

APRIL 1983 75p

AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



Spotlight on
The Hatchet Fish

Western Atlantic Butterfly Fishes
(colour feature)

Two brand new features
* A-Z OF THE AQUARIUM
* MEET THE SOCIETIES
FREE plus
A page
pull-out section

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We at Armitages have had many years experience of meeting the needs of fishkeepers. Our range includes heating, filtration and aeration equipment, foods and remedies, imitation plants and ornaments: in short, just about everything the enthusiast could want.

Take our aeration and filtration equipment, for example. Your fish depend on the clean, pure water for their well-being, and without the right equipment your tank will soon be unsightly and polluted. Our two Gussie air pumps will aerate and circulate the water around the aquarium, and provide the power for air-operated filters. The Armitages battery air pump is invaluable for emergency and occasional use, whilst the new Askoll power filters are ideal for display aquaria which must always be kept looking their best.



Gussie Air Pumps

These offer real value-for-money for the keen hobbyist, economical to run and operating in virtual silence. The "Gussie 1" is a single-outlet model with a performance to provide internal filtration and separate aeration in aquaria up to about 24" long, (or larger if power filtration is being used as well). There is no need for routine servicing or maintenance, and the only part likely to need any attention is the rubber diaphragm which should ideally be renewed once a year. After disconnecting the pump from the mains, this job takes only a minute or two and your pump will then be ready to give reliable service for another year. One spare diaphragm is supplied with the "Gussie", and further supplies are available from your dealer. The power unit consumes just 5 watts of electricity, so the running cost is less than 5p a week.

The "Gussie 2" is a twin outlet model, suitable for aquaria up to 48" long, or for smaller aquaria where especially heavy filtration and aeration is required. Most of its components are the same as those for the single-outlet model, so availability of spares is no problem, and electricity consumption is 7.5 watts - costing about 7p a week. The heavy rubber base very efficiently muffles the noise of the working parts, so that its presence will hardly be noticed in any situation.

To get the best out of your air pump replace airstones regularly, and check the plastic piping for damage and kinks that can lead to trouble. If the performance seems to be down, disconnect the airline from the pump, and blow down it: if you can't easily get the filter and airstone to work in that way, then your pump can't either. Check the airline and components for blockage.

Armitages Battery Pump



This is designed for use in an emergency, or when away from home: during power cuts, for example, or when moving fish long distances. Marine fish are especially susceptible to any interruption in their normal heavy rate of aeration, and the Armitages Battery Pump will help to keep them happy: it could also be used to operate the undergravel filtration if necessary, to prevent the loss of the vital bacteria that make the system so effective. Many aquarists have also found it invaluable when exhibiting in club displays or competitions, putting extra oxygen into the water to refresh their fish. The pump works from a standard SP2 torch battery, which will power it for several hours continuous use and much longer if used intermittently.

Air-Operated Filters

You'll find that we have a model to suit every need, providing really effective filtration and aeration when used with the appropriate Gussie air pump.



The Armitages U Filters employ the method found in the gravel filter: they filter out unwanted waste matter and return to the water that really is clean. Require no maintenance whatever, and are very economical.

Our corner filter is also very inexpensive to buy, and works with Armitages filters. Economical in its use, it should be cleaned once a week - for best results.

Askoll Power Filter

The value of a power filter in an aquarium clean and widely recognised is what you find one that is the Askoll. It fits in by drawing the aquarist's tube of plastic foam solid waste matter from within the filter cold tap. The motor-driven filter, is fully water-tight in any direction to create a current of water around the models available, it has the power of the most powerful of 240 litres/hour, 8PBF that figure is 420 litres/hour. This exceptionally economical filter costs just a few pence in electricity each week: the motors are silent and trouble-free in operation.

The Askoll is suitable for use in both freshwater and marine tanks, and is especially recommended for display aquaria from 24" to 48" long.



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COVER STORY

Hemigrammus bellottii (formerly *Hyphessobrycon bellottii*) is known as the Dash-Dot Tetra in recognition of the black, albeit faint, spot behind the gills and the line that stretches back to the caudal peduncle. This is one of the less common Tetras, occasionally imported by accident in batches of Neons. They occupy similar habitats in the upper reaches of the Amazon and have similar (shoaling) habits. Up to a few years ago, Dash-Dots could be picked up in shops with greater frequency than today, probably because of the larger numbers of tank-bred Neons now coming on to the market. This is a real shame because *H. bellottii* is a very attractive, energetic fish which is particularly impressive in shoals. The red coloration in the eye and "shoulder" visible in the photograph are a clear indication that these specimens are in peak condition. As with most Tetras, these fish are at their best when kept in soft, acid water at temperatures between 24°-27°C (c. 75°-80°F). They are peaceful towards other species and will take a wide variety of foods, provided these are small enough to be swallowed. Maximum size is approximately 2 cm (c. 1 in.). Although both sexes have similar coloration, males are considerably slimmer than females, particularly when the latter are full of roe. There are no well-documented reports of spawning in aquaria but conditions and reproductive behaviour are both likely to be similar to those that apply to Neons. These are, therefore, likely to include soft water and shoal spawning among fine-leaved vegetation.

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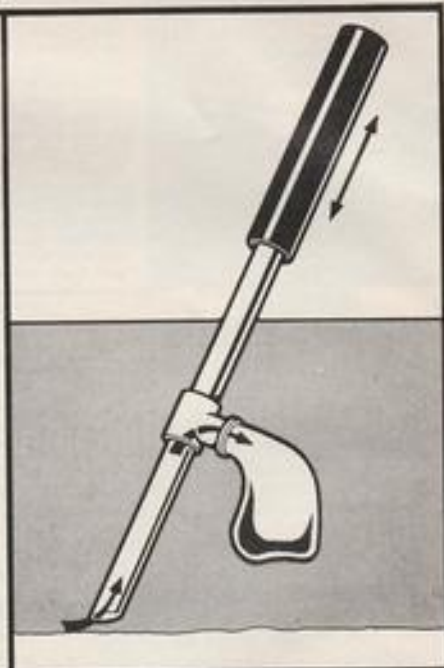
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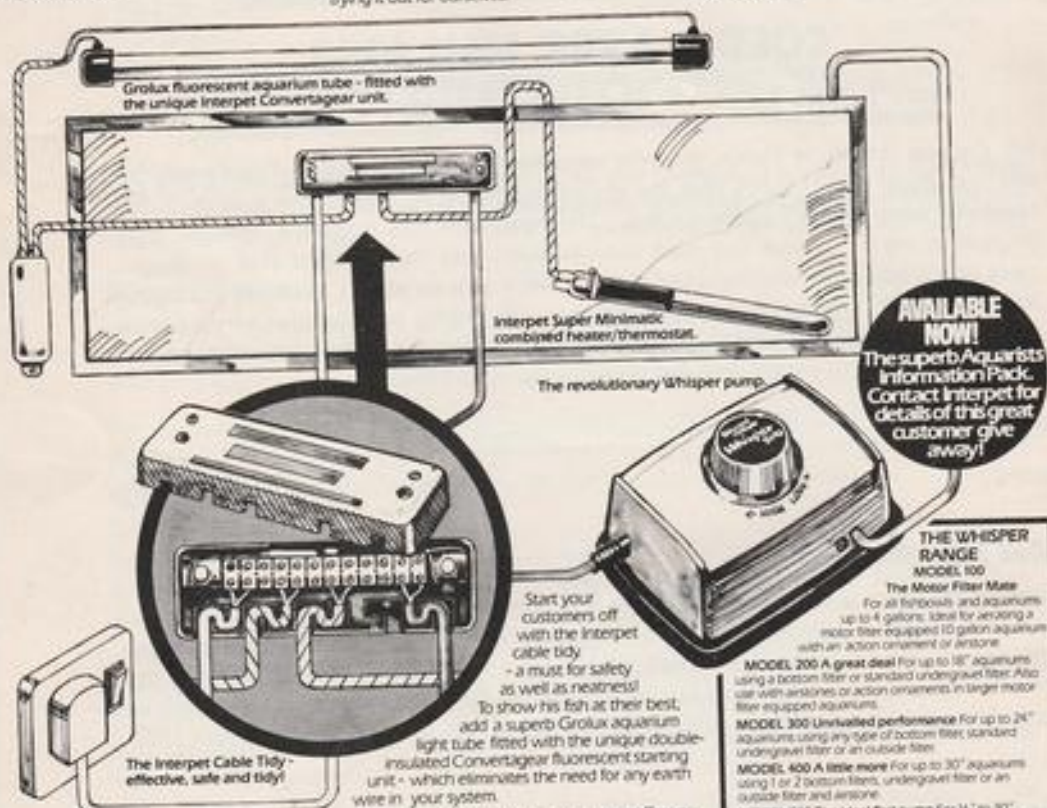


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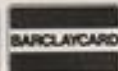


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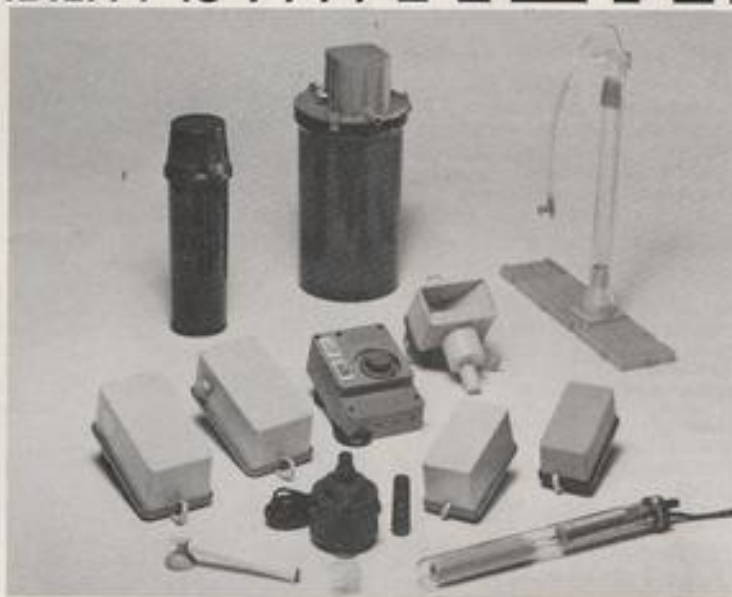
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THE CONSTRUCTION OF AN ECONOMIC FISH HOUSE

By Dr Peter A. Lewis, PhD
Part 3

In this feature I would like to proceed step by step through my most ambitious fish house project which was to build a brick construction adjacent to my home using one wall of my home as the fourth wall of the fish house. Additionally, since I needed a work area, I also chose to add a workshop at the front of the fish house with the idea of providing additional insulation by this incorporation since the workshop doubled as a wind break to the fish house door.

