLISHED 1924



PIRANHAS IN THE WILD
UPSIDE DOWN CATFISH
MARINE ANGELS

PUBLISHER
Andrew Blair
MANAGING EDITOR
Val Williams
EDITOR
Laurence E. Perkins
CONSULTANT EDITOR
John A. Dawes
ADVERTISEMENT MANAGER
John E. Young
PRODUCTION
Sheila Chessman

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Cover Story

Photograph by Bill Tamey
Melanotaenia boesemani, from New Guinea, is among the more recent Rainbowfishes to be introduced into the aquarium hobby. Owing to its brilliant colours and bright disposition, *M. boesemani* is already achieving considerable popularity in Europe and The States. Hopefully, the same will happen in this country where, so far, most of the Rainbowfishes found in shops belong either to the species *Melanotaenia maccullochi*, otherwise known as the Australian Rainbowfish, or to *Bedotia geayi*, the Madagascan Rainbow.

According to some leading authorities e.g. Greenwood and Nelson, Rainbowfishes belong to the order Atheriniformes which can be divided into the families Melanotaeniidae and Atherinidae (the Silversides). This classification separates fishes of the genus *Melanotaenia* from other well-known ones, such as *Bedotia geayi*, *Telmatherina ladigesii* (Celebes Rainbow) and *Pseudomugil gertrudae* (Gertrude's Blue-Eye), which are regarded as Silversides. *Melanotaenia* Rainbows are quite hardy and peaceful in aquaria and will take a wide range of foods which should include a regular live component, such as *Daphnia*.

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AND PONDKEEPER

FEBRUARY 1986 Vol. 50 No. 11

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AND THEN THERE WAS LIGHT!

To get straight down to business, let me introduce myself. I am 35, female, and have followed two very diverse careers—journalism and gardening! Both these vocations were cut short by my submitting to a very insidious nervous complaint that has left me disabled. I am agoraphobic; which means I have an irrational fear of going outside my home. But worse, in the last four years, I have taken up fish-keeping and breeding—so I am now completely round the bend!

I went to school with a girl who was afraid of goldfish. That puzzled me. How anyone could be scared of things that just sailed aimlessly round in water was a mystery. How anyone could be fascinated and obsessed by them amazed me even more. Until I met an 'Aquarist'. I thought he mistakenly believed he was a watch—and had a speech impediment to boot. His name was Bill Hastings—and I shall forever be in his debt.

Bill had kept fish for years, showing many of them at local and national level—with a sideboard of trophies to his credit—and is now a judge at the shows. On his first visit to my flat, he spied an old tank stand made into a bookcase. I hear your cries of horror. I am ashamed. That is, I am now. But at the time I remained unmoved and it was my sister, who lived with me, who took up the challenge. The bookcase vanished, the tank arrived . . . and 'Genesis' had begun.

Following Bill's instructions, the mound of equipment grew: filters, heaters, thermostats, cable tidies, lights, ballast units, airline, valves, airstone, gravel, assorted rocks and plant pots, thermometer, air pump and wood! It was like building a life-support machine. The tank was 48 in. x 18 in. x 12 in., made to fit the stand. Once the lid was made and everything wired on, in and around, we transferred the action to the kitchen—to boil the gravel and rocks. Oh God! Boiling gravel! After four years, the thought alone makes me cringe. By now, you notice, I was involved. In all truth, I was soon to become fascinated. For once the gravel was in the tank, and the gallons of water had given that boring glass receptacle an intriguing third dimension, my gardener's instincts had been aroused. We started to place the rocks, softened into glorious colours now by the Grolux pink, and before our eyes a

by Amanda Grimes

miniature landscape was being formed.

I capitulated when my sister brought home the plants. Sleeves rolled up and a manic gleam in my eye, I all but threw myself into the tank with relish—and snorkel. I was in love—and it's that kind of first love you never quite relive. I have since set up many tanks, but none gave me as much pleasure as helping with my sister's tank and setting up my own.

Once planted and left to settle, this 'Brave New World' was the focus of our evenings for a week. Empty of fish, just quietly ticking over, it drew our eyes to the point where the T.V. remained off, books gathered dust and friends thought we'd emigrated. An empty stage, waiting for the action. . . . I know this is wildly over the top, but can I be the only one who looks back with such fond memory?

"Leave it for a week and then test it with cheap fish," Bill had said. So into this beautiful new home went, gently, some Black Mollies, Platies and Silver-tipped Tetras. The T.V. remained silent. Curious friends came round and stared at us, speechless. We stared at the tank, speechless. It was the silence of Creation. . . . More fish

"I went to school with a girl who was afraid of goldfish."



were collected from shops, and gradually the community was formed. Being housebound, I was denied the pleasure of sharing the selection and consequently greeted the new arrivals with growing excitement—and a mounting desire to set up my own aquarium. Which I did, within the year.

My sister had created the soft, gentle landscape reminiscent of the South coast of Cornwall. I had bought a tank slightly different in shape—48 in. x 15 in. x 15 in.—which, topped by a deep, black-painted wood lid, presented more of a cross-section look than her taller tank. I decided on a jungle look, enhanced by my wilful insistence on putting a layer of peat under the gravel. It was against all advice but I have never regretted it—except when having to move the tank! Over the weeks, the tank was set up and stocked and I had become a new person—an Aquarist.

So much for the enthusiasm of the raw novice. Now, several fish-keeping years later, I am still a student and happy to be so. One day I might be able to call myself an expert but for now I am content to learn from them and add my own penny-worth when my personal experience allows it. When I started keeping fish, my friend Bill lent me some copies of the *Aquarist* and I made copious notes. And here, maybe, is my justification for this logbook. The expert advice was welcome and extremely useful but there was another regular feature I gained invaluable information from—'What's Your Opinion?' Reading what other aquarists have achieved has spurred me on to try breeding—my major interest—often with unlooked-for success. It is reassuring to see that the problem you've had with 'that fish' hasn't been confined to you. And, necessity being the mother of invention, the tips other readers have given on do-it-yourself equipment have enabled me to widen my range. In my limited experience and confined situation, I have become a full-time hobbyist; packing a tankful of successes and dismal failures, laughter and tragedy and discovery into these short years. So if you don't learn anything new from these articles, it is my hope you'll recognise a familiar face, commiserate with a fellow sufferer or at least have a good laugh at a wally who's stuck in first gear. . . .

What's your opinion?

by B. Whiteside, B.A., A.C.P.



For and Against

"Needless to say I would miss your column, which at just two pages is far too short!" writes Mr. N. R. Jarratt, of 7 Mill Hill, Bongate, Appleby-in-Westmorland, Cumbria. The remainder of his letter says: "During the 12 years that I have been reading *The Aquarist & Pondkeeper* I have written twice to you and have had both letters published. The last time was in response to your request for opinions on the increased size of the magazine at the start of volume XLV in April 1980, and now I am writing concerning the increase in size from November 1985.

"Why has the size been increased half-way through the current volume? The new magazine is now too large to fit into the current binder, which will now be left with five empty spaces. If I purchase a new, larger-size binder it will start midway through the current volume. I cannot understand the timing of the increase in size and am annoyed enough to consider cancelling my subscription when it is due for renewal in December 1985."

I appreciate your feelings, Mr. Jarratt. I need a binder to take some of the pre-November size issues, and one to take the new size. In the November 1985 issue I said that I looked forward to seeing our magazine on sale in more outlets. I'm still waiting to see it in any of the shops in the town in which I live. It's some years now since last I saw it in any shop other than an aquarium shop. Sadly we don't have any aquarium shops in the town where I live. My friend and former pupil Robert McGregor closed his supermarket a couple of weeks ago—and the little back section where he sold tropical fish has also gone. There is now only a single pet shop in the town that stocks a limited range and number of tropical fish. I wish Robert good luck in his future ventures: he deserves it.

Well, in contrast to Mr. Jarratt, who

has been annoyed by the new *Aquarist*, we have Mr. Paul Sparks, of 259 Drayton High Road, Hellesdon, Norwich, Norfolk. He writes: "After eight years of the most enjoyable reading I feel I owe my favourite column a few words. Firstly, congratulations on the new-style magazine, definitely a step forward; and for content: the leader in its field. I am secretary of the Norwich-based Thorpe-and-District Aquarist Society, and I would like to pass on an idea put forward by a committee member. The suggestion was to ask a local radio station, in our case BBC Radio Norfolk, for a mention on the air about one of our club meetings. They willingly obliged, with several announcements throughout the day. Our attendance on the night doubled from our usual 50 members. Three cheers for local radio.

"On your question of hard-to-keep species, we have a problem in Norwich with sensitive tetras (*sic*), like cardinals, and clown loaches (photograph 1), which are soft-water species. I have spoken at length to club speakers from the London area and we have concluded that water chemistry is the usual answer to hard-to-keep species. Our local water is quite hard and chalky, so soft-water species are less tolerant of our water, whereas guppies and swords, the hard-water species, thrive.

"Whilst on the subject of keeping alive our precious pets, I feel that the quality of our imports leaves a lot to be desired. I refer to the Singapore imports. Most of these fish lack the colour we are led to believe by magazine photographs; and they rarely reach anywhere near F.B.A.S. show sizes. I feel that in England we receive the cull fish, and not the quality imports. I would be willing to pay more for wild-caught specimens, fresh from their country of origin, rather than the production-line specimens that are offered for sale. These oriental imports also seem to carry some rather nasty bugs, making quarantine periods of about four weeks a sensible proposition. Sorry to run on about this problem but I do feel that the only losers are us, the purchasing aquarists."

As I have no contact with importers or dealers I am unable to comment on Mr. Sparks's remarks about fish imported from particular parts of the world. I do know that some species seen on display today can be much less attractive than the same species were a score or more years ago. Where are all the beautiful kribensis with the many beautiful spots on the dorsal fins and tails? Perhaps we paid much more, relatively speaking, in the Fifties and Sixties, and got better fish. Chickens and eggs are relatively cheap to buy in 1986 because of factory-farming

methods of raising them; but do they taste as good as free-range eggs and chickens? Drop me a line if you have an opinion on the subject. I don't really know much about the relative taste of the products when compared; although I assume that free-range raised chickens lead a better quality life than their battery-caged siblings.

Mr. A. Webster writes from 1 East Ada Street, Murton, Seaham, Co. Durham, and says: "Reading through a few back copies of *Aquarist & Pondkeeper* I have noticed a problem that is common among aquarists and seems to crop up time and time again without a successful solution. The problem I am referring to is that of keeping live plants in an aquarium; and my answer to this is: do not use live plants.

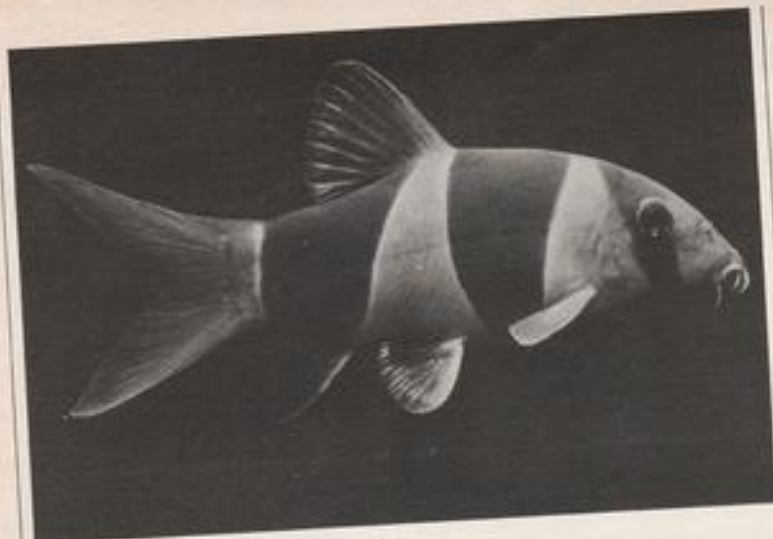
"I know that experienced aquarists will wince at the very idea of keeping fish without live plants but I have been keeping fish for over 20 years now and for the last six have not had one live plant in my tank—and I have yet to lose a fish because of a lack of live plants or, rather, because of a lack of oxygen—the main reason the plants are there in the first place.

"Up until six years ago I spent a fortune on various types of plants, only for them to die within weeks or be ripped to bits by fish. Even so-called hardy plants did not fare any better. It was getting to the point where live plants for my tank were costing more than the fish, so I decided to experiment with a tank that had no live plants whatsoever and the results I have had are excellent: a well-stocked tank of healthy, thriving fish, a goal every aquarist aims to achieve. In my 6 ft. tank, along with the under-gravel filters, I have two 4 in. airstones each run by a separate air pump, and I find that these airstones are all that are required, providing sufficient oxygen in the air they pump round.

"I use a lot of plastic plants in my tank. I find the Plantastic ones a very good substitute for live plants, almost indistinguishable from the real thing. Although initially they are a lot more expensive than the real, live plants, at least once these have been bought there is no expense in addition. If and when they are pulled out by the fish it is easy to replant them as good as new. The fish I keep are Oscars, tinfoil sharks, keyhole cichlids, convicts, silver sharks, blue scaras, etc.

"So, my advice to anyone experiencing difficulty with live plants is: try a tank with no plants at all. I am sure you will be surprised by the results. Have you any views on this?"

Your concluding question is, to me, like a red rag to a bull, Mr. Webster.



A clown loach doesn't like hard chalky water

I have one Plantastics Amazon sword plant in one tank, a tank containing large angelfish and in which plants—other than floating Indian fern—do not grow too well. The artificial plant looks well; a light growth of algae on it makes it look quite realistic. However, my five other tanks contain only live plants and the plant growth in them is so good that at regular intervals I have to clear out large quantities—as opposed to numbers—of plants, e.g. Indian ferns. I can often fill a gallon bucket with excess plants from an 18 in. x 10 in. x 10 in. tank! The photograph shows one of my planted tanks as it was (photograph 2). I would disagree with the suggestion, by Mr. Webster, that the main reason for having live plants in a tank is that they produce oxygen. Their removal of carbon dioxide is probably more important; however, there are many other reasons for having live plants. I have live plants in my tanks because I want live plants—just as I want live fishes. I don't want plastic plants or plastic fishes. I don't want a plastic dog as a pet; and I don't want plastic plants as house plants or garden plants. Perhaps I'm just lucky in that I have green fingers—whatever that means. Plants of any kind—aquarium, house, greenhouse and garden—grow well for me. In my living-room Swiss cheese plants stretch from floor to ceiling, some branches now being on their way across the ceiling; while trailing plants, such as *Tradescantia*, stretch down the walls about five feet. Ivies trail down other walls, stags-horn ferns spread their fronds on walls, and prayer plants open and close their leaves as the light waxes and wanes. The pot plants get nothing other than water and the occasional drop of a powdered fertilizer—its first letter is 'P'. I do not feed the plants in my aquarium; and I seldom change any of the water in the tanks. Outside filters are operated for a few hours each evening, when the tungsten

bulbs over the tanks are switched on for a few hours. Most people who cannot grow aquarium plants keep their tanks too clean and disturb the plants too much.