The question as to where to build my project was almost redundant since my boundary only allowed adequate space on the South facing wall. Additionally the fresh water drain from the roof gutters ran the length of the house along this spare patch of ground. Roughly 10 feet of free space were available between my house wall and the property line. The only relatively minor problem using this wall was the external chimney projecting into my proposed building site which proved aggravating when adding the roof and building tank stands.

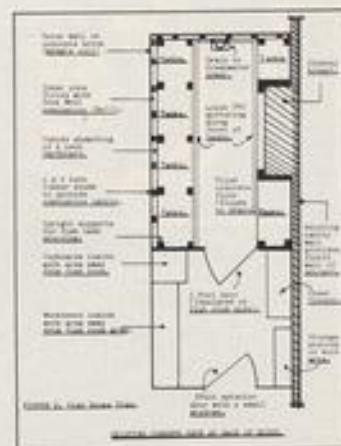
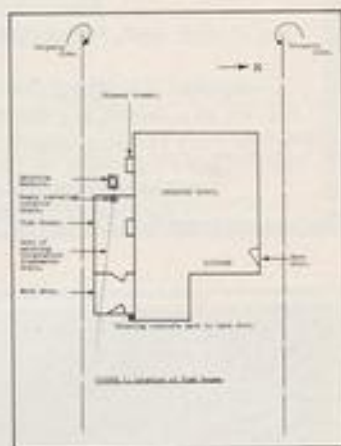
Figure 1 illustrates the location plan and the position of the existing fresh water drain.

Next move was to consult the local Building Inspector and seek his decision as to what plans needed to be drawn and requirements complied with. There I met with some disenchantment and some amusement as I tried to explain what a fish house was. At the time I was living in Huddersfield, Yorkshire, under the Kirklees Authority whose "red tape" I am sure is just as red and just as difficult to untie as most

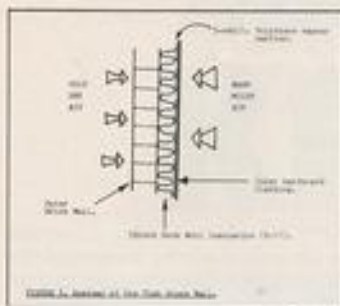
other local authorities. The major problem was that I wanted to do it myself and that I wanted to build a structure to house 30-40 tanks of fish. In the end I had a friend draw up the necessary set of plans to provide to the Planning Council and we described the project as a workshop and garden store. As long as the structure obeys the local guidelines and is not intended for habitation then a single brick wall as intended, is allowed. I submitted plans in January intending to start my project in May. The plans were passed in March, with no revisions. The only added requirement which I had not anticipated was that I would have to dig down to the drain running across the site, expose the drain 6 in. all round and then encase the drain in concrete to a height of 6 in. above the drain. This sounds fine but, believe me, it was hard work since the drain was 3 feet below the surface at the manhole end and sloped to 5 feet 6 inches below the surface by the time it ran outside my proposed building area. An inspector called to check the site before starting construction, after exposing the drain, after encasing the drain in concrete, after digging the footings and after pouring the footings and concrete slab.

Basically, my plan was to build a room 20 feet long, 8 feet wide and 7 feet 6 inches high, divided into a workshop area and a fish room. Figure 2 illustrates my plan. Note the drain inside the fish area towards which the concrete floor sloped. Remember when planning such a drain that a suitable trap has to be used to comply

with building requirements. The work shop area was 8 feet square leaving a fish room with internal dimensions of 11 feet x 8 feet. Both doors opened into the work area thus providing increased space in the fish room. The work area really became an area for storing fish room equipment such as medicines, siphon tubes, *daphnia* nets, buckets, extra gravel, etc. Additionally all my tank making and food preparation was done in this area using a built-in 6 feet x 18 inch three quarter inch plywood work top. The fact that the family deep freezer was also housed in the work area was a real boon in that all my frozen shrimp, beef heart,



liver and white bait used to feed my fishy charges was stored in this freezer.



Along the front of each rack of shelving I installed a length of grey 4 inch PVC guttering held in place with gutter brackets every 3 feet. This was obviously installed at the lowest convenient level on the shelf fronts to allow for draining from the tanks by gravity. My first shelf was 15 inches from the concrete floor and my highest shelf 6 feet from the floor. The gutters each drained into a common PVC splash head which was fitted with a relatively fine nylon mesh to prevent accidental loss of fry or gravel during cleaning operations. I shall return to a more detailed look at shelf construction and the installation of an electric circuit tailored to a fish house in a later article in this series.

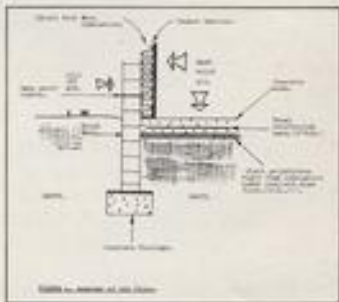
Figure 3 provides cross sectional details of the wall construction. The bricks used were a concrete brick, Golden Buff Bronte to be precise, chosen, not to match the house brick since these bricks were no longer made but for their neutral tones and for the way they blended into the property. The outer wall and footings were built using this brick. The inner dividing wall, keyed into the outer wall, was built using concrete block and gave added strength to the outer skin. Once the wall was up and the roof laid I put 4 inch x 2 inch wall battens cut from recovered lumber at 16 inch centres all around the perimeter of the interior of the fish room wall except for the wall common to the fish room and the house. I chose not to insulate this wall using the logic that this was a cavity wall and common to the house and any heat loss would be minimal

and end up in my home anyway. Between these upright battens I placed 3 1/2 inch Rock Wool insulation purchased as a 45 feet x 15 inch roll. During this operation I wore a cloth dust mask and rubber gloves to try and avoid any irritation caused by the fibres.

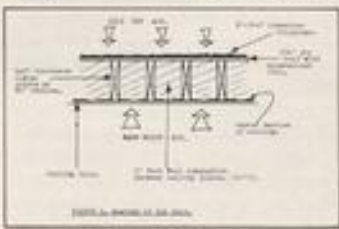
Next came the installation of a polythene vapour barrier to totally cover the inner, insulated walls. This barrier is critical since without a vapour barrier the Rock Wool insulation is liable to turn into a soggy, useless mess in a few short years. Temperature differences between the wall's warm and cold sides will cause fish house moisture to condense inside the insulated stud cavity, filling up pockets that trap air. A vapour barrier will keep the insulation dry and keep moisture where it belongs, in the fish room. The interior wall was completed by nailing a layer of 1/2 in. oil faced hardboard, purchased in 8 feet x 4 feet sheets, to the uprights thus completely enclosing the insulation giving a draught free barrier. It is advisable to use galvanised or aluminium nails for this operation as these will not rust in the moist fish room atmosphere. To really complete the operation it is best to tape each butted edge of hardboard with 2 inch wide plastic tape.

Figure 4 illustrates how the insulation process can be continued at floor level by installing 2 inch thick polyurethane foam, purchased in 8 feet x 2 feet lengths, above the ground before adding the concrete slab. The slab is poured and levelled easier if the wall is first built up to the level of the damp proof course. The concrete slab can then be poured within the perimeter of the low wall to a depth of 5-6 inches using either "Readimix" concrete or hand mixed cement, gravel and sand in the ratio one part cement, three parts 1/2 in. gravel to 2 parts sharp sand. Ensure the mix is made or delivered wet to assist in the pouring and levelling operation. I chose to hand mix the mixture and to reinforce the concrete slab with iron bars spaced one foot apart. The whole mixing and pouring operation took my wife and I two full days one weekend and was probably the most back breaking operation of the project.

Turning next to the roof and ceiling as illustrated in Figure 5 I again used wood cut from recovered lumber, this time 6 x 2 inch timber for the roof joists. The roof sloped 3 inches from the house wall to the edge of the new building and was made up of 1/2 in. exterior grade plywood nailed to 6 in. x 2 in. joists spaced at 24 inch centres. On the plywood a layer of tar paper followed by mineralised roofing felt was laid using a bitumen based adhesive. The roof was finished off by adding 4-5 hundredweight of 1/2 in. x 1/2 in. limestone chippings to aid in the reflection of excessive heat from the roof and evaporation of accumulated rain water.



Internally the roof was finished by adding 6 in. Rock Wool insulation between the joists together with the all important polythene vapour barrier as discussed earlier. The polythene actually aids in the insulation installation in that it is used to support the Rock Wool between the joists prior to adding the ceiling. For the ceiling I added the finishing touches by nailing 1/2 in. thick, 2 foot square acoustic fibre tiles across the whole ceiling again using rust proof nails. I purchased the tiles cheap from a local builders supply house who were glad to get rid





Photograph 1 shows the project at a stage when the brick laying is about one third complete. Note the position of the block wall two thirds of the way from the front wall

of the tiles since they were all rejects and badly marked. A final coat of white, latex emulsion completely hid all blemishes and gave a professional appearance to both the fish room and workshop ceiling.

Thus I constructed over a period of 3 months a fish room and workshop using brick, concrete block, recovered timber, $\frac{3}{4}$ in. plywood sheets, mineralised felt, concrete and Rock Wool insulation. Truly an ambitious project but nevertheless a rewarding challenge and an addition to the home that can only result in increasing its market value. When I came to sell the house to move and take up my next assignment the addition was advertised as a workshop and garden potting shed. When we moved out all that was left of the fish room was rows of shelving and the floor drain. The purchaser actually had a washer and drier plumbed into the room and converted my fish house into a wash room!

Many excellent D-I-Y books are available today which go into exact detail of how to lay bricks, mix cement, lay a concrete slab and construct a roof which basically is all that is needed to achieve your brick fish house. Personally I am a physical chemist and I have had to learn the art of construction from reading followed by trial and

error. Remember, take it slow, one step at a time and try to think ahead making plans for the next stage before you come to that stage.

One luxury I did not plan into this project was a supply of water to the fish room. Draining the tanks was easy but to refill them with water at

THE CONSTRUCTION OF AN ECONOMIC FISH HOUSE

72-75°F I had to connect a hosepipe to the mixer tap in the kitchen and run this to the fish room. A refinement on my project would have been to run a water supply under the floorboards to the fish room.

As for cost of the project that is always an ill defined question since cost is forever relative. In 1973 when I completed the project it cost me £550 but that was many years ago and I used recovered lumber, 2 recovered doors, packing case timber for the shelves and had a friend draw the plans. However, as mentioned earlier, the project added value to my home—far in excess of £550.

In next months feature I shall go into details regarding the construction of a fish house using a wooden shed as the basic framework.

Photograph 2 shows the interior of the fish room as photographed from the work area. Note the small window installed in the end wall and the inevitable condensation despite the double glazing



A FIERCE AND COLOURFUL KILLIFISH

The female is pursued

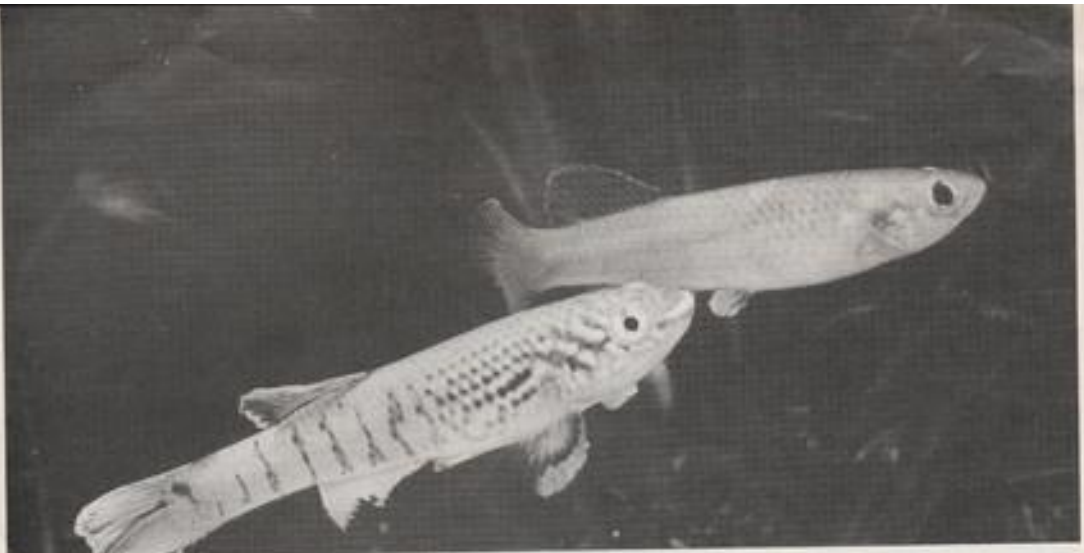


by
R. Zukal

In the tropical rain-forest of West Africa, mainly in the Niger delta and in West Cameroun to Ghana, lives *Aphyosemion sjoestedti*, perhaps the most beautiful representative of the genus *Aphyosemion*. It is found too in the smallest of wayside ditches. It was first brought to Europe in 1905,

but not bred until much later. Since the year 1915, when it was first described by Boulenger, it was known to aquarists under a host of names; *Fundulus gularis*, *Fundulus gularis* var. *coeruleus*, *Fundulus sjoestedti*, *Fundulopanchax coeruleus*, *Fundulopanchax sjoestedti*, *Aphyosemion gularis coeruleus*, *Notobranchius sjoestedti* and perhaps others, too. It is to be hoped that the present name will remain the definitive one, although it is rumoured that this species has a number of sub-species too.

A. sjoestedti is a predator, for it will not tolerate even other members of the same species in close proximity to itself. As it attains a size of 10-12 cm, the adult male is able to swallow guppies without any undue effort. Since he is not particularly tender towards his partner either, it is recommended that the fish should be kept in a low tank which is not too small and well planted in order that the fish can hide from each other in the vegetation. This species is by no means suitable for the community tank. The splend



The male tries to 'ride' the female





The fish spawning



colours of the male only come really to the fore in a tank which has been set aside for just the one species. One must ensure, however, that the tank receives subdued lighting only. For this reason a few floating plants should be placed on the surface. The water should be rather soft, the temperature should not exceed 20°C, otherwise the life-span of the fish will be considerably reduced. The fish keep themselves near the bottom of the tank most of the time and need live food, including small fish if possible. This species is not resistant to *infusoria*, so the water is kept clean by good filtration. A small amount of last added to the water will do no harm at all. If given a good diet and a partial water change in the tank once a week the fish will flourish.

It is difficult to describe the coloration of (male) fish, for the colours are variable. The species contains a number of colour mutations. The males of all mutations, however, have one thing in common and that is the dominant blue-green coloration of the whole body. By way of contrast the female's coloration is rather plain. The sides of the body bear faint red dots. Whereas the fins of the male are yellowish with red dots or blue-green with yellow bands, the female's fins are rounded off and coloured a light yellowish-green.

Shortly before the spawning act there is a short period of courtship and display behaviour

Breeding is not particularly difficult, the fish spawn readily and often in a species tank. One can also let them spawn in a larger all-glass tank. In which case the temperature is raised to 22°C. The fish spawn on the bottom in the peat, on fine-leaved plants or often simply on fine sand. It is advisable to introduce two females to a male. A temperature higher than 22°C is undesirable. The number of eggs laid lies between 100 and 200, but spawning may be repeated several times in the year. The brood hatches after about 6-8 weeks and immediately after hatching they must be given the finest food. After two to three months the young fish become mature, but they should not be used for spawning until they are six months old. I will say a little more about the eggs. These are deposited individually by the female. One can remove the eggs from the peat, sand or plants with the aid of a glass pipe, or remove the whole spawning substrate with the eggs and replace it with new plants or peat. After removal the eggs are stored in only slightly damp peat in a plastic bottle or largish glass dish placed in the dark at a temperature of at least 16°C. It is very important to make a note of the spawning, for after six to eight weeks, or even more, the spawning substrate together with the eggs is placed in a rearing tank and rain-water or water from the species tank is simply poured on to the eggs, which have to withstand a period of drought in the natural state. Within a short time they hatch and are free-swimming.

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 which department you wish your query to go to. All letters must be accompanied by a S.A.E. and addressed to:

Your Questions Answered, The Aquarist & Pondkeeper,
The Butts, Brentford, Middlesex TW8 8BN.

TROPICAL



Dr. C. Andrews

Tropical



brineshrimp . . .

Can you describe the culture of brineshrimp eggs?

Brineshrimp 'eggs' can be obtained from most pet shops, although they are a little expensive. However, the newly-hatched shrimps are an excellent food for many small fish fry.

Brineshrimp 'hatcheries' may be bought from most aquatic shops, but the same result may be obtained by using 2-3 clean milk bottles. Add about two-thirds of a pint of cooled boiled water to one of the milk bottles and dissolve into this about one heaped teaspoon of cooking salt or marine salts. (A better percentage hatch may be obtained if marine salts are used.) Aerate this salt water and allow to come to room temperature (which must be at least 15°C and preferably 20-25°C.) Add about enough brineshrimp eggs to cover a two pence piece and place a cotton wool bung in the neck of the bottle. Aerate the salt water and eggs continuously and vigorously and the eggs should begin to hatch after about 48 hours. Each 'culture' will then last two of three days, so if you need to maintain a continuous supply of newly-hatched brineshrimp over a week or so, you should start off a new culture about every other day.

To remove the newly-hatched brineshrimp, simply turn off the aeration and leave the culture to settle for 5-10 minutes. The living brineshrimp will collect about 2-4 cm from the

bottom of the milk bottle, and can be siphoned out, often directly into the fry tank, using a length of air line. To keep the culture going for another day or two, the bottle should be topped up to its previous level with dechlorinated salt water, and the aeration turned back on.

quarantine . . .

How can I set up a quarantine tank for my fish?

All new fish should be quarantined in a separate isolation tank for at least fourteen days before being released into a set-up tank. While in the isolation tank, any symptoms of disease may be easily spotted and quickly treated.

The quarantine tank need not be an elaborate affair, and may double as a treatment tank. A small to medium-sized aquarium, depending on the size of the fish to be quarantined, plus a hood or cover, an air pump and poly-foam filter and one or two plastic plants for refuge are the basic requirements. The water in a quarantine tank for tropical fish will have to be maintained at a steady 23-26°C with a reliable heater-thermostat, and the temperature checked with a thermometer. The quarantine tanks must have its own set of equipment, including nets, scraper, siphon tube, etc., so that there is no risk of disease transmission to the community tanks or pond. Do not forget—disease organisms can also be carried on wet hands!

After the quarantine period is over, the tank, and all the equipment should be rinsed in a dilute solution of house-

hold bleach, thoroughly rinsed in clean water, and then stored dry ready for use next time.

unusual tilapia . . .

Can you give me some information on *Tilapia buttikoferi*?

There does not appear to be very much information available on the aquarium care of this fish. I would suggest a large tank with plenty of robust rockwork, tree roots, etc. Plants probably will not survive very long, although this fish will probably mix with other similar sized fish species. Avoid extreme pH and water hardness values, and maintain a temperature of around 25°C. Feed on tablet and pelleted food, some vegetable matter and safe live foods.

C.A.

Coldwater



fancy goldfish . . .

Can you please explain to me the difference between Fantails, Veiltails and Orandas?

The fantail is a short bodied fish with a double tail held out well without drooping. It also has double anal fins. The Veiltail is even fatter in the body with a flowing double tail. The tail should not be deeply forked as in the Fantail but an almost straight

COLDWATER

Arthur Boarder

PLANTS

Vivian De Thabrew

KOI

Hilda Allen

MARINE

Richard Sankey

DISCUS

Eberhard Schulze



Fantail goldfish

base to the fin is preferred. The best types are the calico ones with attractive colours and no visible scales. The Oranda is shaped like the Fantail but has no dorsal fin and has a rough protuberance covering the head and gill plates. The red-cap Oranda is an attractive fish.



Veiltail goldfish

goldfish dying . . .

Three of my goldfish and a moor have died for no apparent reason. I set up the tank under the rules of "The Beginners' Hand Book". Can you tell me why they died?