Not giant hog-weed

My photograph of and comments about the large-leaved plant *Gunnera*, in the November 1985 issue, caused Mr. George Thompson, of 2 Berwick, Oxclose, Washington, Tyne & Wear, to write: "With reference to your recent photograph and article about the giant bog weed: you were obviously impressed by it as this is the second time you have shown the photograph—and rightly so as this impressive plant is a real eye-catcher, especially to adventurous children. The plant,

however, can be dangerous to anyone who doesn't know its secrets. As I understand it, the giant hog-weed was brought into Britain as an exhibit at Kew Gardens." Mr. Thompson goes on to say that giant hog-weed bears sharp hairs that can prick and that its sap is a strong irritant. If snapped or cut, he says, the plant can spurt out sap under pressure, and if it lands on your skin it is a strong irritant. Apparently the sap is photo-active and plants are best removed, carefully, after dark. Protective clothing must be worn and the clothing laundered after use. The person who wore it must also wash. "This plant is obviously not one for the pondside in your readers' gardens. If it's already there I suggest it be removed carefully," writes Mr. Thompson. He concludes: "How about putting the postal address for your correspondence in your article. You might get more letters. I hope this letter gets to you as I gleaned the address from the small print at the front—without the postcode, tut, tut!"

Gunnera is not giant hog-weed, and I have not shown the photograph twice. The original photograph I showed of *Gunnera* was taken at Kew Gardens; the second one was taken at Mount Stewart, in Northern Ireland. No doubt giant hog-weed is as dangerous as Mr. Thompson states and should be treated with the respect that it merits. *Gunnera* is a different plant.

I don't know what address Mr. Thompson used but it was obviously a correct one. Readers should, in future, address their letters as follows: B. Whiteside, *Aquarist and Pondkeeper*, Buckley Press Ltd., 58 Fleet Street, London EC4Y 1JU.

Use that to send me your opinions about: (a) breeding live foods; (b) feeding marines; (c) aquarium lighting; (d) terrapins; (e) cultivating *Hygrophila* species; and (f) outside filters. I hope to hear from you. Good-bye until next time.



One of the author's well-planted tanks

Your questions answered

Having problems? Send your queries to our panel of experts who will be pleased to be of service. Every query receives a personal answer and, in addition, we will publish a selection of the most interesting questions and responses each month. Please indicate clearly on the top left hand corner of your envelope the name of the expert to whom your query should be directed. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper, Buckley Press Ltd, 58 Fleet Street, London, EC4Y 1JU



TROPICAL
Dr. David Ford



COLDWATER
Arthur Boarder



PLANTS
Vivian De Thabrew



KOI
Roger Cleaver



MARINE
Graham Cox



DISCUS
Eberhard Schulze

Coldwater

Best age for spawning

Which is the best age of fishes for them to spawn well?

I have found that young fishes are the best for this purpose. Depending on their rate of growth, the two to four year olds appear to be the more vigorous and produce the most fertile eggs. They will, of course, continue to breed for several years. I have had them breed at over ten years of age. However, I am sure that young fishes give the best results. Having stated two years of age, I must emphasise that this is only possible when the fishes have been reared under warm and ideal conditions.

Feeding Goldfish

I stopped feeding the goldfish in my garden pond when the weather turned cold. When shall I start to feed them again?

Once the weather turns warmer you may start to feed. It is not possible to give any date as so much will depend on when the water warms up a little. Not that goldfish stop feeding altogether during the winter. There are usually

mild spells when the fishes may become active. I have found that at almost any time during the winter goldfish will take a garden worm. However, when the water is very cold the fish will take a long time to digest the food and there is really no need to feed them. You will notice that the fishes will become more active as the water warms up a little and then is the time to start feeding.

Mountain minnows and Goldfish

I recently bought four very small White Cloud Mountain Minnows and put them in my community tank. The next day one was eaten by a shubunkin. I did not know that goldfish were carnivorous. Also what should I feed the Minnows on and how can I sex them?

Goldfish and the rest of the Carp family are omnivorous, eating both flesh and vegetable matter. They will also eat their own young and every year countless thousands of young goldfish are eaten by their parents if hatched in a garden pool. It is wrong to try to keep very small fishes with larger ones. The Minnows will eat similar food to that of the goldfish but of course it must be small. You can also keep Paradise fish in your tank, as you ask, but only have one male, as they can be very aggressive to other fishes

when breeding. It is not easy to sex the Minnows except when they are in breeding condition, as they then show some signs such as a fatter body in the female and a rather brighter colour of the male. The latter will chase females.

Westmorland stone

I am going to construct a waterfall for my ponds and would like to know if Westmorland rockery stone will be suitable?

Westmorland stone is quite safe to use but I suggest that you give it a good scrubbing in water in which a few crystals of Permanganate of potash have been dissolved, as you will not know with what the stone has been in contact.

Snails' Eggs

I have found a number of pieces of sausage-shaped bits of jelly underneath water lily leaves and wonder if they are the eggs of goldfish?

What you have seen are the eggs of the Great Pond snail, *Lymnaea stagnalis*. You should be able to see the tiny snails in them. Goldfish eggs are laid singly and are about the size of a pin's head and stick to the water plants where the fish have spawned.

Water snails are reputed to

keep pond water clear but this is a fallacy. They can eat fish eggs and food which is given for the fishes. If any dried food is thrown on the surface, the snails will soon find their way to it. What they do not eat they slime up so that the fishes will not touch it. If you find any small blobs of jelly under leaves, they are the eggs of the water snail, *Planorbis cornuus*.



Eggs of Great Pond Snail on underside of lily pad

Stocking rate

I understand that the rate for stocking a tank is to allow an inch of fish for each gallon of water. Is this correct?

It depends on the area of water in contact with the air. The safer rate is to allow an inch length of fish excluding

the tail, for each 24 square inches of surface area of water. So a tank 24 in. x 12 in. surface would hold twice as many fishes as a tank which is 12 in. x 12 in. but twice as deep, that holds the same amount of water. When stocking a tank or pond you should always allow for growth. Nothing is more detrimental to the growth of a fish than if it is kept in crowded conditions.

Cysts

I have a goldfish in my pond which has several raised white dots on its tail. It has been like it for eighteen months but has not changed and no other fishes in the pond are affected. Is this White Spot disease?

It is not the disease or there would have been a change some time ago. The dots are Cysts and may not get any larger. They are not likely to do the fish any harm and will not spread to other fishes. They may have been caused by damage to the fin whilst the fish was spawning.

Koi

Goldfish and Koi in same pond

I have started to keep Koi. Please could you kindly let me know of names of some very good books on the keeping of Koi, and how to keep them healthy?

I am very uninformed on the keeping of them and I understand they suffer from a great deal of different diseases. Please could you also tell me if it is OK to keep them in a pond with goldfish?

Thank you for all your help.

Koi suffer from no more diseases than do any other type of fish. The only snag is that they tolerate changes in their conditions less well than do the hardy goldfish or other coldwater fish. This means that we should take more care in our methods of keeping our Koi. A good analogy would be that Koi are to

goldfish as a racehorse would be to a Welsh pony.

This being the case then it is no real problem to keep Koi and goldfish together in the same pool. In fact, for many years now I have happily kept some goldfish in my Koi pond and neither the goldfish or Koi have suffered.

I have enclosed a list of books on the subject of Koi keeping, unfortunately not too many exist. They are available from good aquatic shops so you should be able to find them all locally. If not then they are advertised in the *Aquarist* and you will be able to obtain them from one of the mail order companies.

The Koi societies are another useful way of getting information, as they all produce their own club magazines, and I enclose a list of their various addresses.

Koi Societies

I wonder if you would be good enough to let me know if you have any books available for purchase on Koi. My husband has some small Koi in his pond and I would like to buy him a book on the subject for Christmas.

Please find enclosed a list of books on the Koi hobby. An additional idea for a gift might be membership to one of the Koi Societies whose addresses I append below.

All of the societies produce their own monthly magazines which contain a lot of up-to-date and useful information on Koi keeping, and would make an ideal present for anyone interested in Koi keeping.

The societies also offer a wealth of other advantages so are well worth joining.

British Koi Keepers' Society,
Mrs. E. Liddicott,
Membership/Supplies
Manager,
35 Copplebridge Drive,
Crumpsall,
Manchester M8 6PB.

Yorkshire Koi Society,
Mrs. H. Wordsworth,
32 South View Terrace,
Yeadon, Leeds.

Midland Koi Association,
Mrs. J. Hewitt,
Membership Secretary,
1 Durham Crescent,
Allesley Village,
Coventry CV5 9GA.

Pond design wanted

Could you design a Koi pond for me? My present pond is situated on a paved patio area and I would like to extend/ redesign it. Present size 10 ft. x 10 ft. x 2 ft.

Sketch of area overleaf. I am prepared to spend quite a lot to create the perfect Koi pond incorporating all filters, etc. What fascinating fish!

To design a pond for a garden without actually seeing the site is almost impossible. If I was in your position I would contact and join one of the Koi Societies which exist, and then ask them for some help. You will probably find that their ranks contain several experienced Koi keepers, living not far away, who would be only too delighted to help.

Your particular area is covered by two societies, the Yorkshire Koi Society and the British Koi Keepers' Society, and I enclose their secretaries' addresses. Neither is expensive to join and the amount of information you will obtain will be limitless.

Tropical

The Brazilian High-Hat

I have recently bought a pair of Geophagus brasiliensis. Please can you give me some information on these cichlids? I would like to know their common name, how to sex them, and how to promote spawning. Are they good parents, i.e. should I remove spawn after spawning?

They are in a 36 in. tank at 78°F and neutral pH reading. Other fish in the tank are kribensis, Tinfoil Barbs, a Silver Shark, a Mystus catfish and a butterflyfish. The tank is planted entirely with Vallneria, and lighted by a 2 ft. fluorescent tube and two 40 watt incandescent bulbs. Are these conditions suitable? I feed them on basic diet, with Tubifex worms and Daphnia. Is this O.K.?

Geophagus brasiliensis (or *brasiliensis*) is commonly called Brazilian High-Hat or Pearl Cichlid. You cannot sex the fish until spawning occurs, when the breeding tubes appear—the male's is thinner and more pointed than the female's. Like several *Geophagus* species, the male develops a breeding lump on the forehead but this only occurs when the male is several years old.

They are good parents and peaceful with other fish of similar size. The spawning is usually between rocks so arrange the aquarium decoration accordingly. The fish are not fussy about water but do need a large tank—your 36 in. aquarium should suffice. They also like a well planted tank, so again your set-up should be suitable.

The fish are carnivorous so your described diet is adequate, but beware of the *Tubifex*, it may introduce parasites. Also only use *Daphnia* bred by suppliers, not 'wild' *Daphnia*, for the same reason.

The Oscar

I have a 4 ft. tank, etc., and I would like to get a pair of Oscars. I have been told that wild Oscars are nice. Please can you tell me about this type and how to tell male from female, how to plant and landscape their tank, and also what to feed them on?

The Oscar is *Astronotus ocellatus* and is found in the wild in South America, but it is such a popular fish and so easy to breed that fish farms in the Far East produce large numbers for the aquatic trade. This means you will have problems in identifying a 'wild' fish, let alone a breeding pair. The only sure way is to arrange for a local wholesaler to ship fish from South America when specimens are available. This will prove very expensive and the fish will carry parasites.

Since farmed Oscars look and behave identically to their wild cousins, and are free of disease, why bother?

The male has dark patches at the base of the dorsal fin and the pair are ready to breed when 5 inches (10 to 12 cm) long.

Use a large tank (36 inch minimum) and decorate with gravel plus smooth flat stones. The fish will eat anything you can eat, and lots of partial water changes are needed. The eggs are laid on a stone and both fish are good parents. The fry are free swimming at day 5 or 6 and grow quickly on Brine Shrimp, Growth Flake Food, minced fish and meat etc. The juveniles are a different colour to the adults.

Thorny Catfish

Could you please give me some information on keeping *Auchenipterichthys thoracatus* and *Trachycorytes galatius*? Both are about 2½ in. long in a 3 ft tank.

I am also setting up a 3 ft. aquarium without gravel, only air pump and rocks, plants (*Eloidea densa*) for tropical fish. Will it be OK, plus heater?

The fish you list *Auchenipterichthys thoracatus* and *Trachycorytes galatius* belong to the closely related families, Auchenipteridae and Doradidae, the Thorny Catfish. They come from South America where they live in tangled roots set in deep mud. They grub around the soil searching for worms and larvae and sometimes bury themselves until only the eyes are visible. To help them breathe when so buried the intestine can be used to absorb oxygen.

They accept quite low temperatures 20°C (68°F) but live peacefully in a community tank, their thorny coating giving protection from other fish which they ignore.

There are no breeding records.

Reference your second question. In my experience most tropical fish are unhappy in a bare-bottom tank. The mirror effect disturbs them and most fish, even top feeders, like to grub around the bottom gravel looking for morsels.

Bossy fish

A couple of weeks ago I purchased three paradise fish to join a community tank. The fish seemed to settle in

well until recently it became obvious that one of the paradise fish was viciously attacking and upsetting one of my moors.

I transferred the paradise fish into a separate tank. What shall I do now?

The problem with 'bossy' fish is that it is a personality trait and nothing you do will alter the behaviour. There is always a pecking order in a community tank and one fish will be the boss—this is OK if the aggression is only display. It is when actual fighting and damage occurs that attacker or victim must be separated. I suggest you now swap the Paradise fish for a smaller one—or another species.

An undemanding fish

I recently purchased a *Pimelodileus pictus* catfish. I have not been able to find much information about this, so please could you tell me something about this graceful fish (particularly feeding)?

You do not quite have the correct name—the catfish is called *Pimelodella pictus* or Spotted Pimelodella.

It is an undemanding fish, well suited to the community aquarium. It is peaceful—even to much smaller fish—and accepts all types of food. No special water conditions are required. It originates from Columbia in South America.

Aquarium putty

I have stripped down a 36 in. x 18 in. x 18 in. metal-framed tank and now discover that aquarium putty is unobtainable. I have enquired at numerous aquatic establishments (London to Coventry so far), and apart from "it's all sealed these days", the best answer has been "oh yes, it used to be blue, then it was green and finally disappeared altogether about five years ago."

Where can I obtain aquarium putty or has that, along with so many things, been replaced by progress?

Because of silicone sealer, the supply of special aquarium putty was stopped a few years ago, but the putty itself is still available. It will be

found in DIY or Hardware stores as putty for glazing metal casement windows. Do not use the putty for wooden frames—this dries out and allows leakage of water.

If you use the putty for glazing a metal-framed tank, an internal seal of silicone sealer is still recommended for a guaranteed leakproof aquarium.

Expensive African Cichlid

Can you please give me some information about *Cyphotilapia frontosa*?

Cyphotilapia frontosa is one of the African Cichlids. It originates from Lake Tanganyika and therefore prefers hard, alkaline water at about 80°F. It is a big fish, 6 in. in the aquarium, but up to 12 in. in the wild. Despite its size it is quite peaceful and ideal for the Cichlid community tank.

It accepts all foods, flake, pellet, scraps. It is also easy to breed—the male has a large hump on the head (called a nuchal hump) and the female mouthbroods the eggs. The fry incubate over 2 to 3 weeks at 80°F and are large enough to accept crumbled flake food.

Tank size depends on how many fish you wish to keep—but a breeding pair should settle down in a 36 in. x 15 in. x 12 in.

The wild fish are from deep water and so difficult to capture—hence the fish is rather expensive to buy.

Ribbon Eel

Could you please give me some advice on feeding a blue and yellow Ribbon Eel? I purchased one three weeks ago. I have tried live food, ie brine shrimp, frozen foods, mussels. I have left food in the tank at night but it is still there in the morning. I have phoned up various shops and one shop told me that they are filter feeders, but I cannot see this. I used to have a mottled Moray Eel and it used to feed out of my hand.