Without further information it is quite impossible for me to state why

the fishes died. If the fishes were healthy when obtained, then incorrect conditions could have been the cause of loss. The main reasons for losses in a tank are over-stocking and over-feeding. The water for the tank could have come through copper pipes and so could be poisonous. In such a case the fishes would soon die. The stocking rate for a tank is to allow an inch length of fish for each 24 square inches of surface area of water. Feeding should never start until the fishes have settled down in the tank; at least two days should elapse. Too much food will mean that any uneaten will decay and pollute the water. A partial change of water once a week is beneficial. Although oxygenating plants are necessary in a tank, it is possible to over-stock with them so that during the night they cease to give off oxygen and fishes could become asphyxiated and a sure sign when insufficient oxygen has been available during the night is when bubbles are seen on the surface in the mornings.

green water . . .

I have a pond which gets a lot of sun and the water gets very green. The pond is 10 ft. x 4 ft. and has 18 fishes of 3 to 5 in. How many more will it hold?

Any water exposed to light will soon turn green through the presence of Green Algae. If the water had been completely covered it would have remained clear. Get more cover from light with such plants as water lilies and duckweed. The more plants in the pond the less green water.

Your pond will hold 40 inches length of fish, excluding the tail, for each square feet of surface area of water. You will find that fishes in a pond will thrive better if they are of nearly the same size. Where small fishes have to compete with larger ones they often fail to grow. Do not over-feed the fishes as uneaten food which decays can tend to assist the growth of green Algae.

A.B.

Plants**coldwater plants . . .**

Please could you give me some information on setting up a 36 in. x 12 in. x 12 in. coldwater aquarium which would be in a conservatory. Would the plants have to be from a coldwater dealer, or would plants for a tropical tank be all right?

For your coldwater tank the ideal planting medium should be a mixture of coarse sand and aquarium peat, to the depth of at least three inches. The lighting can be done by a 40 watt tube light for at least 8 hours per day.

If the conservatory is not as warm as your living room then you need to plant coldwater plants. Species like Elodea, Hygrophila, Hydrilla, Callitriche, Hottonia, *Cardamine lyrata*, *Ludwigia palustris*, *Mentha aquatica*,



Egeria densa (Elodea)

Utricularia, *Rorippa amphibia*, *Samolus*, *Stratiotes aloides*, *Subularia aquatica*, are suitable for your tank. If the tank is in the living room at a room temperature of around 70°F, then most tropical plants are usable, but you will find that their growth is slow.

V.T.

Koi



koi losses . . .

Following three disastrous attempts to keep Koi I am on the point of giving up the idea unless you can offer some good advice. I have a typical garden pond holding about 1,700 gallons of water, so I only want small, cheap Koi. Having already lost all those bought previously I am reluctant to spend more money until I can find some small Koi that will live.

Oh dear, this is a cry from the heart (and pocket) that is well understood; although most of us have gone through this initial despair in trying to just keep Koi alive, there really are no easy answers.

In the first place, many of the so-called 'cheap' imported Koi are less than healthy upon arrival in this country. Small fish especially suffer from the severe stress of one of the longest flights possible, from a much different environment, and usually in overcrowded conditions in order that economies can be made on the high cost of air freight from the Far East.

Koi of the type in which you are interested do require careful handling, rest, and often treatment in order to overcome various problems associated with prolonged stress, starvation, and tranquillising drugs. All this costs money, and their chances of survival are further reduced by many being swiftly moved on for re-sale before ending up 'at home' in garden ponds. The buck stops there. This may well be the final straw for those that have survived thus far, and heavy losses among cheap, imported Koi are too well-known for me to comment further.

It is accepted that money is in short supply but beginners to Koi-keeping would fare better if they refused to buy small fish of doubtful value and opted for fewer, stronger Koi in the first place. I would also refer to your pond which is an equally important factor in successful Koi-keeping. A lack of understanding and basic good husbandry for these beautiful carp provides further reasons for



Koi carp

losses without doubt. Budding Koi-keepers should pay a visit to "Koi '83", the national, open show of the British Koi-Keepers' Society to be held on Sunday, 26th June at Billing Aquadrome, near Northampton.

This is Europe's biggest Koi Show and the sight of hundreds of superb Koi competing for trophies awarded according to variety, size, etc., should give encouragement to all, as well as providing the opportunity of meeting members and joining that specialist Society which pioneered Koi-keeping in this country.

H.A.

Marine



natural systems . . .

I have kept Tropical fish since I was stationed in Jerusalem during the war, and Marines since 1969. I never seem to learn much about them.

I have a Marine tank 4 ft. x 3 ft. x 2 ft. 150 gallons, but I can never keep coral or anemones more than about six months. I use the natural system and have white fluorescent light 20w at front and 30w fluorescent at the back plus an incandescent 100w. They are on automatically seven hours a day, except when I switch them on extra.

Eighteen months ago the tank which had not been emptied since 1969, was infested with Bristle worms, one as thick as your thumb and about six inches long. I thought they killed the anemones so I cleared them all out and started again. Only two Damsels survived to which I have now added two Clowns. I put in ten gallons of fresh water about twice a month, P.H. is right and I syphon off algae from walls and bottom. I have a piston pump with four aerators and some pond weed growing reasonably well. I get

a lot of Blanket weed which I never had when the tank was infested with Bristle worms.

Have you any advice?

As you are no doubt aware, there are many ways of maintaining a marine aquarium and each year seems to bring more and more variations. Each different method has both good and (still too often) bad points. The concept of a natural system aquarium is very good and some of the best aquariums I have seen anywhere in the world have been of a "natural type". The limitation with a natural system is that one needs a relatively large capacity aquarium such as you have, but extremely low fish and animal content.

Assuming that you wish to maintain the same type of system you already have, I would advise regular water changes of approximately 5-10 gallons per week, but care should be taken in not radically changing the specific gravity as some of the more important marine algae (marine plant) are very susceptible to osmotic change and if you are not careful you will gradually find that only the simple algae (blanket weed types) will survive.

To maintain good plant rather than just simple algal life, I would suggest the following lighting for your aquarium:

1 30w white light source, preferably Tru-Lite or something similar.

1 20w Gro-lux type light.

1 30w North Light.

1 30w U.V.A. Lamp.

The latter should never be viewed directly as it is of moderately short wave ultra violet (the type used for suntan lamps) but once diffused through the water it is not harmful, so some form of canopy over this light would be important. Lighting should be on for between 12 and 16 hours per day. I also recommend the addition of 2 100w halogen type flood lights which should be on a time clock set for not more than 4 hours per day.

In my opinion this short yet intense burst of light is vital for the more complex algae that we have come to call 'marine plant' in recent times. I believe that having done all this you will get a much better result, particularly in maintaining sea anemones

and corals, both of which have very delicate algal life within their tissues without which these sea creatures are unlikely to survive more than a few months.

R.S.

Discus



cutfish with discus ... ?

I recently set up a 48 in. by 12 in. by 15 in. tank for keeping blue Discus. I have undergravel filters, 3 inches of gravel some plants and a pH of 6.6. I recently bought 8 blue Discus fish from a good dealer, which he kept especially for me.

They were sound healthy fish, eating and very active. I feed them with oxheart, bloodworms and Daphnia. I noticed that they were listless and a slimy grey covering appeared on them. Since then I have done a part water change and added salt in small doses. My Discus fish are at the moment more active and taking food. As I live in a very soft water area, I would like to know what pH chemicals are available other than from my local dealer, as I find this very expensive. What cutfish, if any, can be kept with my Discus?



Albino *Corydoras aeneus*

You do not say whether these Blue Discus were Wild Imports or whether they were from the Far East. Neither

do you say whether they are young or fully grown fish. This sort of skin problem is usually not very serious and I am almost 100% sure that it is as a result of a very high bacteria count of the water. The fact that your aquarium is filtered with U/G filters—a system I believe should never be used with Discus fish—certainly points to my diagnosis. Any aquarium with U/G takes too long to run in and will only operate well for a very short time before the gravel bed starts to become saturated with waste and dirt. A dangerous level of saturation is usually to be found in such a system within 5 to 6 months at which time it ought to be cleaned out. Unfortunately the high bacteria count is the result of the newness of the U/G system and I am sure that if you also were to measure the NO_2 content of the water it also would show a very high reading. To overcome your problem you can either use a resin-type filtering material, or Optima or lots of water changes, basically to dilute the bacteria per amount of water. It may also be a very good idea to stop feeding oxheart for a little while since the very fine particles are partly responsible for the high bacteria count; certainly until you have a ZERO NO_2 reading of the water.

Salt does not belong in a Discus fish tank, especially in small doses. You say that your local dealer is very expensive in respect of pH measuring chemicals. The cheapest are Eheim and every test will cost you only a penny or so. I have used them for a very long time and find them very reliable and easy to use.

Catfish and Discus? Most South American Corydoras are OK, but you must remember that they will not take as low a pH value as the Discus fish and also they would not tolerate the very high temperature which is sometimes used to rid the Discus fish of certain ailments. Clown plecos are also fine, they take the same water and do not bother the Discus fish, even at night. Clown Loaches and Discus fish also go well together but remember to have at least a small shoal of 5 or 6 otherwise they will become very shy.

E.S.

From a
Naturalist's
Notebook



EVER heard of lethology? No, neither have I, but the answer in a syndicated newspaper quiz was the study of fishes. Perhaps a misprint for ichthyology; but none of the sub-editors handling it could have known, to let it slip through, such is the lower standard in university-trained journalists. The same daily paper once described in its obituary of a distinguished aquarist, that he was an "etymologist," meaning entomologist, which of course refers to insects. In the old days, printers rarely let us down, but occasionally anglers fished with "gentiles" as bait.

Predatory shell fish

How many enthusiastic keepers of coral-fish aquaria realise how these are sometimes preyed upon by shellfish in their tropical waters? It has long been known that poisonous, beautifully patterned cone-shells like *Conus geographica*, *catus* and *tulipa*, immobilise tropical fish with their poisonous discharge, then eat them. Now an entirely different mollusc a Red Sea gastropod or sea-snail *Drupa ricinus haderi*, has been found to feed on coral-reef gobies by an entirely different method. Using its body to block the exit from holes in the coral where a small or juvenile goby has retreated, it exudes its proboscis which then devours the fish in the same way that it drills holes in small crabs, barnacles and other shellfish to eat them. It isn't poisonous, but is in the same family as the famous *Murex*. The bones of these small gobies were found in the guts of *Drupa* in the shallow coral-reefs near Port Sudan. *Conus* and *Drupa* are the only gastropods known to prey on fish.