The blue and yellow Ribbon Eel is a marine fish with teeth—that lives on a carnivorous diet—so it is not a filter feeder. It really should accept your offered diet of

mussels etc.

Wholesalers handling the species say they feed silverfish broken-up or live (but adult) brine shrimp. In cases of difficulty in feeding, live Guppies are fed to the Eel. (As a member of the FGA I disapprove of this practice, of course.)

The problem may be disease not diet, in which case the prognosis is not good. If other 'symptoms' appear contact me again, or the local vet.

Tinfoil Barbs

Would you please send me information about Tinfoil Barbs, in particular life span?

I ask this question as I have had one for 17 years, and he or she was about 1½ in. long when I got it, and now measures 9 in. from tip to tail.

The Tinfoil Barb is *Barbus schwanenfeldi* also known as Schwanenfeld's Barb, originating from Thailand, Borneo and Indonesia. In the wild it reaches 35cm (or 14 ins.) so your 9 in. fish is still 'small'—however in the aquarium it usually only reaches 9 or 10 ins.

It is an easy fish to keep and eats almost anything: include some vegetable flake or lettuce leaf, etc in the diet. In a large tank with mature, slightly acid water at 27°C a pair will mate, scattering several hundred eggs that hatch in 24 hours. The fry are easy to raise.

I think your 17 years for the fish is a very long life. Small Barbs generally live for four years. Large fish tend to live longer—the only published data on longevity (1,001 Answers to Questions about Aquarium Fish by Mellen and Lanier, USA) list the following: Angelfish 10 years; Red Astronotus 5 years; Australian Rainbow 8 years; Betta (Siamese Fighter) 2½ years; Black Tetra 6 years; Bloodfin 5 years; *Corydoras aeneus* 7 years; Jack Dempsey 10 years; Clown Loach 10 years; *Copeina* spp 4 years; Danio 3 years; *Epiplatys dageti* 4 years; Gourami 4 years; Guppy 2½ years; *Merymnis* spp 8 years.

No data for the Tinfoil, but the record now stands at 17 years!

Marine

Cloudy water

I have been keeping Marine fish for two years and never had any trouble until now, and I need your help. You see, I have always had two tanks and I decided to sell the one and get a larger one 36 in. long x 30 in. tall x 15 in.

The trouble is the water keeps going cloudy and I have done everything to stop it but cannot. I gave a complete water change. I have got an under gravel filter also a Fluval 52 internal power filter, changed the rocks and after all that, still no good, so what am I doing wrong Mr. Cox?

I have never had any trouble with my other tanks. I have never over fed my fish but I am not sure about my under gravel filters because I had to cut one, so that it would fit in the tank.

There is nothing wrong with your filtration. The water cloudiness is caused by a population explosion of microscopic, unicellular, phytoplanktonic algae or diatoms. The most common culprits are algae from the genera *Dinallitella* and *Mono-chrysis* and the diatom *Phaeo-dactylum tricornutum*.

Twice in every year, in the periods which we loosely call Spring (March / April / May) and Autumn (Sept / Oct / Nov), these huge population explosions of all microscopic aquatic organisms—plants and animals—food organisms as well as pathogens and parasites, occur in all bodies of freshwater, brackish water and seawater all over the surface of Planet Earth. They can be monitored in aquariums, both freshwater and seawater, heated and temperate, just as surely as they can be monitored in the River Ganges, Lake Titicaca and the mighty Pacific Ocean. The precise mechanisms responsible for these colossal planktonic population increases ("blooms") are extremely complex and presently imperfectly understood even by eminent research scientists who have spent their entire working lives in this field.

For the last 18 years, I have made an annual graph of

my Company's sales of the four appropriate medications and every year the results are the same. When I plot my graph, with the 12 months January to December on the horizontal "X" axis and the number of units of each medication sold on the vertical "Y" axis, every year produces the same "dromedary's hump"—type graph with sales of all four medications peaking first in Spring and then again later in Autumn. This astonishing phenomenon is not just limited to the northern hemisphere. When plotting sales figures just for Rhodesia, South Africa, Australia, New Zealand and South America, exactly the same twin-peaked graph occurs.

Now that you understand the cause of the problem, we must ask how to solve it.

First I must stress that conventional filtration methods are totally useless as a means of solving the problem. These microscopic plants average only 8 to 12 microns (1 micron = 1 thousandth of a millimetre) in size. They pass straight through all filtrant media except the finest grade of *diatomaceous earth*. I would not, however, suggest that you go out and buy a DE filter. Instead, you should do the following:

1. Keep all lighting off the tank for seven days;
2. Temporarily, stop using all seawater-enriching nutrients, algal fertilizers, trace elements boosters, and vitamin supplements.
3. Stop all feeding of the fishes and invertebrates for seven days;

After seven days of this regime, you will find that your seawater has returned to its previous crystal clarity.

Semi-natural Method

I am setting up a marine fish tank 48 in. x 12 in. x 15 in. high. I am using a U/G filter. The method I am using is the semi-natural method and there are some things I need answers to as follows:

1. Is a tank 12 in. x 8 in. x 10 in. big enough for a quarantine tank?
2. I will be using three fluorescent lights, does this mean I will need three box starters?

3. Is there any other means of lighting the tank which is suitable?

4. How long will it take to get a good growth of algae if the lights are on 8-10 hours a day? The algae is for the fishes to graze on.

5. Which foods can you feed to anemones? How much and how?

6. What kind of fish should I not keep with anemones?

7. How much water should I change and how often?

8. Will the fish stay healthy and fit if they are only fed on flaked foods?

1. A tank measuring 12 in. x 8 in. x 10 in. has a gross capacity, i.e. filled brimful with no objects to displace water, of only 3½ Imperial gallons (16 litres). By the time you've fitted an under-gravel filter and covered it with cockleshell and coralsand, that capacity will be down to 2½ gallons. A decent-sized bit of coralline rock to make the quarantine feel secure will further reduce the seawater volume to 2½ Imperial gallons (11½ litres). If you stick to my golden rule of not exceeding 1 in. of fish length to each 4 Imp. gallons of seawater you will see that the maximum-sized fish which you could quarantine in such a minuscule tank would be a fish measuring 0.625 in. long—only ½ in. long!

Still even a small one is better than nothing at all. You will just have to keep smaller species and/or buy your fishes as juveniles.

2. You will need three sets of starter gears unless you use a twin-set and a singleton.

3. Alternatively and more effectively, you could use two of the new mercury-discharge spot-lights. This would have the advantage of enabling you to site those invertebrates having a high lighting requirement such as anemones and live coral-heads directly under each spotlight.

4. It would be wiser to leave the lighting switched on for at least 12 hours each day if you are hoping to keep successfully invertebrates. Green algae will appear within a few days and, if fed regularly with an algal food, will soon form a lush growth.

5. Anemones need to be fed with garden-pea sized chunks of irradiated lancefish, squid, cockle, etc., on each

alternate day. Clearly some judgement and skill regarding amounts and frequency are called for on the part of the aquarist, since no two anemones have exactly the same food requirements. The food is simply dropped into the tentacles as near the central mouth as possible.

6. Do not keep any members of the genus *Chaetodon*, *Heniochus*, *Megaprotodon*, etc. with an anemone. All these butterflyfishes will peck at the anemone. The only two butterflyfishes which leave anemones alone are *Chelmon rostratus* (Copperband Butterflyfish) and *Forcipiger longirostris* (Yellow Longnosed Butterflyfish). Even amongst these two species one occasionally finds an individual which will have a go at an anemone from time to time, although they don't usually constitute a serious threat to the anemone.

7. No two marine aquaria are exactly the same in design and function and similarly no two marine aquarists manage a given aquarium in the same way. Therefore no advisor can possibly give a blanket suggestion with regard to quantities and frequency of partial water changes. I have always used the following criteria with total success and safety:

- (i) **Never** change more than one third (33%) of the seawater at a time;
- (ii) **Always** use the colour, the pH reading and nitrate reading of the seawater as the ultimate arbiters determining when a partial water change is due;
- (iii) **Colour**—if the seawater has assumed an unhealthy yellow colour and a foetid odour a partial change is due, and;
- (iv) **pH**—if, despite adding a buffer to the seawater, the pH still collapses to less than pH 8.0 within a few hours, then a partial water change is due, and;
- (v) **Nitrate content**—if the nitrate reading increases to more than 50p.p.m. a partial water change is due.

8. A few very hardy species of fish such as Damselfishes will thrive perfectly well on a diet of nothing but flake-foods, but the vast majority of coralfishes also need regular feeds with irradiated seafoods on at least alternate days if they are to stay fit and well.

Language of fishes

The hunters

John A. Dawes

Ask anyone to name two predatory fish and you are likely to end up with Sharks and Piranha as your two prime candidates. You are equally *unlikely* to find Neons or Angels mentioned in this respect.

Yet they, too, are predators, and just as effective, in their own ways, as their more notorious counterparts.

One of the reasons for people's differing views/images of these four hunters is that we normally equate predation with the actual killing of large (or largish) prey. There is a certain ' nastiness ' associated, quite illogically, I think, with predators. Few people would, for example, consider a Piranha as a 'pretty' fish — interesting, yes — imposing, yes — remarkably well-built, yes — even spine-chilling — but 'pretty', perhaps only to another Piranha!

Many of these same people, on the other hand, will see Neons, Cardinals and Angels as beautiful, peaceful fish. When you look at the diet of these species, however, you find that it consists virtually exclusively of whole, live animal matter. And that, by any definition, is predation. What's more, Angels have just as efficient hunting methods as Sharks. The only thing is that the nature of their prey is different. But, if Angels were *not* efficient hunters, then there would be no Angels at all!

The basic problem facing all hunters

is how to catch their prey. The multitude of ways in which they go about the job is so varied that one could spend a whole lifetime keeping fish and only observe a minute fraction of the existing strategies in aquaria.

The 'Language of Predation' is not always easy to interpret. Nevertheless, some of it is so easy as to be almost self-evident.

I have already mentioned Piranha. What is it about the way they are put together (as opposed to their reputation) that identifies these fish as predators? The immediate, and almost instinctive, response would be, "Their teeth".

Yet, when you look at these closely, you find that they are predominantly designed for cutting and not, necessarily, for catching and gripping. Catching and gripping teeth tend to be narrow and conical (i.e. spike-like). There is usually, in addition, a gap between each tooth. This allows individual teeth to puncture the flesh of the prey and hold on, either till a chunk breaks off through the struggles of the prey itself, or till the prey can be manoeuvred into position and swallowed whole.

There are many examples of this in the fish world. One that I find particularly 'good' in this sense is the Pike-top Livebearer (*Belonesox belizanus*).

Pike-tops are streamlined, powerful

fish armed with exceptionally good gripping teeth. They are found in northern South America (Belize, Guatemala and Yucatán), but extend northwards into southern Mexico. There is no mistaking the predatory habits of these fish. In fact, they are so obvious that, when I showed a slide of a Pike-top to a group of 11-year-olds (during one of the lessons I used to give in schools while I was a lecturer at Bath University), there was total unanimity in the class concerning its feeding habits. I remember quite vividly that, when I asked for a reason, one of the girls said, with total conviction, "Because it looks mean!"

She was right, of course. The aura of 'meanness' is brought about by the long snout, the teeth themselves, the well-formed (and, clearly, highly efficient) eyes, the strong, muscular, torpedo-shaped body, the posterior location of the dorsal fin, the obviously powerful caudal fin . . . and so on.

These fish are so predatory at times that females (maximum size approximately 20 cm.) have been known to catch and swallow males measuring more than 10 cm. in length.

If we compare the Pike-top with a Piranha, there are some very sharply defined differences.

Piranha are not sleek and streamlined—they are roundish, stocky and very robust. In other words, they are not built for speed. In addition, their teeth are so well adapted for cutting and fit together so well that they function almost as a single, serrated, precise cutting unit. The fit is so exact that, according to Jacques Géry in his excellent book *Characoids of the World*, Piranha "are unique among the characoid fishes in having sharp interlocking cutting teeth forming a continuous saw on both jaws, well adapted to taking a good piece of flesh out of fishes or even mammals. . . . The teeth are so well interlocked that an entire set on one side has to be replaced when a tooth is worn. . . ."

The jaw itself is very powerful and thickset—just the job for tearing through tough skin and tissue. One other factor that is highly significant is that Piranha occur in large shoals in the wild.

Putting all the above together, we end up with a fish that is most definitely not a 'lettuce eater'!



Piranha are among the best known hunters of the fish world.



The Pike-top Livebearer, *Beloneox belizanus*, is a sleek, efficient predator.

Yet, what does its body and behavioural language tell us about its hunting technique?

Well, for a start, we can say that Piranha are not particularly fast-swimming hunters. Therefore, their diet is likely to consist of relatively slow-moving prey or, by accident, normally fast-moving prey that becomes confused, disoriented or trapped.

Secondly, we can say that, because their teeth and jaws are so well suited for cutting, Piranha will tend not to swallow their prey whole, but in chunks.

Since they prowl in shoals, we could also probably conclude that Piranha use one of the advantages described in my earlier articles in this series entitled, *Safety in Numbers* (October 1985), i.e. an individual fish stands a much better chance of obtaining a meal if it belongs to a shoal. This advantage results from the fact that a shoal, however small, can scour a much larger area than any single individual. The behaviour of those fish that come across food is such that the message is quickly transmitted to other members of the shoal which, consequently, can obtain their share of the spoils.

Yet another bit of deducible 'body language' is that fish that cut up their prey are likely to feed quite regularly on animals considerably larger than themselves.

One of the best examples I can think of illustrating everything I have said above in action is that brief, distressing sequence in David Attenborough's BBC series, *The Living Planet* in which an adult Capibara (a large South American rodent) is demolished by a frantic shoal of Piranha in just a few, blood-stained, torrid minutes.

Although high speed chases, such as those of the Pike-top, and mob violence, such as that of the Piranha, are two effective hunting methods, there are, of

course, many other strategies.

The one crucial thing that they all have in common is that they result in predator and prey being sufficiently near to each other for an attack to be launched.

However, this does not mean that the hunter needs to chase its prey. Careful, precise stalking can produce equally good results.

One characteristic often associated with this technique is an irregular or 'broken' body outline, as found in Lionfish (*Pterois*) which can look for all intents and purposes, like a bunch of floating seaweed. 'Leaf' Seahorses (*Phyllopteryx*) hunt much smaller prey but take the mimicry to such an extent that it is sometimes difficult to believe that you are actually looking at a fish and not at a strand of fucoid seaweed—even when you know the facts.

Other fish either sit and wait for food to come to them, or, alternatively, actually attract unsuspecting victims by means of a lure. Excellent executioners of the first of these techniques are the Scorpionfishes and the Stonefishes (families *Scorpaenidae* and *Synasciidae* respectively).

The 'language' of the strategy they employ is so obvious that no-one could possibly misinterpret it. Eyes on top of the head, large, cavernous upturned mouth, 'squashed' appearance, mottled, camouflaged fins and body surface (even with what appear to be algae on some Stonefishes) and other features can only point towards a 'sit-and-wait-and-gulp' hunting strategy.

Anglerfishes (order *Lophiiformes*) belong to the 'sit-tight-and-lure-your-prey' category in which the first dorsal spine in many species is developed into a line and bait arrangement (an illicium) used to attract unsuspecting victims towards a lightning-fast death. Many Anglers have also evolved an incredible likeness to their surroundings, making their presence even more difficult to detect. Some, for example, appear to have their body covered in sand. These, not surprisingly, often sit on sandy patches in a reef. Others may look like gaudy sponges, others like seaweed-encrusted rocks... and so on.

As I mentioned earlier, some of the 'Language of Predation' is difficult to interpret. The examples I have chosen are 'easy' ones but they help to illustrate the basic requirements that a hunter needs. Therefore, if we look at those common, beautiful, 'peaceful' species like the Neons and Angels that I referred to in my opening section in the light of these requirements, then the messages carried in their teeth, behaviour, body shape, eyes or any other of a number of features, will leave little doubt that they too must carry the hunter tag.



This Anglerfish, *Antennarius* species, has sand-like camouflage which allows it to blend in with its surroundings.

Tomorrow's aquarist

Lee Smith - like father, like son

The Bristol Aquarists' Society Open Show, held towards the end of the coldwater season each year, is always worth a visit. The fish are, of course, superb as one would expect at such a prestigious event, and people travel the length and breadth of the country to take part. Therefore, competition is extremely keen and standards are correspondingly high.

B.A.S. is always striving to encourage young fishkeepers to participate in the Open Show and they, in their turn, invariably respond enthusiastically.

Some of these young participants have appeared on this page in the past and this year is no exception.

One of the youngest (if not the youngest) winners at the last B.A.S. Open Show was Lee Smith, six-year-old son of Stephen Smith, whose popular 'Coldwater Jottings' appear monthly in *A & P*.

Lee has always been a very keen fishkeeper (at least as far as he can remember). You only have to mention the word

'Goldfish' and he's away! It is tremendous to see someone of Lee's age so deeply involved in the hobby. He knows a lot about fish too! In fact, the fish that won him a coveted Second Prize in the Junior Section at the B.A.S. Open Show started off as an 'adopted', stunted Nacreous Veiltail which Lee nurtured (all on his own) into its prize-winning condition on a diet consisting largely of *Daphnia* and Bloodworms.

According to Stephen, Lee always wants to get involved in the most mundane chores like cleaning out tanks or scrubbing ponds.

This can sometimes present a few problems, particularly during culling exercises when rejects are very likely to return 'unseen' to the rearing ponds almost as fast as they are removed!

One of Lee's favourite activities is going into the countryside on *Daphnia*-collecting expeditions. "Once I even got a foot stuck in the mud, but Dad pulled me out," he says. "When I wrote about it at school in my News-book—I also drew a picture with Bloodworms and *Daphnia* in as well".

According to Lee, he is looking forward

to the coming season and hopes to pick up some more prizes.

Judging by what he has done so far, and by his boundless enthusiasm, he should do very well indeed.

Good luck, Lee—we'll see you around no doubt.

Competition winners

Have you sent in your entry for our super competition, 'Fish Names—Old, Common and New' sponsored by **Tahiti Aquariums**? If not, you're still in time but, **hurry**—the closing date is **10 February**. Send us your entry today. You could be one of the lucky ones to win a fabulous **Marina Aquarium** with its own **Marina Hood** and a **Modular Stand**. Remember to mark your envelope clearly with the words 'Fish Names Competition'.

Watch out next month for the winners' names on this page.

Beginners' corner

We get a huge mailbag every month from new and established aquarists and pondkeepers asking for advice from our panel of experts. The questions can be anything from solving the problem of an aggressive Angelfish which has an insatiable appetite for small Neons, to the complexities of biological filtration or the identification of an obscure, recently imported 'new' fish.

Among the many queries we receive is a regular (and large) number from beginners who have gone into fishkeeping completely unprepared and have, not surprisingly, come up against apparently insurmountable problems from the start.

In **Beginners' Corner**, we will be dealing with some of the joys and pitfalls of starting up in the hobby.

There will be short items on topics such as suitable starting communities of fish, the best size of tank to choose, the control of algae, the establishing and maintenance of good water quality, correct feeding and so on.

We will also be pleased to hear from you concerning your early experiences in the hobby, how you overcame them, how you first got interested in fishkeeping, or anything else which you would like to see under our **Beginners' Corner** title. Useful tips for newcomers to fishkeeping would be particularly welcome.

Please send your contributions to:

**Beginners' Corner (T.A.),
Aquarist & Pondkeeper,
Buckley Press Ltd.,
58 Fleet Street,
London
EC4Y 1JU.**



Lee Smith proudly posing with his second-placed Nacreous Veiltail Goldfish

Histrio histrio is an excellent fish for the aquarist with a specialist tank available who is looking for something different. To say the least, its appearance is bizarre and its behaviour unusual.

Perfectly adapted to spend its life amongst clumps of Sargassum weed, Histrio might not be thought the ideal aquarium inhabitant. However, the Sargasso fish is to be found in habitats other than the vast expanses of sargassum weed. The currents of the oceans naturally break up and transport large masses of the weed all over the warmer parts of the Globe and the creatures therein obviously have to go with it. Thus Histrio is also found on coral reefs and appears to be able to maintain a satisfactory life style in such a different environment. Its colouring, perfectly adapted to match its life in the Sargassum clumps, is also not too far out for it to blend in well with coral encrustations and other growths found on the reefs of the world. It is quite able to alter its colouration to match the darker coloured algae and clumps of rock that it is likely to encounter.

Histrio seems, at least in the aquarium, to have some difficulty in matching its colour to that of coral sand but is ideally able to adjust to the German ceramic rock that many of us use in our aquariums in place of the much heavier and more expensive coral. This ceramic rock is dark in colouration and is full of holes and spaces very suitable for Histrio to lurk in. This latter factor I believe to be very important in the successful maintenance of Histrio, or perhaps any other angler fish, in the home aquarium. This order of fishes, possibly apart from the very deep sea species, does appear to need to be able to blend and almost disappear into its surroundings for it to feel happy and secure. I can't imagine an Angler fish being happy in the average community tank with its fairly sparse clumps of coral and general lack of cover. This could be why some writers report the fish to be sensitive and difficult to maintain whilst others, presumably with a more suitable environment, state exactly the opposite.

Living in a very small invertebrate tank

The subject of this article is, in fact, living in a very small invertebrate tank with a considerable amount of rock and coral rubble providing adequate cover for it to hide if it should feel the need to do so.

The only other fish in the aquarium is an exceedingly aggressive *Pseudocromis paccagnellae*. This latter is undoubtedly the most voracious and generally vicious creature that I have had the misfortune to keep. Whilst it is O.K. with the corals and anemones present in the tank, it has disposed of three other fish that were originally in the aquarium with it. Short of placing a *Pterois* species in the

SARGASS

Possibly not the most beautiful of fishes, this anglerfish has however, some characteristics making it a worthwhile aquarium occupant, says Tim Hinitt



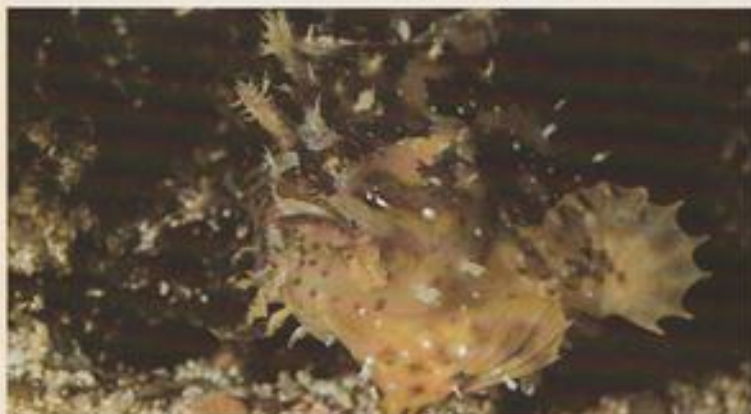
SSOFISH

Below left: Its camouflage rendering it almost part of the background, the Sargassofish is, nonetheless, being watched by a *Pseudochromis* whose head appears on the left.

Bottom left: Close-up of *H. histrio* showing a baleful green eye and an intimidating mouth.

Below: Sargassofish displaying its fins adapted for clinging to floating weed.
Bottom: *H. histrio* emerging from its crevice for food.

All photographs by the author



tank, I could think of no other solution than to let it have the tank entirely to itself. However, when the Sargasso fish appeared in a local dealer's shop in Bedford, I decided that this may be the ideal companion for the *Pseudochromis*. This has proved to be more or less correct as the Angler does not appear to be unduly put out by the odd nip from the 3 in. long *Pseudochromis*, the latter staying well away from the 'sharp end' and confining its attention to the occasional nip of the tail.

Likelihood of bullying

It is fairly obvious that were *Histrio* to be placed in a community tank say with fairly large angels and fish of a similar territorial nature, it would very likely be bullied for, although it can swim very well if necessary, it will nearly always prefer to waddle along the bottom even if provoked quite severely.

Histrio will spend most of the day in a rock crevice, preferably in the darker parts of the aquarium. However, when food is produced it will change colour with excitement and wave the lure on the top of his head backwards and forwards. Feeding *Histrio* is not a problem providing the aquarist is prepared to spend a little time in the preparation and the giving of the food. Ideally, live fish should be supplied but this can prove expensive and difficult to obtain. A very good substitute is to thread a frozen Lance fish, in its entirety, on to a piece of nylon fishing line and then to dangle this in the aquarium. Inevitably the Angler will emerge and, with a bit of jiggling on the part of the aquarist, the Lance fish will be engulfed and the nylon line pulled free. Whatever you do, don't actually tie the Lance fish to the nylon line as I first did. This necessitated the removal of *Histrio* from the water and the retrieval of the Lance fish and nylon fishing line with a pair of tweezers because he won't spit it out! After a few days the nylon line can be dispensed with and *Histrio* will take Lance fish direct from the fingers.

Well adjusted to low water pressures in aquaria

The Sargasso fish would appear to be more suitable for the home aquarium than many of its deep water relatives. Coming from near the surface, when living in the Sargassum weed, it is obviously well adjusted to shallow water pressures and lighting situations. This is a very important factor that I think is often overlooked when considering other species for the aquarium. *Histrio* grow to some 15 cm. in length but would possibly remain a little smaller in the aquarium. Most offered for sale seem to be in the region of 5 cm. in length. Whether watching it angle for a living fish or studying its wonderful camouflage patterns, *Histrio* is a very entertaining creature that is not difficult to keep and well repays the outlay and interest shown in it.

HUMP-BACKED LIMIA

The original wild form of this live-bearing toothcarp comes from Haiti, where it is found in a variety of still waters and slowly flowing waterways. It is found also, however, along the coast in brackish waters. It would appear, therefore, that the fish do not make a lot of demands on the aquarist but are easy to keep. In fact, they can be comfortably accommodated in a small aquarium as long as one bears in mind that they are a shoaling species. A pair on their own can cause worries, especially in an environment which does not suit them.

They love sunlight and their beautiful yellowish-brown coloration gleams to its best effect in the rays of sunlight. Subjected to constant artificial light their coloration becomes far less attractive. Further, they must not be kept in water which is too soft. Water hardness of about 8°DH constitutes the minimum degree of hardness, whereas it is difficult to establish the maximum, although there are examples of specimens being kept in water with a DH reading of 28°. On no account, however, should fish be suddenly transferred from medium-hard water to very hard water, but the water composition must be equalized by gradually reducing the hardness. In certain conditions they are rather susceptible to illness. This is especially so if the fish are kept for a long time in a small aquarium in which the water is not changed, but so-called 'old water' is allowed to develop. This kind of water is not to be recommended.

Nevertheless, it often transpires that a change of water is not carried out for a long period of time, because healthy plant growth tends to suggest that it is unnecessary. When we do set about the task extreme care is called for as these fish do not find an abrupt change of water pleasant at all and may even perish

as a result! So the rule is: a partial water change of 10 to 15% on a weekly basis. In this way the fish are kept in top condition.

A constant temperature is also important, which may fluctuate between 24 and 26°C and even fall to 21°C during the night, but higher or lower temperatures over an extended period of time do not suit the fish at all.

They feel at home in a well-planted aquarium which has marginal vegetation and groups of plants growing towards the surface in the open part of the tank. If they take fright for any reason they are thus able to disappear amongst the plants. The sexes of these yellowish-brown fish with their seven to eight dark bands on their flanks can be distinguished providing they are not less than eight months old. Specimens from the same brood which have reached this age can be differentiated sexually by size, the females being larger than the males. Later the gonopodium of the male develops.

High-back and sail-like dorsal fin

Fully grown males can attain a length of 4.5cm, females grow to about 7cm. As they get older the body shape of the fish changes. Especially in the males a more high-backed shape develops, together with a wonderful sail-like dorsal fin. My own specimens freely accept live food and algae. As the latter source of food is not always available (anyone who needs some cannot obtain any and whoever has some cannot bear to part with it) one can satisfy their needs with dried food of a vegetable nature.

In the spring and in the summer one simply places a piece of moor oak in a glass container in the full glare of the sun. When it is covered with algae the wood is placed in the aquarium and the fish then graze from it. As far as reproduction is concerned this species is not exactly highly productive. In my ex-

perience the number in a brood varied between 12 and 26 young. It is better to pair fish which are not too young. When offspring are produced the sexes are to be separated as soon as they can be differentiated. This may take some time, however. Much longer than is the case with the guppy, for example.

After the fish have been separated into males and females they should be left to develop until the males are about four centimetres long. The two sexes can now be put in the same tank, although this must not be a breeding tank. Their diet should consist mainly of vegetable foodstuff. The more vegetarian the diet the better, as this has a definite influence on the size of the brood produced and the condition of the young. They will be so healthy that hardly any fish will be lost, which does happen if this kind of diet is not offered. A brood of more than 20 young can be counted as a good result. At birth the young fish measure about ten millimetres and can be fed immediately with brine-shrimp nauplii. A few days later one should then give them water-fleas which have first been put through a sieve.

While they are being reared a constant temperature which is not too high seems to be better than relatively warm water. My best results have been in water at a temperature of 23°C. The young do not grow particularly quickly, although they begin to take on their coloration after three to four weeks.

Poecilia nigrofasciata is no fish for the raw beginner. Anyone who has bred a number of live-bearing toothcarps, however, will not experience any great difficulties. The fish is distinctive not only for its shape and coloration but also in its behaviour. By breeding these fish one also has the opportunity of providing an attractive addition to the tanks of other aquarists, for the species is not always obtainable through dealers.