A century ago, in 1883, large supplies of goldfish were bought in the London

by Eric Hardy

market and introduced to breed in the mill-ponds (lodes) of Lancashire and Yorkshire where steam-power was used, in order to clean this warm water. The water often became hot and dirty from frequent usage and the goldfish ranged through considerable variety of colour from almost black to white. Sometimes the ponds became choked with pondweed introduced accidentally with the nets of anglers. The red colours of their goldfish were thought to be in relation to the amount of pondweed. Though Mendel's work had been published in 1866, it remained largely unknown. Mr Long, manager of the then famous Southport public marine aquarium, confused it with the camouflaging colour-changes in octopus, turbot, even sea-horses turning pale when he lined their tank with white blocks in his collection, a blow on the tank making his octopus change immediately from pink to dark crimson.

Planting time

From now till June, the main goldfish spawning time is also planting time

for garden ponds. Male goldfish are chasing or leisurely following females. But we are also netting sickle-jawed grubs of *Dysticus* water-beetles before they eat fish-fry. When April merges into May lady's smock dresses the boggy bank with lilac. American skunk-cabbage now becomes one of the most striking waterside plants with large, golden-yellow arum-like spathes, followed by huge banana-leaves of glorious cucumber-green. It seeds abundantly and germinates in shallow water; but it is best to sow seed in autumn to germinate the following spring for its white-flowered Japanese relative *camtschathensis*.

Planting a new pond needs oxygenators like *Elodea*, curled *Lagarosiphon*, smaller *Anachris callostrichnoides*, *Myriophyllum* or water-milfoil, water-lobelia (not with swans), water violet, marsh-arrowgrass and bladder-wort rooted firmly in the bottom or floating in mid-water. For the average pool, white pink or yellow varieties of water-lily *odorata*, *laydeckeri* and rosey *Nymphaea* serve well, with *maritima* and *chromatella*'s mottled leaves. Most vivid red water-lily is *escarboule*, and for yellow, *Sunrise*. These, like *gladstoniana* and *nabersa* need 2 ft of water; but diminutive *pygmaea* will grow in only 3 ins in tub or sink, providing no frost reaches them.

Six to 8 ins of water will flower *Aponogeton* the water-hawthorn, enhancing the side of their pool with ornamental grasses like *Glyceria spectabilis* and *Eriophorum latifolium*. Established in a clump beside irises, flowering rush makes an imposing sight with long sword-shaped leaves and an umbell of small pink flowers held high in July and August.

Continued on page 31

BRITISH AQUARISTS FESTIVAL



Mr. & Mrs. A. Underwood
1st prizes in Fancy Goldfish Fantail - Grandes,
Best pair of fish in show, A.V. Coldwater Pairs,
and Best Coldwater fish in show.
"The fish prefer 'Aquarian' to any other
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Mr. D. Shields, 1st prizes
in Tropical Furnished
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"I've fed the Cardinals
since 1981 on
'Aquarian', and
they are now
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1st prizes in Best Coldwater Breeders, Best Shubunkin and Best Swordtail.
"We always use 'Aquarian' as it provides a balanced diet and does not
cloud the water."

Mr. R. Colby
1st prize Moors and Wiltails.
"I use 'Aquarian' because
I find it is the best flake on
the market."

Mr. T.A. Crickshank
Champion of Champions
"I've always used
'Aquarian'."

The British Aquarists Festival held at Belle Vue, Manchester on November 6th and 7th, 1982 again proved to be a showpiece for the very best of British aquarists. Once again it was 'Aquarian' fish flakes that stole the show.

When we asked the top winners which food they fed - time and time again the same answer came back - 'Aquarian' flakes.

Why? Some said it was because 'Aquarian' is made from only the finest natural fresh ingredients. Others replied it was because 'Aquarian' is painstakingly prepared under the strictest factory conditions. 'Aquarian' flakes are hermetically

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WINNERS
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sealed after manufacture to retain their full, natural and nourishing freshness. Whatever the reasons - there's no doubt that the top aquarists at the British Aquarists Festival had one reason in common - fish fed on 'Aquarian' get results. Ask the winners of the British Aquarist Festival.

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COMMENTARY



by
Roy Pinks

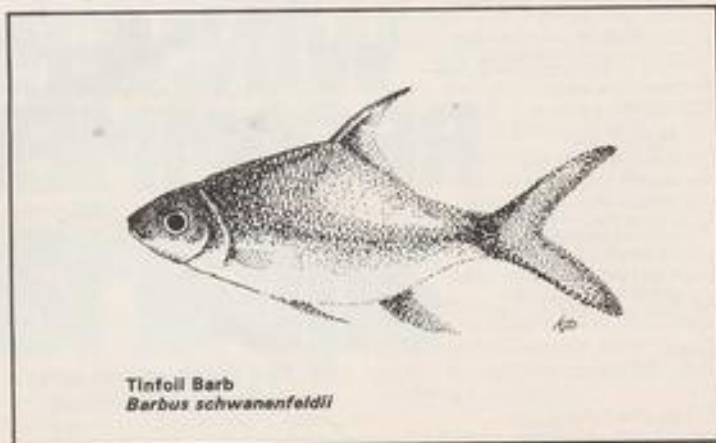
WHEN I was acting as locum for Jack Hems some time ago I received a spate of letters about the keeping of Piranhas and their near relatives. I was never enthusiastic in my replies, and did my best to discourage aquarists from keeping fish which can become extremely dangerous and which have so little by way of charm to recommend them as tenants of our tanks. Their diet is very demanding and even when they are in good colour they seldom repay the care lavished upon them because they tend to mope about or remain motionless for long periods—scarcely the characteristics of a desirable aquarium fish. Most purchasers of pet fish will look for colour, liveliness, compatibility with other species and overall hardiness. Alas, Piranhas score low throughout. I have been considering meanwhile what I might offer as alternatives. At the outset I would completely discount any appeal Piranhas might have because they are so sensationally aggressive and bloodthirsty. This would be as stupid a reason for buying a fish as it would be to make a backyard pet of a cobra. So we should try to buy our pets for the right reasons. The prime appeal of Piranhas is the silvery, diamond-like brilliance of many of

the scales when viewed in certain lights. Like the Mirror Carp and the Diamond Tetra, there are some fish which possess this rare quality of living light, and even though the rest of their colouring may be drab, this one characteristic helps to sell them even to the reluctant.

A secondary feature of the Piranha is its rather unusual shape—a slightly flattened lozenge resting on one point, and this is very much in its favour as a contrast to fish of more conventional herring-like build. Taking all in all I concluded that a very toothsome alternative for those attracted to the Piranha's looks would be the Tinfoil Barb (*Barbus schwanenfeldii*). This is essentially a very silver fish indeed, deep in the body and with a black line topping the dorsal and outlining the prominent tail. The fins are pinkish-orange and the black eye is very distinctively large and appealing, so much at variance with Piranhas & Co. whose looks are disdainful and untrustworthy. The upper part of the Tinfoil's body is sculptured beneath the dorsal area in such a way that reflections from this silvery surface take place even if the lighting is not particularly good. Tinfoil Barbs are misleading in their youth. Commonly sold at about the 2 in. mark they merely look attractive and lively and very metallic indeed. It is a pity that so many purchasers feel that they have been diddled when

these lovely fish rapidly put on size and begin to dwarf the rest of the collections—Gouramies included! As they can grow to over a foot it is obvious that some thought should be given to their fate at an early stage, but here again these fish have it over Piranhas. You usually end up with just a single Piranha lording it in a tank because of unsociable habits, but in the case of Tinfoils you can safely leave them with smaller fish or run several together in a tank dedicated to the single species. It is not very good policy to keep fish of greatly disparate size in the same tank, as they simply look ridiculous, so you may end up with three or four Tinfoils in a 36 in. tank and never really regret the day.

They prefer soft, rather acid water, in the mid 70's range. Feeding is by no means a difficulty, and they will eat almost anything you offer, though vegetable matter is important to them and they make off with your plants if you neglect them in this respect. Their rate of growth has to be seen to be believed, but unlike many other rapidly-growing species here is one which you will probably want to keep even when it has reached the embarrassing stage, as it is such a charming performer in captivity. This is the one fish I can think of which will probably cause you to buy a

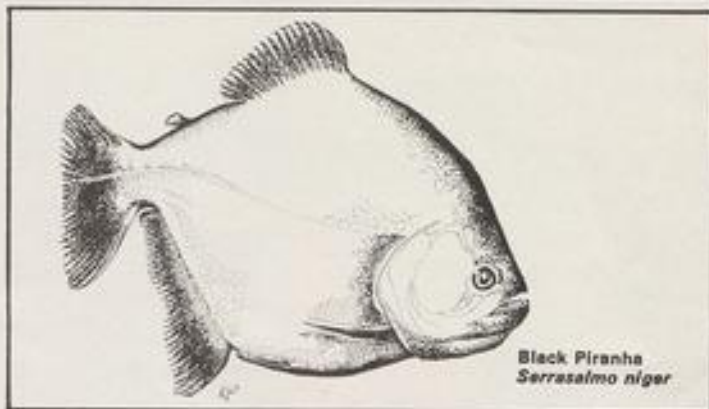


Tinfoil Barb
Barbus schwanenfeldii

COMMENTARY

bigger tank to house it, whilst in most other cases you are more likely to take the monster to the local shop and exchange it for something far less worthy. A feature of the growth of Tinfolis is not just an increase in size but a general enhancement of bulk and structure and colour, so that in good condition they take on a lustre almost unique.

With fish like these you need to consider tank furnishings rather carefully, and you can dispense with much of the lightweight plant life, concentrating on the less edible lines, and as for the hardware only a few, prominent, landmarks are called for. Two gigantic lumps of coal (if you can afford them), will set this species off sensationally—the contrast is most pleasing. With large specimens and a heavy turn round of food and excreted products it is necessary to carry out regular cleaning routines or to employ a



Black Piranha
Serrasalmo niger

heavy duty filter in the tank to maintain the water in crystal clear condition. Muzziness of water or of the tank front will go a long way to destroying the strong visual appeal offered by these most beautiful barbids, so filtration in this case is a practice I strongly recommend. As a spectacle a tank of Tinfolis takes an awful lot of beating.

One prominent local aquarist used to have a 36 in. tank, containing several adult fish, on his mantelpiece, which was visible from the road outside his house. It certainly stopped passers-by, especially after dark when the illuminated tank was very much a showpiece—and it was often a near thing with the traffic, too!

From a Naturalist's Notebook

Continued from page 28

Though *denticulata* and large white dark-eyed *chionantha* with gold-powdered leaves this month follow little pink *rosea*'s early start of the bog-primulas at the end of winter, the bulk belong to May and June. If you

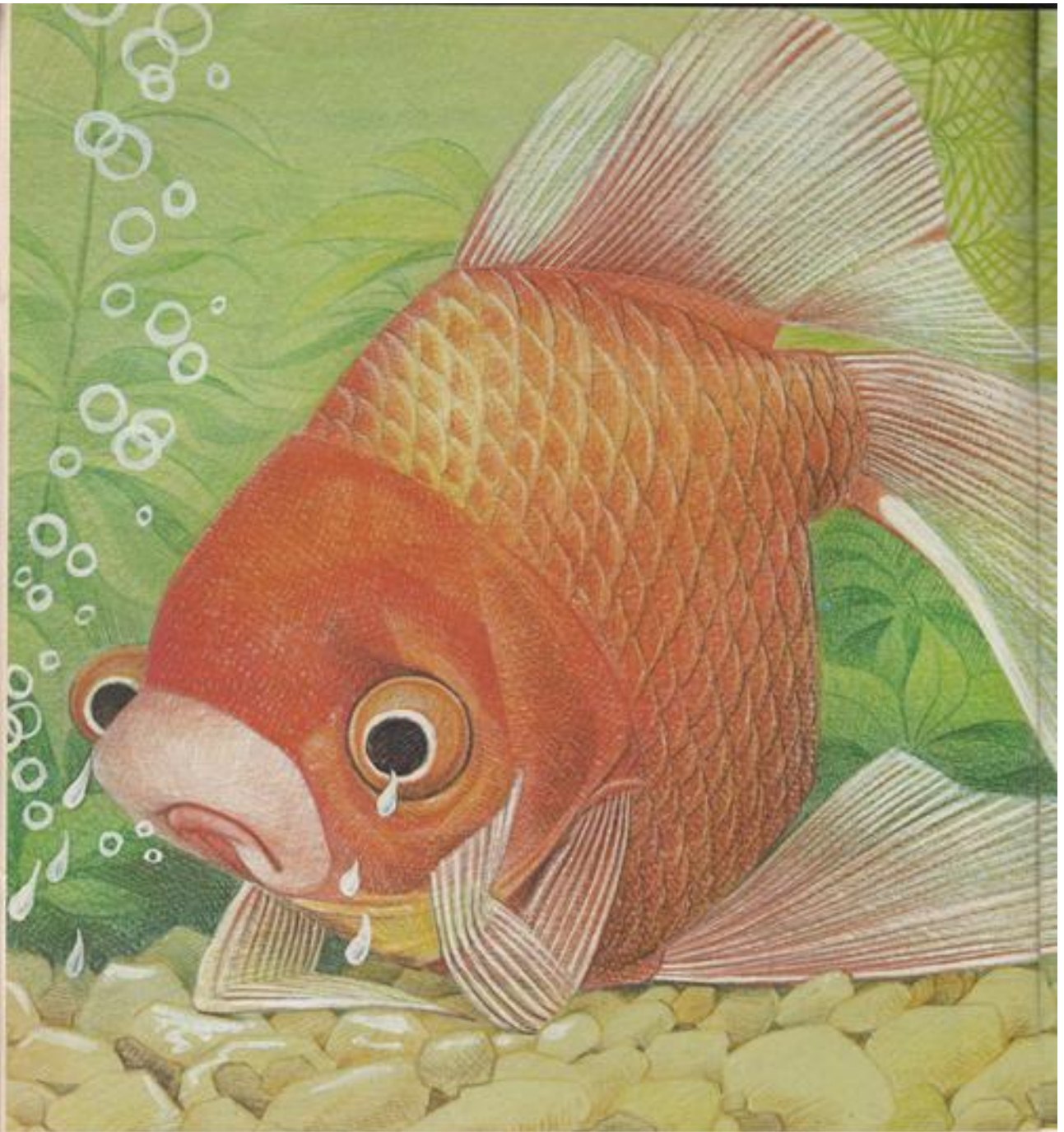
wish to move *Iris sanguicularis*, which so joyfully heralded spring in the pondside rockery, do it now as it is over, or before it starts again in September. It takes a couple of years to settle and flower well again after the disturbance of root-division.

A bed of scarlet-stemmed osier-cuttings, pressed a foot or more into soft soil among the kingcups this month, will brighten next November's

gloom. Rub off unwanted lower buds to form a "head" from which scarlet rods will shoot away. A multitude of golden *Salix* shrubs or trees likewise colour their young rods to greet a tired commuter's return home when the sun is low. Before their foliage come spring catkins and you can select for those with yellow or red anthers, or the purple anthers of small Chinese *rhederiana*.

OSCAR





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omesick fish.

THE plant world includes bacteria and microscopic fungi which are, of course, smaller than Wolffia. Of the higher, flowering plants, however, Wolffia is without doubt the smallest in the world.

It belongs to the family Lemnaceae, which is composed of two sub-families. These are Lemnoidae, which contains the genera Spirodela and Lemna, and Wolffioideae, which contains the single genus Wolffia.

The genus Wolffia is characterised by its round or oval shape, it is without roots, the inflorescence has no spathe and consists of a single male flower. The anther is divided into two pouches. The genus contains two sub-genera: Euowollfia and Wolffia. The first sub-genus is characterised by a more or less round form, so that the plant body can be cut into two symmetrical halves by a vertical cut. The best known of the eight species in this sub-genus is *W. velvitschii* Hegelm from tropical West Africa and the West Indies. It develops an inflorescence which has two flowers. Out of the other species, which have an inflorescence made up of one flower, one might mention, at least, *W. hyalina* (Delile) Hegelm. from Egypt and *W. repanda* Hegelm. from West Africa. *Wolffia arrhiza* belongs to the same group. Species in the sub-genus Wolffia have a more flattened-out plant body. Of the four species, *W. oblonga* (Philippi) Hegelm. from Chile and *W. gladiata* Hegelm. from Mexico, are the best known. It is important to note that flowers of the sub-genus Wolffia are so far unknown, those of the sub-genus Euowollfia are extremely rare and it is almost certain that they will not be met with in artificial conditions.

Wolffia arrhiza is the species most commonly cultivated and a note about it will be found in any book about aquaria. It is found widely in parts of Central and Southern Europe, but it is transported to Northern Germany during the spring-time migrations of water

The world's smallest representative of the higher plants

Wolffia arrhiza

by Karel Rataj
Photo by R. Zukal



A culture of *Wolffia arrhiza* at the water surface

birds, where it often reproduces extensively during the summer. It does not survive the winter in these northern climes, however, but is brought back again the following spring by the water birds. It is probable that it was first introduced into Europe in this way. Its true home is Northern and Western Africa, also extending through India to the Philippines. *W. arrhiza* has a length of 1.3 to 1.5 mm and is 1.18 to 1.27 mm broad. Its shape usually resembles small spheres lengthened on one side or it is egg-shaped. At the point where it is elongated develop new plantlets which are only 0.1 to 0.2 mm large at first, quickly grow bigger and develop further plantlets and so the whole culture

spreads like larva. It is a floating plant which is capable of growing on sufficiently moist earth and reproducing itself further. It is also able to survive periodic dry periods and its rate of growth is extremely high. *W. arrhiza* is only slightly lighter than water and floats on the surface of the water. Whenever the water is disturbed, however, it submerges and adheres to plants growing under water.

How should one regard this species as far as the aquarium is concerned? Because of its many particularities it is an interesting plant to observe. This is the most, however, one can say. In other words, it is an extremist. Either it does not grow at all in the aquarium, because it does not have the conditions which suit it or because it is consumed by fish (especially the larger live-bearers), or it grows too quickly by far so that, within a short time, out of 2 to 3 mm of vegetation hundreds of thousands of individual plants are produced which completely cover the surface of the water. It is then almost impossible to get rid of them. If one picks them up from the surface the water is disturbed, individual plants escape under water and adhere to fine-leaved plants there. From there they float back to the surface and before one knows it there are hundreds of thousands of them once again. My personal opinion is that Wolffia is a harmful and tiresome weed in the aquarium and has no place there. If one does wish to cultivate it, however, then a small all-glass tank is suitable, containing normal medium-hard water which is occasionally enriched with the usual fertilizers for domestic plants. If it reproduces successfully it can be used as an additional food item to supplement the diet of larger, adult specimens of the genera Poecilia, Xiphophorus and others. Only so much of the plant should be introduced into the tank as will be consumed within a few minutes. Everything should be eaten by the fish, down to the last remnants.

Western Atlantic Butterflyfishes

by Dr. Robert J. Goldstein

DURING the 1970s, Dr. Warren Burgess was working on his Ph.D. dissertation on the butterflyfishes, a monographic work which was subsequently published by TFH as *Butterflyfishes of the World*. During the same period, I was at work on a book on the angelfishes and butterflyfishes of the world, a work which has never been published although completed some time ago. I have previously published excerpts from that work, in part because my conclusions don't always agree with those of Dr. Burgess and it seemed a good idea to allow people to draw their own conclusions from our different sets of observations and the different weights we apply to those in common.

In this article, I would like to discuss the western Atlantic butterflyfishes: *Chaetodon capistratus*, *C. ocellatus*, *C. striatus*, *C. sedentarius*, *Prognathodes aculeatus*, *P. (Bauchotia) aya*, and *P. (B.) guyanensis*. While I concluded that *Prognathodes* was a valid genus, and *Bauchotia* a subgenus of that genus, Burgess concluded that *Prognathodes* was a subgenus of *Chaetodon*, and *Bauchotia* a synonym of *Prognathodes*. To see how I have organized the Chaetodontidae, let us look at the following key to the genera.