The shoaling
Humpbacked Limias
are easy fishes
to keep says
Peer Koppenaar
who here details
their management
in aquaria



MARINE ANGEL FISH

Below: Young *P. imperator* (Emperor Angel Fish) in juvenile livery

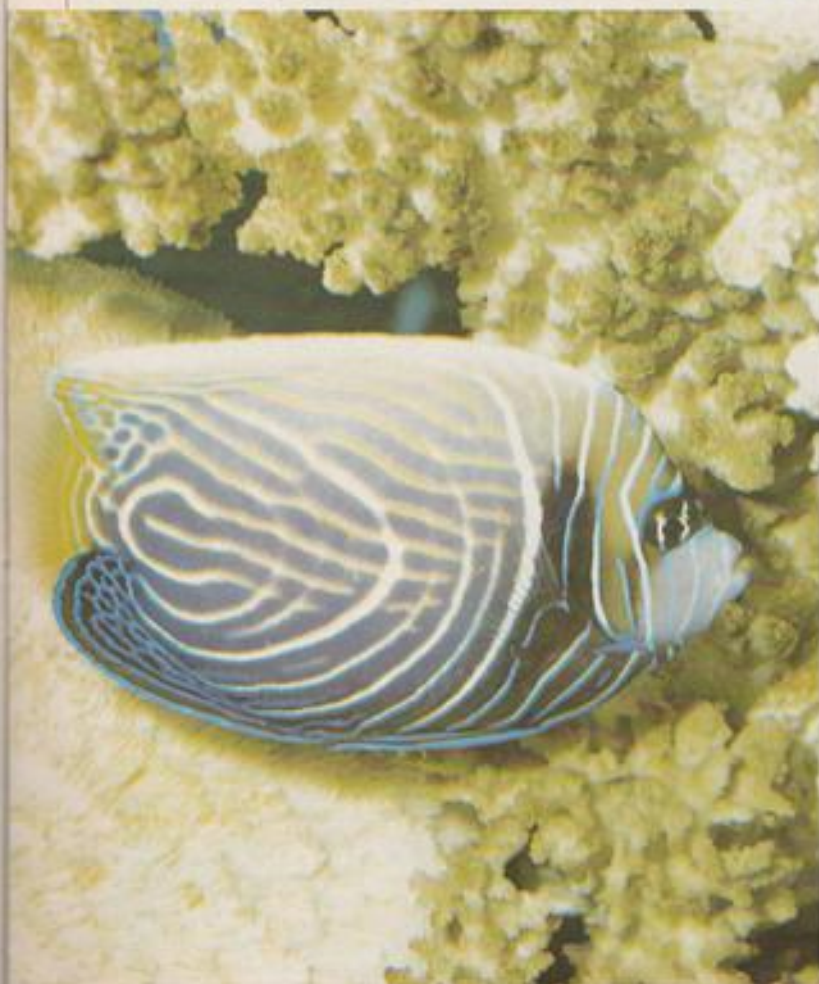
Below right: Adult specimen of *H. ciliaris* displaying the splendid livery of a mature fish

Right: Adult Blue Ring Angel Fish (*Pomacanthus annularis*)





Probably the most colourful and spectacular of marine fishes kept in aquaria, Angel Fishes are expensive and require ample space. Stephen D. Sawyer offers some basic advice on initial care of these majestic fish.



Of all the many beautiful and exotic marine species currently imported, marine angel fish hold pride of place in the eyes of most aquarists.

A newcomer to the hobby is very soon to discover the sheer majesty of the several angel fish genera, *Pomacanthus*, *Excoelphipops*, *Holocentrus* and *Chaetodontops* being the most readily available. The qualities that make angel fish such sought after aquarium inhabitants are numerous but none more important than their spectacular colouration, apparent intelligence and inquisitiveness and their graceful motion as they patrol the aquarium. Even though they are probably the most expensive family of marine fish kept by the aquarist, this does not affect their popularity and a good specimen of almost any species rarely remains in a dealer's tank for very long. In this article I would like to present a guide based on my own experiences in the care of angel fish.

Purchasing a good specimen is in itself a skill. If you follow all the basic rules (active, feeding well, good colour and body) you will greatly increase your chances of success. Don't be afraid to question the dealer, angel fish are both expensive and difficult to maintain so it is especially important that your acquisition is healthy in every way. Some newly imported angel fish will never recover from the trauma of being removed from their natural environment combined with the rigours of travel and no amount of care and expertise can encourage them to adapt.

Acclimatising an angel fish to your aquarium is generally the most important and dangerous time. An angel fish should, on introduction, be cautiously inquisitive inspecting every aspect of the aquarium. Even the extremely shy species, *Pomacanthus maculatus* (Blue Moon), *P. annularis* (Blue Ring) and

Eucichthys xanthurus (Blue Face) will be seen if the room is kept quiet and free from movement. If your angel fish hides away, watch him cautiously for he may be showing signs of impending disease. Only rarely will fighting not occur if you place an angel fish in a settled community aquarium. He will almost certainly be attacked by any resident angel fish with different degrees of severity depending on size and type of species. This can obviously lead to problems as infections may occur on any resulting wounds. Unfortunately it is not unusual for an angel fish to show signs of disease a few days after his introduction into the aquarium merely due to the stress created by the move.

Many species of angel fish exhibit 'Stress Blotch' which, as the name suggests, are blemishes on the skin of the fish which make it appear that he has been wounded very seriously. In fact this is not the case, it is merely old wounds becoming very apparent because the fish at that point in time is unhappy with his environment. However, it may not only be old wounds manifesting themselves on the skin of the fish but also a more general blotch can occur covering vast expanses of the fish's skin making it look extremely unsightly. *Eucichthys nana* (Majestic Angel fish) and *Pomacanthus imperator* (Emperor Angel Fish) display this blotch perhaps more often than any other species.

Needless to say, if your angel fish displays this blotch colouration something is seriously wrong and medication may be necessary.

Unfortunately blotch can also be caused by poisoning, usually copper which in the case of a new fish would normally be eliminated but when considering the treatment with a copper based solution of any established angel fish it can lead to considerable confusion.

The size of fish purchased also plays an important part in the successful maintenance of one of these truly magnificent species. An angel fish of less than 3 in. in length would be considered a risk by most marine aquarists. At that size you are attempting to keep a juvenile fish, and as is the case with all animals, juveniles are less hardy. Another important factor is that juvenile angel fish, especially of the *Pomacanthus* genus, change colour dramatically as they mature and due to the general environment provided by a home aquarium, it is usually found that they do not change fully into adult livery. At sizes greater than 7 in. you are considering an adult specimen. Fish of this size need huge areas and volumes to flourish. An ideal size is 4 in.-6 in. for the resources available to most aquarists but unfortunately demand for fish of this size is great so when considering the size to price ratio this is the most expensive size.

Angel fish do not always tolerate each

other's presence, especially in a well decorated aquarium, leading to continual bickering and even serious fights. It will often be found that only a discrete number of angel fish can be maintained successfully. Three large angel fish (4 in.-8 in.) would require a tank of 100 gallons to live relatively peacefully together. More angel fish can be kept together than this but the continual pressure of space will lead to the gradual decline over as much as a year or two in one or more of them until their demise is inevitable. It is often said that large discrepancies in size reduces the amount of fighting but the difference in size required is often underestimated. For example, it would not be unusual for a 6 in. fish to dominate a 2 in. fish, stunting the latter's growth or even inducing its death. Large angel fish (6 in. or more) if well settled and, more importantly, enough room provided will tend to show each other too much respect for fighting and squabbling over areas of rockwork to develop into anything too serious. Generally, if enough space is provided serious problems should not be encountered; however there are exceptions one of which is *Holocanthus passer*. Specimens of this species will never successfully mix with *H. ciliaris* (Queen Angel Fish) and *H. clarionensis*.

With regard to the feeding of a settled specimen, it rarely presents any problems as it will accept nearly all of the easily obtainable foods (cockle, mussel, squid, various shrimps, lettuce and suitable flake preparations) although individual preferences will, of course, be encountered. Feeding alone, however, is not a sign of good health, an angel fish will often eat on the day he dies. Angel fish are intelligent and readily adapt to a captive environment so if a newly purchased fish refuses to eat he may be suffering from a combination of ills but often it will be an intestinal infection of a bacterial nature caused by poor conditions on importation. If the latter is suspected, and one can only rely on judgment through one's own experiences, he needs to be removed to a hospital tank and receive an appropriate medication. I would personally prefer to use a copper based treatment as opposed to antibiotics as very little is known about the latter. Treatment can be undertaken in the community aquarium but the lives of the healthy inhabitants are then put at risk. The success rate in instances such as this are low and even though the fish may appear to be perfectly healthy, exhibiting good colour, acceptable respiration etc. he will not attempt to eat and will die in the weeks to come.

To conclude, this article only scratches the surface in describing how to keep these wonderful creatures; the rest cannot be learnt from reading; as in most hobbies there is no substitute for experience. Personally speaking, though I am sure I am not alone in expressing these sentiments, keeping an angel fish in excellent condition is one of the most rewarding challenges the marine branch of the hobby can offer.

Young Queen Angel Fish (*Holocanthus ciliaris*) showing juvenile colouration



AN INTRIGUING MOUTH-BROODING BETTA

Steve and Chris Clark of the Anabantoid Association of Great Britain writes of his successful experiences with breeding *Betta unimaculata*, from North Borneo which likes alkaline conditions and is a mouthbrooding species.

Although it was first discovered in 1905, *Betta unimaculata* has only recently been seen in this country, when the *Internationalen Gemeinschaft für Labyrinthfische* in Europe sent 17 specimens to the Anabantoid Association of Great Britain. This mysterious jewel was made even more intriguing by the sparse information available about it.

Popta, in 1906, described a new species of mouthbrooding *Betta* which she erected to the genus *Parophicephalus*, the type was called *P. unimaculata*. Regan then placed the fish into the broader genus *Betta* in 1910 and Weber and de Beaufort in 1922 confirmed that the fish was *Betta unimaculata*. However, Norman in 1953, proposed it be once again included in its own genus, along with *B. macrostoma* and Richter also agreed with him on the basis of the behaviour of the two species. While in most mouthbrooders the female picks up the eggs and passes them to the males, in *B. unimaculata* and *B. macrostoma* the males are reported to pick them up for themselves.

B. unimaculata has variation in the spines and soft rays of its fins according to location. The dorsal fin may or may not have a hard spine and consists of

6-9 soft rays. The anal fin can also have a spine and 27-30 soft rays while the caudal is rounded. The body is elongate and the mouth large. The colour of the mature fish is olivaceous or brownish, lighter below with a more or less distinct lighter lateral band. A dark spot is found at the base of the caudal fin, hence the name '*uni maculata*,' meaning one spot, in Latin. Live male fish have dark opercles and throats and can attain a length of 8.2 cm.

The habitat of these fish includes a large area of North Borneo. *B. unimaculata* are abundant toward the headwaters of forest streams which consist of small pools only connected by trickles of water. The ravines in which the streams lie are steep and narrow and when torrential rains occur, a heavy runoff occurs. This depletes the populations of the pools, so to reinvade this habitat, *B. unimaculata* must scale low waterfalls 15-45 cm high. In some cases these fish have been found above waterfalls 2-5 cm high. With this jumping ability and labyrinth organ, which enables them to breathe atmospheric air, they can live in pools where no other fish can survive.

In pools averaging 60 x 100 cm and 15 cm deep, there is normally one adult and several juveniles; the known pug-

nacity of *B. unimaculata* and limited food supply might account for this. The floor of their habitat is covered with dead leaves, but little other vegetation is present. Floating leaves also cover the surface so if a leaf is pulled across the surface, adults move across with it to hide, as the pools give little protection against predators. The diet of this fish consists of terrestrial insects, although aquatic invertebrates are also taken.

New introductions

I received five specimens of this fish shortly after they had been brought into the country by Chris Andrews of Tetra, the AAGB Hon. Vice President. I placed them in a 36 x 12 x 12 in. tank consisting of six compartments made by gluing glass to a false back 3 ins. from the rear of the tank. Each compartment measures 6 x 9 ins. and has a Polyfilter. The water added consisted of 15% aged aquarium water, about 40% of peaty water and was topped up with fresh tap water and brought to 27°C. I am blessed with tap water of a neutral pH and this, when added to the slightly acid water, gave an overall pH of 6.8. Half a flower pot and a variety of plants to cover half the area of the tank were used to finish the decor of the breeding aquarium. Later I discovered that un-



B. unimaculata (male). Both sexes appear to be identical and sexing was possible only by introducing two specimens to one another when, if males, they displayed to each other.

like most Anabantoids, which inhabit soft acid water, *B. unimaculata* comes from slightly alkaline conditions.

The little information available to me at the time gave the impression that the female was small and light brown in colour, but all my fish looked identical. I therefore set about trying pairs of fish together. When two males were placed together they confronted each other and challenging took place, often facing each other with mouths wide open. However, the worse damage occurring was only a split fin. Eventually, this way, a pair was found. Each fish was elongated, the body covered with lime and dark green scales with a bluish sheen. The dorsal fin is speckled and edged in gold and the anal and caudal fins are mottled on a green back ground. The fish were heavily fed on *Tabifex*, *Daphnia* and their gourmet food, Black Ants, fresh from the garden. (Please take care that they are collected where insecticides have not been used).

The female rapidly developed the more swollen belly, then started gently 'pecking' the male's chin. Finally, she coaxed him into a typical Anabantoid embrace, expelling eggs which the male fertilised and took into his mouth. Over the rest of the day they continued to spawn until the male had a distended mouthful of

eggs. Unfortunately, two days later, he swallowed the eggs after being, so I thought, disturbed. This same occurrence took place several times over in the next few weeks and always resulted in the eggs being eaten. (Later I discovered the female is often ready to spawn before the male has finished brooding the eggs and pesters him, so a solution is to remove the female or add an extra male).

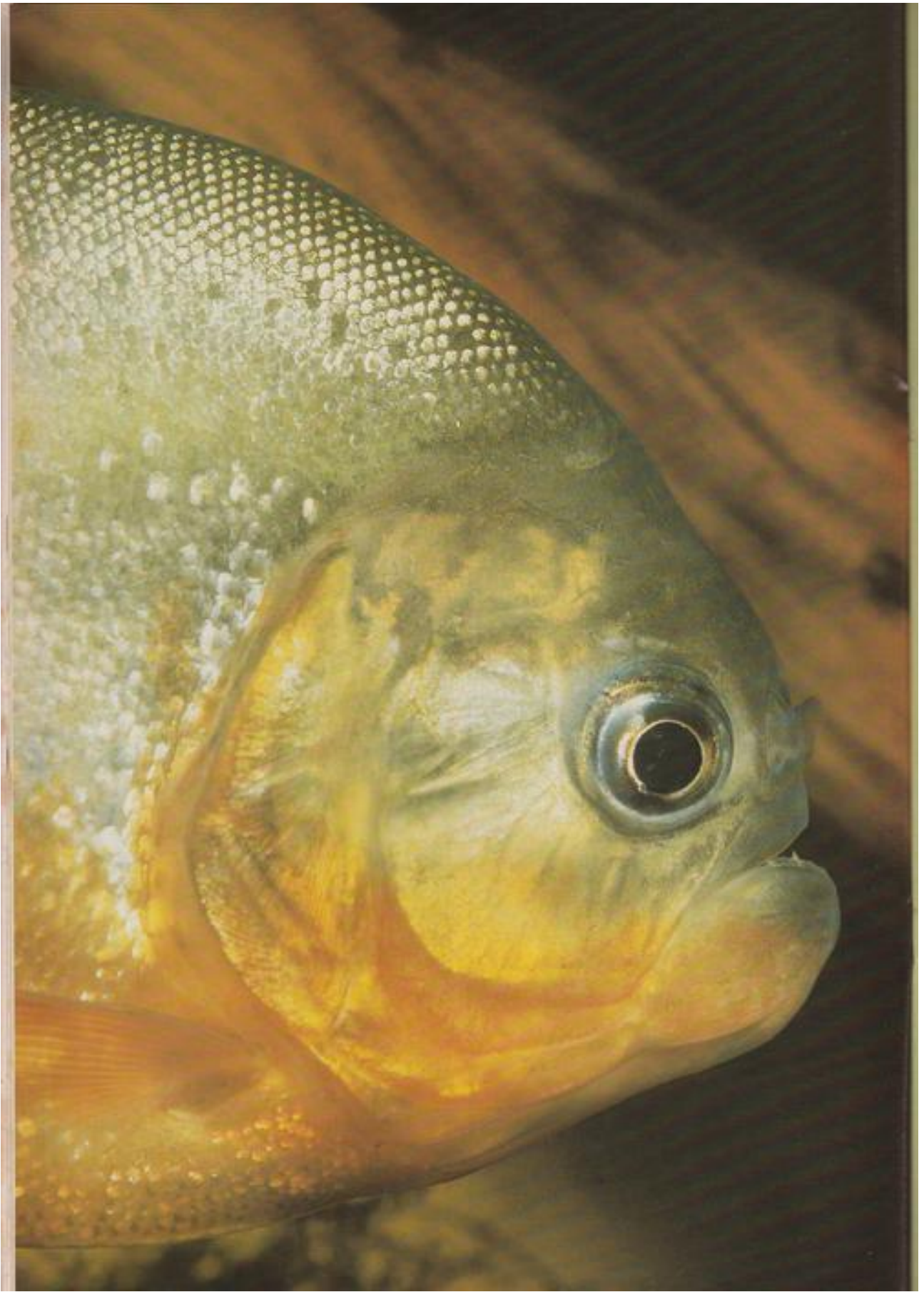
I decided to try with one of my other males in the tank with the female, once again without success. Finally, I placed the original pair in an 18 x 12 x 8 in. tank, furnished in the original way and secluded it in the spare bedroom.