Key to the Genera of Chaetodontidae

- 1A Snout markedly produced, often tubular.....2
1B Snout neither markedly produced nor tubular.....3

- 2A Dorsal spines 9, body with vertical bands.....*Chelmon*
2B Dorsal spines 11, body with vertical bands.....*Chelmonops*
2C Dorsal spines 12 or 13, body unbanded, soft anal with large, black spot, upper half of head black.....*Forcipiger*
2D Dorsal spines 13, body banded or unbanded, soft anal without large, black spot, upper half of head not distinctly black.....*Prognathodes*
3A Dorsal spines greatly produced, head often with horny protuberances.....*Hemichromis*
3B Dorsal spines not greatly produced, head profile smooth or regular.....4
4A Teeth reduced or absent.....*Coradion*
4B Teeth well-developed.....5
5A Dorsal spines about 6.....*Parachaetodon*
5B Dorsal spines more than 9.....6
6A Body scales small, more than 60 in the lateral series.....*Hemitaurichthys*
6B Body scales large or of mixed sizes, less than 60 in a lateral series.....*Chaetodon*
Note that, although I have placed *Prognathodes* in a separate but equal genus alongside *Chaetodon*, the key presented is merely a tool for quick identification, and should not be construed as a taxonomic argument! In fact, *Chaetodon* has appeared in scientific literature in many guises. Some of the names which I consider synonyms of *Chaetodon* Linnaeus, 1758 are: *Chaetodon* Artedi, 1738 (nonbino-

mial), *Tetragonopterus* Klein, 1744 (nonbinomial), *Chaetodon* Linnaeus, 1758 (as applied to angelfishes), *Chaetodon* in the sense of Cuvier, 1829, *Rabdophorus* (= *Rhabdophorus*) Swainson, 1839, *Citharaedus* (= *Citharaedus*) Kaup, 1860, *Linophora* Kaup, 1860, *Sarothrodus* Gill, 1862, *Tholichthys* Gunther, 1868, *Tetragonopterus* in the sense of Bleeker, 1877, *Chaetodontops* Bleeker, 1877, *Hemichaetodon* Bleeker, 1877, *Lepidochaetodon* Bleeker, 1877, *Gonochaetodon* Bleeker, 1877, *Oxychaetodon* Bleeker, 1877, and *Anisochaetodon* Klunzinger, 1884.

The variety and abundance of names indicate groups or clusters of species that had certain characteristics in common. Indeed, several of these groups are retained today as subgenera in my system as well as in those of other writers. However, subgeneric categories, in my opinion, should represent convenient ways of dealing with these fishes, rather than phylogenetic relationships. In my view, the work done on these fishes to date precludes placing great weight on relationships based on these superficial similarities. I am relying largely on work of Nalbant (1971), as well as very old works of Jordan and Evermann (1898) and Jordan and Fowler (1903). Burgess has presented a different scheme, and I refer readers to his outline on pages 107-111 of *Butterflyfishes of the World*. Also see his page 306 and following for synonymies of *Chaetodon*, which are more extensive than my own and which reflect a different organization of the family than the one I arrived at independently.

With these remarks on taxonomy out of the way, I would like to go on to discuss something of the habitat and behaviour of these fishes, relying on pictures or brief descriptions rather than extensive measurement data for the benefit of the aquarist (who usually has little taxonomic interest).

The four species of *Chaetodon* are generally found in relatively

shallow continental shelf waters of the United States and countries to the south. *Chaetodon sedentarius* has often been described as a deep-water member of the genus, which is not quite true. Rather, *C. sedentarius* does occur in water as deep as 100 meters while several related butterflyfishes do not, yet it also occurs in very shallow water of the surge zone (especially young ones), just as do the juveniles of *C. ocellatus*, *C. striatus* and *C. capistratus*. In short, workers have traditionally found it deeper than other species in the Bahamas and Gulf of Mexico (the fringe of its range), but it is more typically a shallow water form just like its near relatives. Unlike some of its relatives, it has a narrow range, occurring not much beyond the Caribbean and West Indies, and not extending with any great frequency to the south, although strays are found just about everywhere one looks! I have found *C. sedentarius* juveniles to be the most common butterflyfish in the surge zone of the Florida Keys during certain periods, perhaps reflecting its ability to cope with poorly overgrown substrata and a limited food supply.

Chaetodon striatus appears to be far more demanding in its requirements. This banded butterflyfish tends to occur in areas of live coral or, especially, live vegetation and tends to remain just outside the surge zone where the water is quieter and the food supply more regularly distributed. It is very widespread, having been reported from southern Brazil to New Jersey, and across the Atlantic off the coast of West Africa. The juveniles are fairly common in the Bahamas, and distinguished by a black dorsal spot. I have noted, however, that half-grown and adult fish are far more readily found in the Bahamas and West Indies than the juveniles, and that juveniles of this species are rather uncommon in shallow, US waters that host other butterflyfishes in the summertime. Thus, one is likely to run across grown *C. striatus* with some frequency, but the young will be less numerous

than young of related species, if not altogether absent. The fish is more fussy in its eating habits in aquaria than other American butterflyfishes, but this might reflect their aversion to strong currents. I would suggest keeping them in rather quiet aquaria in pairs (the way I have seen adults in nature) and with considerable algal growth or live bottom, and only very small fishes as tankmates. *C. striatus* tend to roam over a large territory and when a pair is seen in one area, it is unlikely that a second pair will

1. *Chaetodon capistratus*, the four-eye butterflyfish. Specimen collected from the Outer Banks of North Carolina, August 1982 by the author. The water was turbid, salinity 0.016, shallow (0.5 meter), cold (70s °F), and the bottom was an old sea wall overgrown with oyster shells (mostly dead). At this locality, butterflyfishes were fairly common

2. *Chaetodon ocellatus*, the spotfin butterflyfish. Collected the same time and place as No. 1. 2





3. *Chaetodon sedentarius*, the reef butterflyfish, collected by the author in rubble in the Florida Keys (depth, about 1 meter or less). The bottom was characterized by cinder blocks, siltation and occasional patches of grass

be in the vicinity. I cannot sex them, and so suggest that you look for fish associating in the dealer's aquarium. You might begin with a group of small ones, but be prepared to separate those that do not pair as they grow larger. These fish do enjoy refuge in stinging coral, and I would keep a pair of grown or half-grown fish in an aquarium of at least 70 gallons, with no more than half a dozen other small fish as tankmates (perhaps gobies and blennies).

Chaetodon ocellatus is probably the most northerly ranging of the American butterflyfishes. There are areas in New York City where juveniles may be found in late summer in, if not great numbers, then numbers sufficient to cause no surprise to ichthyologists. It is also the most common butterflyfish at Tortugas, Florida, west of the Florida Keys. It has been reported from Brazil to Cape Cod, but its centre of abundance is the Caribbean region and the northern Gulf of Mexico. It commonly occurs in pairs or small groups, and is frequent over bare or dead

bottom, unlike *C. striatus*. It is also tolerant of low salinity. I have collected this fish in late summer on a rubble-oyster shell strewn inlet on the Outer Banks of North Carolina, where the salinity was low, and the water rather cold and

4. *Chaetodon striatus*, the banded butterflyfish. An aquarium specimen. This is the only shallow water butterflyfish of the western Atlantic with a black and white pattern. Those colours are usually reserved for deepwater forms



5. *Prognathodes aculeatus*, the long-snout butterflyfish. The American Fisheries Society now accepts *Chaetodon* for this genus, following Burgess



8. *Prognathodes guyanensis*, the Guyanan bank butterflyfish is quite rare. *Prognathodes aya* is quite similar

murky with suspended sediment. Sponges were abundant, but not algae or hydroids. A variety of tiny crustaceans were the principal food source in the area.

Chaetodon capistratus is probably the most common of the Bahamian butterflyfishes, and is also common as far north as North Carolina. I have found it to far outnumber other butterflyfishes in all the waters where I have collected, and that may indicate its current status and abundance more accurately than the old report that indicated a Tortugas dominance for *C. ocellatus* (an old report, and stocks do vary over time).

It has often been written (sometimes by me!) that *C. ocellatus* and *C. capistratus* are found in northern areas in late summer because they are carried northward with the Gulf Stream from the Bahamas and then blown inshore by the September and October storms that develop far out at sea and then rush up the Atlantic coast. I no longer believe any of that gibberish.

The new gibberish in which I believe is based on new information. First, there is an offshore tropical reef fauna extending on the edge of the Continental Shelf as far north as North Carolina. That fauna is based on rocky outcrops overgrown with sponges, rather than coral rock overgrown with live coral. Here, many kinds of tropical butterflyfishes, angelfishes, wrasses and everything else lives, deep down

out of the light zone (barely), washed by the overlying Gulf Stream as it courses along the edge of the Shelf. Just outside (inshore) this zone, the water is quite cold much of the year. In late summer, the inshore waters warm sufficiently to allow the passage of Gulf Stream and tropical bottom fish inshore, where they are caught by fishermen and collectors in good numbers. Thus, every now and then a sailfish will be hooked from a fishing pier in North Carolina, and rocky shore zones will have night sergeants, butterflyfishes, angelfishes, triggerfishes and filefishes, and wrasses. These fish will die as winter sets in, if they do not migrate back out to the Shelf. While strong pelagic swimmers, like sailfish and mackerel, can make that trip and typically are migratory, the small tropical bottom-fish are non-migratory, and are killed by the first strong cold front of winter.

That the inshore fish arrive by swimming along the bottom in warm summer water seems obvious to me today. I have never found a butterflyfish or angelfish (or wrasse or serranid) in floating sargassum weed. And I have dipped up an awful lot of the stuff. Further, most of these inshore tropicals always associate with bottom structures, and it is likely that they worked their way inshore when the water was in the high 70s and low 80s (°F). I have found them when there hadn't been a storm in over a month, and the fish couldn't have come anywhere else except from immediately offshore. The fish only occur north of the middle Atlantic states much later or in smaller numbers, and may

have arrived earlier with the plankton. In this scenario, the fish are in the Gulf Stream as planktonic larvae, and the larvae work their way inshore upon metamorphosis. They can only get inshore in late summer when the water is warm enough to allow survival. The planktonic larvae may have been produced anywhere, from the Bahamas to North Carolina. In short, we don't need storms to account for the occurrence of marine tropicals on the shores of the northern part of the USA. The fish might be carried with plankton, or they might travel along the bottom to the nearest shoreline where they take up refuge. All that is required is normal summer heating of the inshore waters of the Western Atlantic.

Once in a while, *Prognathodes aculeatus* occurs in the inshore waters of Florida, but apparently only rarely extends north of this area. This fish prefers deep water, tends to occur singly when grown, but forms groups when very young. It feeds on algae, crustaceans and sea urchin feet and typically ranges from Florida through the Antilles. It is very common below 130 feet, where it can feed on live sponges and corals.

Occurring from Yucatan to Cape Hatteras, *Prognathodes aya* is a fish of the deep shelf, and doesn't occur in waters where collectors work. It is replaced in the Antilles and the islands off South America by the closely related *Prognathodes guyanensis*. Both are unlikely to be seen by aquarists, and are even considered rare in ichthyological collections. Nothing is known of their food habits or behaviour beyond their depth preferences.