They spawned again and on the eleventh day the male spat out about half a dozen young. Quickly, I transferred the pair to another tank and the male spat out a further 75 fry which I siphoned out into the rearing tank. Over the next few days he released a further 65, to give a final total of about 150 fry of which I left 20 with the adults who appeared to totally ignore them. As the young are released from the mouth after the Anabantoids' most difficult feeding period, the first 10 days, when they would normally only eat *Infusoria*, the young mouthbrooder took baby brine shrimp and microworm straight

away. Their growth is very rapid and you can almost see them grow. Two weeks out of the mouth they were already taking *Tabifex*. Mine was not the only breeding success in the AAGB and this species has now been fairly widely distributed within our association and exhibited at all the major fish shows.

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THE PIRANIHAS

Among the several genera of large charicins are those regarded as dangerous flesh-eating Piranhas and others described as harmless fruit-eating Pacus.

Dr. Robert Goldstein reports on the recent appearance of some of these intimidating species in North American waters

Left: Red Piranha *Serrasalmus (Tadylella) nattereri* recognised as a really dangerous and true Piranha.

Photograph by M. Gilroy.

Below: One of the Red Pacus caught in the Cape Fear River and which weighed around three pounds.

Photo by Dr. R. Goldstein.

Right: Teeth of a 'harmless' Red Pacu said to be a fruit eater but a Black Pacu known to have been fed on meat removed the tip of its owner's finger when he retrieved it from the floor after it jumped from its aquarium.

Photograph by Dr. R. Goldstein.



In the early sixties, fisheries biologist Martin A. Moe, Jr., then an employee of the state of Florida, was asked by his supervisor to evaluate the possibility of piranhas becoming established in Florida waters where they might gobble up tourists. Both federal and state authorities were concerned that large numbers of these disreputable fish were being imported into Florida from South America for trans-shipment throughout the United States. Surely, if the fish were imported into, for example, cold-temperate New York, any fish released with discarded water would be killed by the cold. But fish and water discarded in the steamy subtropical region of a Florida import station might somehow survive, and if they did, might they not then breed?

Moe went about considering the problem in a very organized way, and his results were published in 1964 in the *Quarterly Journal of the Florida Academy of Sciences*. First, he described the range of the most common piranha species (*Serrasalminus nattereri*, *S. ternetti*, *S. niger*, and *S. piraya*) as extending from the Rio Orinoco at the northern limit of South America (10 degrees north latitude) to the Rio de La Plata in the south temperate zone of that continent (about 35 degrees south latitude), and then compared the subtropical climate of Florida (the most southerly of the United States) with the climates of Brazil, Argentina, Paraguay and Uruguay. He reported that the fish could survive a reported minimum temperature of 20°C (68°F) and a reported maximum of 32.2°C (95°F), and apparently spawned all year round. These conditions were found in Florida. He speculated that, under the favourable conditions of a mild Florida winter, the fishes might survive to spawn, and subsequent natural selection could favour the development of a derived stock tolerant of cooler temperatures.

An established population in Florida

Yet, incredibly, Moe concluded that, although it was 'possible' that piranhas might accidentally become established in Florida, he considered it 'unlikely.'

By 1977, the unlikely had happened. In that year, a reproducing population of *Serrasalminus humeralis* was discovered in an enclosed pond at a south Florida tourist facility.

The find was interesting but not a cause for alarm. In those days, people thought that very few piranhas were dangerous, most of them were not, and that people should be aware of the difference. They believed that *S. humeralis* was one of the concave-headed and harmless 'pirambébas' rather than a convex-headed and dangerous 'piranha.'

Since two dozen half-grown fish had been introduced to this pond many years earlier, and more than fifty fish ranging from very tiny to very large were collected when the pond was poisoned, there was no doubt that the fish were breeding.



Caught on a baited hook in the Cape Fear River, a fruit eating Red Pacu, member of the *Colossoma* genus. Was it released by an aquarist?

The biologists called in to remove the fish got some more surprises. First, the fish had survived an extremely cold winter, where the water temperature had dropped to about 12 degrees F. Second, they had survived during periods when dissolved oxygen levels were extremely low. And, most sinister of all, the piranhas in the pond seemed resistant to the effects of Rotenone, and that fish poison had to be employed much longer and at much higher concentrations than anyone expected.

The biologists saved the dead piranhas (about half the total caught) for stomach analyses, and managed to save half the fish by putting them in clean water. These surviving fish were taken back to the laboratory and used for temperature- and Rotenone-tolerance experiments.

Stomach analyses of dead fish

The stomach analyses on the dead fish showed that very small fish ate insect larvae, the next size up were feeding on livebearers in the pond, and the largest fish had been eating both chunks of meat and lots of fish scales, perhaps from each other.

The experiments with the surviving fish produced some surprises. The Rotenone studies were inconclusive, but the temperature study results reopened the whole issue of piranha survival in American waters. The biologists found

that the captured fish were not killed until the temperature had dropped to 11°C (52°F), far colder than anyone had expected.

Had they been acclimating to colder temperatures during succeeding generations? The study results suggested that these particular piranhas could survive an additional 300 miles to the north, and well out of the subtropical zone.

All this might have been just of passing interest to anyone outside southern Florida. But I became intensely interested last year when I learned of two 'piranhas' caught in a major river here in North Carolina, halfway between Florida and New York, and a thousand miles north of that Florida pond.

The first report was interesting, but only barely. A sport fisherman had caught a so-called piranha on a baited hook in the Cape Fear River. I wasn't concerned. After all, it was summer time, and Wilmington is a warm area anyway (the northern limit for lots of tropical species). Perhaps a local aquarist had dumped the fish into the river.

About a week later, another fisherman about fifty miles away also caught a so-called piranha on a baited hook!

The North Carolina state authorities became concerned. Where were these fish coming from? How many were there in the river? Were they breeding? Were they dangerous piranhas or one of

the harmless species of the group?

The two fish were borrowed from the individual fishermen (the state had no authority to confiscate them) for study, and turned over to David Herlong, a biologist with the local electric utility company (aquarists know David as a recent President of the American Cichlid Association), who showed them to me for my assistance. I was able to provide him with technical literature, and David proceeded to do the laboratory studies that would provide an identification. Unfortunately, the two fishermen wanted to save the fish for mounted trophies, and he was forbidden from opening them up for stomach analysis and other internal investigations.

David concluded that the fish were harmless red pacus, members of the genus *Colossoma*. That they were large (one of them about three pounds in weight and the other only slightly smaller) was of considerable interest to us both.

But then our speculations parted company, and both of us drew different interpretations of the event.

David thought that the fish were released by an aquarist, could not have overwintered in a river this far north, had either been put in the river at a large size or had grown rapidly, and were all the fish there were or part of a very small population.

In my view, two fish caught fifty miles and a week apart on hook-and-line suggested a considerable population of meat-eaters. Although members of the group are known to grow rapidly, fish in the three-pound class were clearly not young-of-the-year. I could not believe that an aquarist would dump enough large fish to account for what I considered a large population. Furthermore, the Cape Fear River has industrial hot-water discharges where it passes through the industrialized city of Wilmington, providing warm refuges from low winter temperatures at several points along the shoreline.

The two individual fish were caught near Wilmington close to the coast, not far from industrial discharges and military installations, and well inland near Fayetteville, site of one of the largest and busiest military installations in the United States.

Introductions from South America by military personnel

In my view, a number of piranhas had probably been brought into the United States by military personnel returning from South America. In this scenario, the young soldiers had then lost interest in the 'man-eating' fish and simply dumped them into the nearest waterway, where the fish had survived. The questions that next arise are: (a) how long ago had they been placed in the river, (b) had they been there long enough to reach sexual maturity, (c) had they spawned, and (d) if so, were offspring surviving the winter in thermal refuges?

Only time and additional landings by hook-and-line and by net fishermen will

answer these questions. For now, North Carolina's Cape Fear River has been determined to be suitable for at least the red pacu for at least part of the year. And since the ecological requirements of most piranha-like fish seem to be similar, these questions are of more than academic interest.

What do we know about the so-called piranhas? The most important taxonomic work on the group is that of the French ichthyologist J. Gery, *Poissons characoides des Guyanes, Generalities et Famille des Serrasalminidae*, published in *Zoologische Verhandlungen* (Leiden), No. 122, December, 1972.

The family Serrasalminidae was divided by Gery into three subfamilies, the Myleinae, Catoprioninae, and Serrasalminae.

"The fish had jumped out of its aquarium, and when the owner tried to pick it up, the snapping jaws had removed the tip of one finger."

The Myleinae contains the genera *Myleioma*, *Colossoma*, *Myleus*, *Metymnis*, *Acanodon*, *Utiariticichthys*, and *Myleinina*.

The Catoprioninae contains the single genus *Catoprion*, and the Serrasalminae contains the single genus *Serrasalmus*.

Catoprion contains only *C. monto*, the wimple or flagfin piranha, a pleasant but only occasionally imported aquarium fish with absolutely no personality.

Most of the other members of the Serrasalminidae are difficult to tell apart, but many people broadly divide them into the parimbebas (harmless *Serrasalmus*) and pacus (*Myleinae*) on the one hand, and the dangerous species of *Serrasalmus*, which are called piranhas, on the other. Pacus were said to have black bellies, while parimbebas and piranhas had red bellies. Parimbebas were then considered to have concave foreheads and pointy mouths while piranhas would have convex foreheads and blunt mouths.

Because many of them change shape with age, some *Colossoma* species are now known which have red bellies, and the feeding habits of very few species are known with certainty, all these rules and artificial divisions are worthless.

Gery, for example, considered the Myleinae to be fruit eaters and general herbivores. That was no more than an assumption. Very few of these fishes have been kept in captivity. Furthermore, what a fish does in one habitat may have little bearing as to what it will do elsewhere. Like those 'fruit-eating'

Colossomas caught on baited hooks in the Cape Fear River!

Fifteen years ago I became the owner of an 18-inch black pacu (*Colossoma* sp.), which had grown from a 1.5-inch fish in just three years. Not on fruit. On meat. The fish had jumped out of its aquarium, and when the owner tried to pick it up, the snapping jaws had removed the tip of one finger. That's when he gave the fish to me. So insistent was he on getting rid of that maiming monster that he threw in the 65-gallon tank just to get me to take the fish.

Thus, all piranha-like fish should be handled with extreme care, whether they go under the name piranha, pacu, parimbeba, or pussy-cat. As far as known, they won't refuse meat. The so-called dangerous piranhas seldom go into a feeding frenzy, apparently never attack swimmers, and seldom attack anything large other than a bleeding, wounded animal in nature. They normally feed individually or in small groups, and they feed largely on fish. Yet they are capable of terrible destruction under rare circumstances. They'll tolerate both low oxygen concentrations and low temperatures. We now know that some will tolerate levels of fish poison that would kill other fishes. And the finding of one specimen in a river near Wilmington indicates another surprising possibility, that these fish might be tolerant of coastal concentrations of salt not previously known among Characoid fishes which might enable them to move out of one river and into another along the coast during periods of high flow.

Breeding every few weeks

The *Serrasalmus* species of piranhas apparently breed readily at regular intervals of a few weeks. All that seems to be required is large size, a rich diet of fish chunks, and lots of room. They spawn in surface tree roots that extend into the pools and among the roots of floating surface vegetation. The eggs may number 5,000, are about two millimeters in diameter, and yellow. Some of them may even be above the water's surface. The male drives the female away and guards the spawning territory. The eggs will hatch in about nine days. The fry are ignored, since the adults prefer bigger fare.

The babies can be started on newly hatched brine shrimp and growth is phenomenally fast, the fish quickly graduating to bigger and meatier diets.

Currently, there are local laws in the United States restricting the possession of piranhas. Those laws have been fought, unsuccessfully, by aquarists as unnecessary outside of Florida. I don't know the laws in European countries, but I would be concerned about the tourist traffic between Europe and Africa and the potential for developing fish farming operations in Africa to supply the European market.

It's time to open our minds and reconsider our position.

FIRESIDE READING FOR COLDWATER FISHKEEPERS

For the majority of people—and fishkeepers are no exception—a book with plenty of colour photographs is always attractive. But to strike a balance between colour and information is always a difficult task: too much colour and the price becomes prohibitive; while too much 'fact' makes the book appear like a textbook and runs the risk of having little public appeal.

The 'Fishkeepers Guide' series published by Salamander Books provides a perfect balance, and will retain the interest of beginners and expert fishkeepers alike.

Two such books in the series will without doubt find a place in the library of most coldwater hobbyists: *Garden Ponds* by David Papworth and *Coldwater Fishes* by Dick Mills.

Both are the kind of handy books which make them attractive for non-interested members of the family, while there is plenty of information contained within the covers to make them useful sources of reference for the enthusiast.

'Garden Ponds'

It was a delight to see all those memories of summer pictured in the first book, *Garden Ponds*. If you are thinking of building a pond then, before you start the designs, this is a worthwhile investment. In addition to the colour photographs of several pond and patio-garden layouts there are some well thought-out diagrams covering all aspects of design, excavation, building and maintenance.

I was impressed to see one particular chapter on Electricity in the Garden—an aspect which is rarely covered in any

detail and which deserves special attention from every pond-builder.

Thorough chapters on plants, with lilies receiving their own sections, are provided, as well as a refreshing view of non-piscine pond stock: frogs and toads, snails and newts and beetles.

Suitable coldwater fish for the pond other than Goldfish and Koi are considered, the text accompanied—as it is throughout the book—by some excellent photographs.

Naturally, Goldfish and Koi receive the full treatment with, for once, some of the fancy varieties of goldfish such as the Veiltail, Moor and Lionhead considered for pond habitation.

I'm afraid I am always irritated to see fish incorrectly identified in any authoritative reference. To see a picture of a Nacreous Fantail (a twintailed goldfish) captioned as a Blue Shubunkin (a singletail) gives me little wonder that the public, as well as retailers, are sometimes confused when even 'the books' are inconsistent.

Ten pages of goldfish—only four of Koi. Now there's a turnaround! To be fair, though, anything other than such a cursory glance at Koi would need to be a full-blown volume in itself: this is a book about ponds, and Koi cannot be ignored as potential inhabitants.

Apart from the Shubunkin and one upside-down photograph this book cannot be faulted. Whether a fishkeeper, a 'gardener' or just a browser it is well worth buying.

A Fishkeepers Guide to Garden Ponds by David Papworth. Price £3.95
Published by Salamander Books.
(ISBN 086 01 129 5)

'Coldwater Fishes'

Some of the information and photographs in the previous book have naturally found their way into its sister volume: *Coldwater Fishes* by Dick Mills. However, there is no reason why the two should not sit side-by-side on the bookshelf or coffee-table.

Again this cannot be faulted on the basis of content. OK so I would personally not give tank space to a few of the poor specimens of goldfish illustrated, but for the non-serious keeper of pet fish I suppose they are quite acceptable.

A comprehensive look at Goldfish strains features the less common Jikin and Tosakin as well as Bubble Eye, Pompon, Pearlscale and the more popular fancy varieties. The photographs are excellent being sharp and true to colour. I was impressed to see both top and side views of the Tosakin—drawings of this goldfish never convey the beauty of this rare strain which, incidentally, must surely present quite a challenge to breeders.

Koi receive a fair crack of the whip with most of the popular types explained and illustrated. A reference list of colours, patterns and descriptive terms will help in identifying the name of that beauty you've had your eye on at the aquatic centre!

Other coldwater species come under the spotlight, with no less than 23 excellent colour photographs of fish ranging from Sunfish to Red Shiner to Stickleback.

Dick Mills opens this chapter with an important commentary about the hobby of coldwater fishkeeping: "To many

people, coldwater fishkeeping meant Goldfishes or (by a further stretch of the imagination) Koi.

"Over the past few years many more fishkeepers have not only learnt of the existence of other fishes that can be kept in unheated aquariums or ponds, but have taken the trouble to seek out these species and gain practical experience for themselves.

"In doing so, they have made others more aware too, through showing these species at exhibitions for instance, and now there is quite a long list of coldwater species awaiting the attention of all fishkeepers. I applaud this observation. No longer can coldwater fishkeeping be regarded as the 'poor relation' of the aquatic hobby".

As in the volume on the garden pond, this book has an impressive selection of colour diagrams to accompany a forward text. Comprehensive advice is provided on setting up aquariums and ponds, while separate sections deal with pond and aquarium plants.

Feeding, maintenance, breeding and disease are all covered in similar depth. So whether you are a seasoned coldwater fishkeeper or a complete novice, you will surely enjoy this book.

A Fishkeepers Guide to Coldwater Fishes by Dick Mills. Price £3.95. Published by Salamander Books (ISBN 0 86101 1341).

'Breeder's Guide'

The coming year of 1986 sees the emergence of a new Fishkeeper's Guide from Salamander with the addition of *A Fishkeeper's Guide to Fish Breeding*, by Dr Chris Andrews.

Techniques for conditioning, spawning and rearing most popular freshwater fish are covered, including a section on breeding goldfish and other coldwater species.

Publication is expected in the Spring and I hope to include a full review in a future edition of *Aquarist and Pondkeeper*.

'Keeping Goldfish'

It should not be forgotten that there is a vast proportion of young fishkeepers who are as keen as any on advancing their knowledge about their favourite type or types of fish but who would become lost among Latin names and complex diagrams.

Another title by Dick Mills, *Keeping Goldfish* is ideal for the youngster who may wish to develop his or her interest in their 'fairground' fish and explore the fascinating world of the Goldfish.

Although lacking any use of colour to accompany the text, this book provides a detailed yet easily-understood analysis of keeping goldfish, from choosing and setting-up an aquarium to feeding, breeding and treating disease.

I was impressed by the photographs, which are on the whole crystal clear and do not suffer at all from being black-and-white. All the popular strains of goldfish are featured as well as some of the lesser known varieties.

Of particular interest is the list of useful addresses as well as a bibliography—both essential in my opinion: having 'hooked' a beginner it is important to guide them into the hobby rather than leave them flat.

Keeping Goldfish by Dick Mills. Price £3.95. Published by Blandford Press (ISBN 0 7137 1693 2).

"Coldwater Fish in the Home and Garden"

It should not be passed without recognition that manufacturers and distributors admirably fulfil their responsibilities to the aquarist in general. The first two titles reviewed in this article are distributed through Interpet, while this final book under review comes from Tetra.

Written by Prof Werner Ladiges from Germany the text is edited by Dr Chris Andrews and provides a pleasant 'mix' of technical information and handy reference material—liberally sprinkled with a multitude of line drawings and full-colour photographs. Of its 70 pages in all the book is neatly divided into two halves: (i) covering the technical aspects of setting up an aquarium, together with construction and habitation of the garden pond; and (ii) details of several species of coldwater fish.

This second section is a fairly comprehensive account of European, North American and Asiatic coldwater species, with details about the origin and history of the Goldfish and its development in Europe; different goldfish varieties; breeding; diseases; and a section, naturally on Koi.

I know it is all too easy to pick fault, but I feel I must make a point about some of the bizarre mutations of goldfish illustrated. One in particular really did make me wince!

Its main feature was the inner part of the gill covers are turned outwards, rendering the gill filaments visible. The coloured drawing accompanying its description shows a Pompon bearing a dorsal fin, while the gill-cover is hideously folded!

I really must say that this example does serious goldfish hobbyists no credit. Indeed, any goldfish breeder will know that spawnings occasionally produce such strange features—and these are immediately discarded as deformities. Under no circumstances would a reputable enthusiast perpetuate such a deformity—and especially one which leaves the gill filaments so vulnerable.

Having stated my piece, though, this book is on the whole a pleasant addition to the bookshelves of any aquarist and serves as a useful introduction for newcomers to the hobby of coldwater fish-keeping.

Coldwater Fish in the Home and Garden by Prof W Ladiges. Price £4.75. Published by Tetra Press and available by mail order only.



Stephen Smith



Spotlight

THE UPSIDE DOWN CATFISH

How does this African catfish maintain an inverted position when feeding on animals which float on the water surface. Dr. Michael Benjamin reveals some scientific findings

As most fish adopt a horizontal position and have a downward-facing belly when swimming, our attention is immediately drawn to those that depart from the norm. There are of course fish that swim vertically, like the sea horses (*Hippocampus* sp.) that glide gracefully forward by delicate movements of their dorsal and pectoral fins, or the shrimp fishes (Centriscidae) that can advance in small shoals or shelter among the spines of sea urchins. But to the freshwater aquarist, one of the best known oddities is the upside down catfish, *Synodontis nigricentris*, that can swim or float on its back.

It is a member of a family of naked (i.e. scaleless) catfish, the Mochokidae, that are widely distributed throughout Africa, except for the region north of the Sahara. They live in slow-flowing waters or lagoons and may gather together in large shoals. Although other members of the genus *Synodontis* can swim on their backs (e.g. *S. contractus* and *S. victoriae*), *S. nigricentris* is best known to the modern naturalist. It was first described in 1936 and introduced to the aquatic trade in 1950. There quickly followed a number of articles on 'the curious fish that swim upside down', including one by Fraser-Brunner in the November 1950 edition of the *The Aquarist & Pondkeeper*. As Fraser-Brunner correctly pointed out, upside down catfish may have been new to the aquarists of that time, but they were certainly not new to the ancient Egyptians, who frequently depicted them in their wall-paintings and engravings. Furthermore, the fish are mentioned in the writings of Aristotle. The general opinion is that the Egyptian catfish is *Brachysynodontis batenoda*, the 'Shal baten soda' of the Arabs, or the 'Shal with the black belly'. It is found at Cairo, but is better known from Khartoum, Fashoda and the White Nile.

S. nigricentris is a stocky, club-shaped

fish with a dorsal profile that is more strongly arched than its ventral one. The body is covered with brown or cream blotches and may have a number of irregular light or dark cross bands. Although its specific name implies that its belly is darker than its back, this reversed pigmentation is not always obvious. Presumably a dark belly camouflages the owner and offers it some protection against predatory birds. However, at the front of the pectoral and dorsal fins, there is also a very strong spine that can be locked in position. The spines stick in the gullet of large, predatory fish or birds and discourage their attacks. The head of *S. nigricentris* is heavy boned, its eyes large and closely set and the small, ventrally-directed mouth is surrounded by three pairs of barbels and houses teeth that are well adapted for algal grazing. The females are often plumper than the males.

Its habits of swimming upside down may be associated with feeding on animals that float on the water surface, for *S. victoriar* is reputed to make daily vertical migrations in order to eat the floating pupae of midges. It surprised me to find that few people have closely studied the behaviour of *S. nigricentris* in aquarium conditions. However, some continental workers from California and Germany are an exception, and I would like to tell you about some of their scientific findings (published in *J. comp. Physiol.*, vol 110, p 323-331 (1976)) in layman's language. First, they emphasise the important general principle that certain fish can adapt their body posture to the orientation of a neighbouring substrate, so that for example, they keep their bellies towards a vertical rock face or the side of a tank. They call this the 'ventral substrate response'. Indeed, *S. nigricentris* frequently shows such a response and so we may see the fish swimming, belly downwards, on the bottom of a tank. It is normally only

when leaving a substrate (i.e. when its sensitive barbels are no longer touching it) that our friend swims upside down—although it may progress in this fashion for a short distance when approaching a tank bottom in its 'Australian' pose. Next, they produced evidence to refute the possibility that simple mechanical factors, such as the position of the swim bladder, could account for the unusual posture. But the most critical question they ask is 'how is the balancing organ of the ear modified so that reflex action does not force the fish to correct its upside down posture?' It seems there is nothing unusual about the structure of the ear, for it resembles that of other catfish that habitually swim the right way up. What struck the scientists however, was that the 'wiring' (nervous circuitry) between the brain and the balancing organ of the ears is rather special, for it can be reset to zero as it were, once the body has tilted more than a certain critical amount (about 22 degrees). In their opinion, this is why *S. nigricentris* can stay upside down, undisturbed by reflexes that would bring most fish back to the normal position.

S. nigricentris is well suited to aquarium conditions, for it is peaceful and undemanding and is one of the smaller members of its genus—rarely exceeding 8 cm in length. It may be kept in community tanks, though some of its flat-mates may disapprove of the constant movements of its barbels. As it is crepuscular in the wild (i.e. active at twilight), it should be given subdued light in a roomy, well planted tank that provides plenty of places in which it can hide. It is omnivorous, will feed on the algae in your tank and graze on the undersurface of water plants, but is also partial to live worm food. It has been successfully bred in captivity, but published reports are not yet common. According to one successful breeder, they start back swimming when 10 weeks old.

Coldwater jottings



Stephen J. Smith

Do not Disturb

Now that we are in the midst of the worst of the winter, many coldwater fishkeepers will be twiddling their thumbs in anxious anticipation of the forthcoming breeding season. Some may well be tempted to provide that extra feed during any mild break in the Winter—don't! There may well be yet another severe frost just hours away, and any food administered now will either remain uneaten in the pond—where it will rot and cause pollution—or if any fish has taken any food this is likely to remain undigested in its gut, where again problems could arise.

During Winter months the metabolic rate of coldwater fish slows down considerably—so much that the animal becomes almost dormant and can sometimes appear a sorry sight huddled with its companions at the bottom of the pond. However, do not despair. The fish will have stored food reserves during Autumn and any attempt to disturb the fish at this stage could upset its metabolism.

If you have paid attention to pond maintenance in late Autumn, all dead leaves and other decaying matter will have been removed from the pond, so the threat of toxic gases building up if the pond freezes over will have been removed. I do not recommend banging a hole in the ice—this is likely to cause the fish serious stress from shock waves. If you feel happier having a hole in the ice, use an electric pond heater when frost or snow is imminent. I overcome the problem of ice and snow by using polythene covers over my ponds. Sheets of greenhouse polythene are stretched tightly over wooden frames and lie on the pond surround. Water temperatures keep fairly stable using this method and oxygen

exchange is helped by propping the corners of the covers on small bricks. Because an insulating layer of air is established between the outside atmosphere and the water surface, only the worst frosts penetrate enough to freeze the water surface. I usually allow minor snowfalls to remain on the covers, thus providing a modicum of extra insulation, but heavier snowfalls not only cause problems with their enormous weight but also block out light, so I brush this off.

Some coldwater fishkeepers use neither heaters nor covers, but allow ice and snow to provide its own protection and insulation. This is perfectly safe, but can only be recommended if the pond has been given a thorough cleaning in the Autumn, otherwise any decaying matter will cause problems if sealed under ice. As stated previously, fish do not feed during 'hibernation' so will not be polluting their environment. Attention paid to pond husbandry during the Autumn, and subsequently allowing the fish to remain undisturbed during the Winter, will without doubt contribute towards healthy and successful spawnings at the onset of Spring.

Fish by the million

Most coldwater fishkeepers are reluctant to move their fish at this time of the year for fear of introducing disease by damaging the protective layer of mucus. Indeed, my own feelings have always been to disturb the fish as little as possible from late November to early March. According to the Severn-Trent Water Authority, however, this is an ideal time for restocking. The authority breeds several million coldwater fish every year for stocking rivers and lakes, and introduced almost two million roach and bream into Worcestershire and Gloucestershire waters in December. All the roach were from Bristol Waterworks' Chew Valley Trout Lake and were moved by oxygenated road tanker. Severn-Trent were delighted with the condition of the roach and the success of the transfer operation.

According to the authority there is less likelihood of infection during cold weather. The metabolism of the fish is far lower so they tend not to cause themselves physical damage, and are less likely to suffer from stress. Consequently, the risk of infection is greatly reduced and the fish acclimatise easier, making the Winter 'a good time for introducing fish'. Said a spokesman for Severn-Trent: "The roach were first-year fish averaging around two-and-a-half inches in length—a good size for roach. They arrived at the Avon in superb condition with hardly any scale loss and it was a major bonus having lost so few fish on the journey."

Quiet time?—not likely!

This time of the year is considered by many to be a quiet time for the average coldwater fishkeeper. All the cleaning has been done (hasn't it?), the fish are 'asleep' the days are too short—and after all, it's far too miserable outdoors. For myself, however, it has been a far different story. As always at this time of the year I am anxiously looking forward to the onset of Spring—and spawning-time! One of the most important aspects in rearing coldwater fish is plenty of space. So, taking advantage of some fine weather at the beginning of December I decided to install extra rearing ponds.

Using my favourite method of salvaged roofing joists (some people use railway sleepers) lined with heavy-gauge polythene, I had constructed three ten-foot by five-foot ponds within a matter of days! The joists are laid on their edges onto level ground and pinned together using short lengths of seasoned timber and three-inch nails. An extra depth is then dug from the centre of the pond and all stones, roots, etc removed. A cushion of sand is then spread over the base before placing the liner over the construction. The liner will take the shape of the pond as water is hosed into it. I always find it a good idea to make minor adjustments to the liner while it is being filled, to ensure the minimum number of creases. When almost full, the corners of the liner can be neatly folded, and the top pinned to the joists using roofing nails.

Before trimming off the excess liner I prefer to 'cap' the edges using salvaged floorboarding. Finally, I always endeavour at this point to construct a cover frame—of netting or greenhouse polythene covers—using two-by-two timber.

So, far from being a quiet time, Winter does provide an opportunity to catch up on those 'little' jobs—and my back will have just about recovered in time for Spring!



Can Spring be far behind?

Company profile

Gems and Jewels from John Allan Aquariums Ltd.

Eheim filters (and other aquatic accessories), Schwarzer air pumps, and Jewel aquariums (along with their stablemates, Gem aquariums) have long been regarded by aquarists in this country and abroad as dependable, 'quality' items.

It is virtually impossible to go into an aquatic shop without coming across, at least, one of these brand names, all of which have been well established in the UK hobby for years and show every sign of continuing to play a leading role for the foreseeable future.

The Company behind all the above, and a host of other products, is John Allan Aquariums Limited, of Bury St. Edmunds in Suffolk.

The Company is headed by a team of three directors, namely, John and Allan Riley (hence the John Allan tag) and John Ransom. Each has his own specialisation but all share a great love for their products and a deep commitment to 'quality'.

This is obvious, not just from the response of aquarists to John Allan products, but also from the comprehensive, detailed approach taken by the Company both towards the manufacture of its own lines and to the adoption of external ones for incorporation into its ever-expanding catalogue.

Going by the evidence we saw during our visit, it is clear that the Company is involved in an unending, vigorous search for improved products as well as for refinements that will take its own designs and manufacturing processes even further along the line towards its ultimate goal. This is good news from the aquarists' point of view, of course.

Despite the energetic approach to new developments, it does not follow that established lines are unnecessarily replaced or tinkered with. For example, Gem aquariums have proved so popular with hobbyists that over 1,000,000 (yes, one million!) have been sold over the last 15-16 years. Clearly, a resoundingly successful product such as this is best left alone. It, obviously, meets an existing need and undoubtedly does so superbly well.

The Jewel aquarium (another best-



The Gem Panavision Display Unit is designed to keep its good looks for years and shows off fish beautifully in a shop setting

seller), depends largely on its elegant anodised aluminium frame and top-quality construction for its success. Hundreds of thousands of these aquaria have been sold to aquarists worldwide. What is more, they have also been adopted by numerous retailers and wholesalers all over the world, both for marine and freshwater organisms. Whichever way you look at it, this constitutes a remarkable success story for Jewel, involving as it does, the maintenance of literally millions of fish and other aquatic organisms over a period of around 20 years.

One retailer who is well-known to

Aquarist & Pondkeeper readers and who keeps his stock of Discus in Jewel aquariums is Eberhard Schulze of The Highgate Aquarist. Anyone who has visited this shop will agree that Discus and Jewels complement each other beautifully.

As mentioned earlier, John Allan 'products' (consisting either of the Company's own lines or those of overseas manufacturers whose sole UK distribution rights John Allan Aquariums Ltd. holds) are distributed the length and breadth of the country. What many hobbyists are not aware of is that John Allan also manufactures shop display units for aquaria (and, incidentally, for bird cages as well). The Gem Panavision Shop Display Unit is built of anodised aluminium in a silver finish that is designed to keep its 'new' look for many years. Each unit comes complete with eight 24 in. Gem Panavision aquaria (each aquarium supplied with glass sliding panels), waterproof fluorescent lamp units fitted with 40W tubes, electronic pulse-starter, adjustable wall-fixing brackets and adjustable feet. Just take a look at the display unit in your local shop next time you drop in. If it is a Gem unit you will be able to see the same attention to detail that characterises the other products mentioned so far.

Yet another string to the John Allan bow is an arrangement with Education Authorities within the London area whereby the Company manufactures aquaria according to the Authorities' stringent design specifications. Safety requirements in schools, particularly in laboratories, are (quite rightly) very high indeed. Every possible safety loophole is, therefore, examined thoroughly before an item is deemed acceptable for educational use. It is to John Allan's credit that the Company can produce aquaria, and particularly, fully wired up hoods which meet these exacting demands. Quite naturally, enquiries from Education Authorities outside London would be greatly welcomed.

While it is clearly impossible to review the complete range of products manufactured or distributed by John Allan Aquariums, a few facts and figures



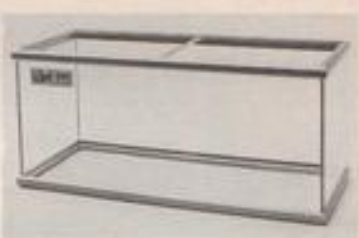
concerning a tiny selection from the range will help to illustrate the diversity.

The Gem Panavision 2000 Aquarium is available in three finishes—Black, Oak or Walnut. All models (ranging from 24 in. x 12 in. x 18 in. to 63 in. x 16½ in. x 21 in.) have fitted, hinged lids making access for feeding and cleaning easy. The 2000 frame extends all round the aquarium doing away with the need to provide the customary cushioning polystyrene sheet. The hood carries plastic clips suitable for holding two fluorescent tubes.

The Gem Panavision 2000 S takes things a stage further and is supplied complete with waterproof light fittings. The larger models are fitted with double light units and have a special switch in the mains cable which allows each tube to be controlled individually if so wished.

John Allan Condensation Trays differ from the norm in one or two rather

interesting ways. Since they are built to prevent spray from air pumps and filters from splashing on to the inside of the hood, they are designed as small units rather than long single ones. This means that 24 in.—30 in. tanks can be



The Jewel Panavision Aquarium is available in sizes ranging from 24 in. x 12 in. x 16 in. to 63 in. x 12 in. x 18 in.

fitted with one or two 11 in. x 11 in. trays while 36 in.—60 in. tanks can likewise be fitted with 17 in. x 11 in. trays. This 'double' approach means that it is quite possible to cover just one half of the aquarium (the one receiving the splashes), leaving the other exposed to maximum illumination. It also makes feeding and servicing the aquarium a much easier operation.

The Gem 2000 S Delta Aquarium sitting on its magnificent cabinet makes an impressive corner unit capable of gracing any living room. If a more standard, i.e. non-corner arrangement is required, the range of Jewel aquariums, including the Panavision versions, and Jewel Cabinets in Walnut, Oak, Dark Oak, Mahogany and Black can be adapted to meet most aquarists' needs.

Then there are the Eheim Thermofilters, the Schwarzer Air Pumps, the John Allan Sealants, the Eheim Automatic Feeders . . . and so on, and so on. . .

For full details of the complete range of products, contact Allan or John Riley, or John Ransom at John Allan Aquariums Ltd., Eastern Way Industrial Estate, Bury St. Edmunds, Suffolk IP32 7AB.



The Jewel Panavision Aquarium with Super Hood comes complete with light fittings. Also shown photograph is the Jewel Universal Cabinet

The Gem Panavision 2000 S Aquarium which is sold with all the necessary light fittings, excluding tubes

News

LIVING JEWEL TOUR OF JAPAN

Organised by Japanese Water Gardens

COST: £1,275. Single Room Supplement £160

ITINERARY:

Day One Sunday, March 9th—up up and away on board Japan Airlines 747—DESTINATION JAPAN. Our flight takes us over the celebrated Polar route with a short stop at Anchorage, Alaska.

Day Two Monday, March 10th—adjusting our watches finds us arriving at Narita Airport late afternoon, where we connect with Japan Airlines Flight to Nagoya, arriving in Nagoya around 7.30, prior to being transferred to our Hotel.

Day Three Tuesday, March 11th—Morning trip by local train to Itoh Fish Farm—this is our own breeder where we can be assured of a warm welcome. In the evening a celebration dinner will be arranged, giving you the opportunity of meeting and talking to both the employees at the Fish Farm, the Owners, the Shippers and representatives of Japan Airlines.

Day Four Wednesday, March 12th—Rest Day for those who wish. Optional Trip available to Mikimoto Island to see the celebrated pearl divers, or for those who wish to see still more fish, the chance to return to Itoh Fish Farm.

Day Five Thursday, March 13th—An all day bus excursion visiting many of the Koi Dealers in the Nagoya area.

Day Six Friday, March 14th—Early morning transfer to Bullet Train for Kyoto, arriving around mid day followed by lunch at a first class restaurant and a city trip taking in many of the sights of this beautiful and historic former capital.

Day Seven Saturday, March 15th—Coach available all day with visits to two Koi Breeders in the Nara Area, followed by visit to the largest Buddhist Temple of its type in Japan.

Day Eight Sunday, March 16th—Early transfer to Bullet Train to Tokyo, arriving late morning, the rest of the day is free for either sight seeing or alternatively for a visit to Tokyo Disney Land.

Day Nine Monday, March 17th—Train to Narita Koi Farm or for those who wish a rest day in the famous city of Tokyo.

Day Ten Tuesday, March 18th—Arinki Pool visits, a unique opportunity to see koi and visit Japanese Homes, together with a visit to Tokyo Koi Dealer.

Day Eleven Wednesday, March 19th—A Rest Day or train to Narita Koi Farm.

Day Twelve A Rest Day with an evening flight to Hong Kong or London.

New Lobster Hatchery

Marine fish and invertebrate keepers should be interested to know that there is a new lobster hatchery in Anglesey, North Wales, producing European lobsters specially for marine aquarists.

These are the true dark blue marine lobsters that occur around the coasts from Morocco to Norway, but they are not the same size as those you are likely to see displayed in a restaurant, but are 25-50 mm long, and make fascinating and attractive specimens.

The lobsters have been individually hand raised in a hatchery for 4-6 months. The process starts with wild egg-bearing female lobsters being held until their eggs hatch into planktonic larvae. These are then reared in special upwelling tanks for 2 weeks. After 3 moults they metamorphose into the adult body shape and are about 10 mm long. They are then grown on individually to avoid cannibalism. This is achieved by using a series of sub-divided trays suspended in shallow tanks. The lobsters are fed daily on mysid shrimp or chopped mussel flesh.

After 4-6 months they are 25-50 mm in length and have the vivid blue with white fringe markings of the adult. They make ideal aquarium specimens and their colours show up well in white or 'Grolux' lighting. They are very active and are often to be seen exploring their surroundings, probing with their feet and feeling every contour with their very long antennae. They are also good climbers.

They can withstand any temperature in range 5° to 25°C in good quality natural or artificial sea water. They will feed on a variety of natural food such as mussel, mysid shrimp, fish, brine shrimp or cockles. These can be stored frozen and small amounts thawed as necessary. Dry foods such as krill or river shrimp are also suitable.

What makes them especially unique is that they are virtually never found in the wild at this size. Also, this is the first time ever that lobsters have been available in this way to existing or potential marine enthusiasts.

The lobsters are dispatched from the hatchery in very strong insulated containers, which also contain instructions. Prices vary according to size: £4.00 for 25-35 mm lobsters and £4.75 for 35-50 mm ones. There is a flat charge of £1.60 for the container and delivery.

If you are interested in keeping lobsters but are unsure of any technical details, why not telephone the hatchery manager, Mr. Patrick Franklin, at Mona Lobsters, The Hatchery, Brynisiencyn, Anglesey 024 873 234.

Next month

After a dismal overdose of winter days, we welcome Spring with a **Special Coldwater Issue** containing a pull-out **Colour Supplement** packed with features for the Coldwater hobbyist and pondkeeper and of special interest to newcomers to the hobby as when **John Caveller** posed the question: **What is a Koi?** and discusses the origin of these increasingly popular pond beauties and illustrates some of the most sought after varieties.

For the Goldfish enthusiast there will be articles by **Pauline Hodgkinson**, **Dick Mills**, and **Stephen Smith** while **Barry James** will recommend some plants with a difference for your pond and coldwater aquaria.

Bill Heritage, in the first of his articles for this magazine, will be offering suggestions on the installation of a garden pond.

For the Marine aquarist there is **Spotlight**, turned this time upon the **Orange Wreckfish** by **Dave Keeley**, and **The Apogonid Fishes** by **Dr. Robert Goldstein**.

Tropical fishkeepers will enjoy **A. van den Nieuwenhuizen's** article on the differences between species known as **The Phantom Tetras**, and an investigation by **David Curran** into the true odd-ball fishes, **The Spiny Eels and their Relatives**.

All this and more plus, of course, our Regular features, will herald the real beginning of the year's activities in the garden and the fish house.

News from the societies

Runcorn Aquarist Society

Sunday, April 6th—Runcorn Aquarist Society, 15th Annual Open Show to be held at The Royal Naval Association, Halton Road, Nr. Old Town, Runcorn, Cheshire. For a comprehensive show programme send a 2nd class s.a.e. to Mrs. R. Muckle, 23, Adela Road, Runcorn, Cheshire WA7 4TU or Tel: Runcorn (092 85) 76099 or 61521.

North Eastern Federation of Aquarist Societies

The N.E.F.A. would like to extend sincere thanks to all other Federations for their kind thoughts following the death of Jack English.

British Marine Aquarists' Association

The B.M.A.A. was formed by a group of Midland enthusiasts in 1970 with aims to cater for the growing number of marine aquarists in the U.K. The association has since had its ups and downs but has always survived and in the last few years has had a steady rise in membership. This year has seen a substantial number of American aquarists enrol and the membership continues to rise, now approaching 550.

The association publishes a bi-monthly magazine called *Marine* which contains articles, ideas, discussion page, problems, letters and the occasional special report.

Another feature of the B.M.A.A. is its twice yearly seminars, one of which is in October each year and hosts the A.G.M. This, unfortunately, is not always as well attended as the membership numbers would suggest.

This year at the A.G.M. a number of changes occurred as a couple of the committee members ended their three years of office. The nucleus of the new committee comes from the association's original home: the West Midlands, and they are also determined to continue the growth of the B.M.A.A. The next A.G.M. will be held in the West Midlands along with the seminar where a great deal of effort will be made to increase the attendance at this function. The new venue has already proved to be successful; when the local W.M.M.A.G. held their seminar there last October there was an attendance of 64 with the local group having a membership of 32.

The association also puts on a stand at various aquarist shows such as Doncaster and Belle Vue which brings

Obituary

May Nethersell

Fishkeeping embraces a tremendously wide cross-section of people and one of the pleasures of belonging to any aquatic Society is the social contacts that you make. These attachments are quite likely to stay with you for years and it comes as a terrible shock when you lose a long-standing acquaintance.

At the beginning of December last year the hobby lost one of its genuine characters when May Nethersell passed away. In the past year or so May hadn't been too well, but in the 1960-1980 period she was to be seen almost every weekend at one Open Show or another.

A very active, exhibiting member of Riverside A.S., May was well-loved throughout the hobby and, during the build-up of the major London Shows at Alexandra Palace and the Horticultural Hall, especially endeared herself to exhibitors and Officials alike with a constant

supply of teas, buns and, above all, good humour; in those times of hard work, stress (and short-temper!) she became 'Mum' to all and not just by name.

In addition to exhibiting, May also found the time and energy to establish the F.B.A.S. Show Stand's presence at Open Shows and this also enlarged her circle of friends. For this unstinting service she was awarded, along with husband Bill, the F.B.A.S. Yellow Badge and Diploma. In her own eyes, however, her proudest fishkeeping moments came when she twice won the F.B.A.S. Supreme Championship.

An immediate sense of loss occurred when illness first curtailed her appearances at Shows; occasional recent outings to local Shows seemed to promise a slow but sure return to health, but it was not to be. We know fishkeepers everywhere will join together in sympathy for Bill and the rest of May's family, and feel a collective sorrow for the loss of someone who brought friendship to all of us.

Goodbye May—and thanks for everything.



May Nethersell admires her F.B.A.S. Supreme Championship winning Panague

our hobby to the notice of freshwater aquarists.

A further concern to the association is the adverse publicity seen in the press regarding marine conservation and the aquarium trade. The association has recently formed a group to look at the problem and show the rest of the trade that we care about such matters. We wish to show that we do not intend our image to suffer at the hands of rough operators. The association feels that this is important—it is necessary for somebody in authority to see that we

are putting our own house in order before anybody becomes heavy-handed and the majority suffer because of the few.

If any one is interested in joining the association, then the address below will be of interest.

Mr. B. Underwood,
Membership Secretary, B.M.A.A.,
28 King's Street, Earl's Barton,
Northampton NN6 0LQ.

Membership fee is £9 per annum which includes six issues of *Marine* per year.