For further information on Atlantic butterflyfishes, the reader is urged to read Randall's *Caribbean Reef Fishes*, Burgess' *Butterflyfishes of the World*, Wall's *Fishes of the Northern Gulf of Mexico*, and Bohike and Chaplin's *Fishes of the Bahamas*. Don't worry too much about the taxonomy of the group. Twenty years from now, all of us will be regarded as wrong!

GOLD

BRITISH AQUARISTS FESTIVAL 1983

by
A. Darby

ALMOST every weekend, someone in the U.K. becomes eligible to enter for the most coveted award in the "World of Fishkeeping".

All societies holding Annual Open Shows can, by selection, apply for the *Aquarist and Pondkeeper* Gold Pin and entry form for the Champion of Champions class at the British Aquarists' Festival.



Award to winner at "Open Shows"

This Gold Plated pin, in the shape of the Aquarist badge is awarded only to the "Best Fish" in open shows and is a coveted prize in its own right. Since the inception of this award in 1967 only fifty or so societies each year have applied for the honour of presenting the prize, so one can appreciate the rarity of the award.



Award to winner of 'The Champion of Champions' contest

The Champion of Champions contest forms a part of the British Aquarists' Festival and the competing fish are judged by judges invited from all over the country.

The outright winner of the contest is awarded this splendid Hall-marked gold lapel pin, in the shape of the *Aquarist and Pondkeeper* badge, supported by Laurels and inscribed "Champion of Champions" together with a cash prize of £50 and a beautiful commemorative plaque.



The plaque is oxidised silver-plated, mounted on a handmade Indian Rosewood back, inscribed with the coveted title Champion of Champions.

Similar commemorative plaques are presented to second and third successful contestants together with cash prizes of £30 and £20 respectively.

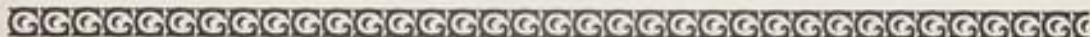
The British Aquarists' Festival of 1983 is being held at the Exhibition Halls of Belle Vue, Manchester, and will be open to the public on 5th and

6th November.

The fish are judged on the Friday and have to be benched by midnight on Thursday 3rd November.

For further details of the Awards and entry forms societies should write to the *Aquarist and Pondkeeper*.

Details of the British Aquarists' Festival can be obtained from Mr. J. U. Hall, 54a Carr Road, Calverley, Pudsey, West Yorkshire.



**GIVE THEM THE FOOD
THEY CHOOSE
FOR THEMSELVES.**

MEAT
FISH
CRUSTACEANS
LIVER
COD LIVER OIL
VITAMINS
MINERALS
PROTEINS

In their natural habitat all fish instinctively seek out the foods that are best suited to them.

And these can be as varied as the different species of fish. At Phillips we've done a great deal of research into the



eating habits and requirements of all types of tropical and cold water fish to ensure that our foods give them the balanced diet which they need to keep them active and

Press Release



Coldwater fishkeeping on the increase — foodsticks are catching on . . . !

THE coldwater side of the fishkeeping hobby is enjoying a peak in popularity at the present time. It has been estimated that in the UK alone something like one in every 15 homes keep coldwater fish (either in the house or the garden), and that this accounts for no less than 5½ million goldfish.

Since many coldwater fish are relatively undemanding with regard to water quality, this has led to a commonly held belief that they only need to be fed on foods such as dry bread, oatmeal, etc. However, the results of research at Tetra's own laboratories in West Germany have shown that even the hardy goldfish has quite precise nutritional requirements. True, many fish will survive if fed on low quality foods, but to do really well (and show good coloration, breeding success and resistance to disease), they must be fed correctly. A correct, balanced diet contains proteins, fats, carbohydrates, minerals and vitamins—all present in the correct amounts. Too much or too little

of some of these nutrients may lead to problems.

For sometime, *TetraFin* and *DoroFin* flaked foods have been available in the UK and they are undoubtedly the leading flaked foods for coldwater fish in the world today. However, it became clear that a good quality floating food for larger coldwater fish was also needed.

Many hobbyists are aware that when larger fish are fed conventional flaked or pelleted foods, small fragments of food inevitably remain uneaten in the water. This is not only wasteful but also poses a potential pollution threat. Floating pond pellets have to some extent, overcome this problem, but their nutritional value is often low. Therefore, until relatively recently, the range of high quality prepared foods available for large fish has been rather limited.

Tetra Foodsticks

FOLLOWING research at the Tetra Laboratories, along with trials at West Aquarium (Europe's largest breeder of ornamental fish), the idea of foodsticks was developed. These foodsticks are made by a special process

called *extrusion*, which results in their characteristic centimetre-long appearance. When added to the pond or aquarium they quickly absorb water, taking on the appearance and texture of earthworms (a favourite food of many larger fish). Small fish may nibble at the foodsticks and large fish simply swallow them whole. This, along with their very high level of digestibility, results in minimal waste, virtually no risk of tank or pond pollution—and a healthy, balanced diet!

Because the ingredients of the Tetra foodsticks have been carefully selected and processed, it is important to emphasize that they are highly nutritious and may be used to form a staple diet for all large fish. Since they float for many hours, they may be easily removed with a handnet if they remain uneaten.

New TetraPond Staple Foodsticks

BECAUSE of the success of foodsticks, Tetra have been forced to invest in new production methods to meet the public demand for these foods. This has resulted in the foodsticks being produced in far greater quantities and has allowed Tetra to pass on these 'economies of scale' to the hobbyist. Therefore, the new *TetraPond Staple Foodsticks* (in their attractive green drums) represent a really sensibly priced but high quality floating food for coldwater fish. Real value for money!

When dealing with coldwater fish (especially in an outdoor pond) it is important to remember that temperature has a very important affect on their appetite. Below about 10°C most pond fish will not feed to any great extent, and below 5 or 6°C they go into a form of hibernation. Thus, as temperatures rise in the spring, pond fish should be fed sparingly on good quality foods until (as temperatures rise to 15°C and above) the fish begin feeding actively. In general terms it is best to feed coldwater fish 2 or 3 times a day—but

PRESS RELEASE

only with as much food as is consumed in a few minutes. There is no reason why, during a mild winter spell, pond fish should not be given a light feeding.

New *TetraPond Staple Foodsticks* are available in one, three and (super-economy) six litre sealed drums and

are suitable for all coldwater fish. Tetra also produce:

TetraPond DoroFin Foodsticks for large goldfish and koi, available in 500ml sealed drums.

DoroMin Foodsticks for all large tropical fish (including marines), available in 170gm, 340gm and economy 1,010gm sealed drums and,

ReptoMin Foodsticks for terrapins, aquatic frogs and newts available in

30gm and 150gm sealed containers.

Technical enquiries or for free advice on any aspect of fishkeeping, contact Dr Christopher Andrews at the *Tetra Information Centre*, 15 Newlay Lane Place, Leeds LS13 2BB (Telephone: 0532-555980). Please note that information leaflets on correct feeding, coldwater aquarium fishkeeping and garden ponds are also available from the *Tetra Information Centre*.



Killifish Identity

As a member of the British Killifish Association, I feel I must write to you reference the article in the October "Aquarist" entitled "Two African Killifish" written by Rudolf Zukal. It does contain a certain amount of error.

In the first part entitled *N. orthanotus*, which comes from the Mozambique, it states that it was formerly known as *N. guentheri*. This is not true, *N. guentheri* is a quite different fish from Zanzibar. Reference T.F.H. Book KW 083 "Nothobranchius" Pages 55 & 56. It is thought that there may be a connection between *N. orthanotus* and *N. kuuana*, which both come from Mozambique. Also the photo which is titled *N. orthanotus* is, in fact, *N. guentheri*.

With reference to the section on *N. palmapuiri*, the incubation period of the eggs is given as 4-6 weeks. According to all the reference works I have read, and my own experience the actual time is nearer 12 weeks. I feel that if this is not corrected any aquarist new to this type of fish, and trying to breed them, would be put off when they tried to hatch the eggs after 4-6 weeks without success.

A. BRUCE, Wymondham, Norfolk.

American Killifish

I was delighted to read Anthony C. Tereira's article on four species of *Fundulus* and I found the illustrations second to none. For some years I have taken an interest in fishes from North America and because of this I have taken the trouble and expense of visiting that part of the world to catch my own specimens. One of the four species, *Fundulus diaphanus diaphanus*, I caught with almost monotonous frequency in the lakes, streams and ponds of New Jersey. This species is very common, certainly in the aforementioned State where considerable areas of its habitat are frozen over during the winter months.

Of all the coldwater species of fish I have personally kept this is certainly one of the most hardy, having a temperature range from freezing to the middle eighties; indeed, a closely related killifish mentioned in your article, *F. heteroclitus* has a fatality "ceiling" of 93°F! Mr. Tereira states that *F. diaphanus* is subjected to considerable fluctuations in temperature in the wild; this indeed is very true and I have found the conditions I have been able to provide have been much to its liking. Each year I can guarantee a successful spawning in the breeding troughs I have established in my back garden. In each of two troughs there is a heavy growth of aquatic plants with a sand base in one and a peat base in the other. The plants are varied; in the first trough there is a mixture of *Lagarosiphon major*, *Egeria densa* and *Ceratophyllum demersum* and in the second *Elodea canadensis* and a *Potamogeton* species introduced from the wild. In both troughs the spawning is successful. The fishes remain in

these troughs all the year round and despite the heavy icing of last winter there were few fatalities.

The troughs are quite small, measuring five feet in length, two feet wide and one foot deep. On the subject of aquaria: it is essential they are not heated. Adequately high temperature readings will register during the summer in natural sunlight provided the tank is situated near a window facing east or west. Obviously a careful watch should be kept over the parent fishes during breeding because of their cannibalistic tendencies; one pregnant female only lays about fifty eggs.

I have no problems regarding the feeding of this species; the fishes in the outside troughs are self-contained. There is usually an abundance of mayfly larvae, bloodworms and water fleas throughout the spring and summer. Of those I keep indoors only the ones kept in community aquaria will eat dry food; they take the hint from the other species, as it were.

It is unfortunate that these interesting North American killifishes are not on the open market. For the dedicated fishkeeper with sufficient enthusiasm and money it means a short holiday in the United States of America in order to obtain them. In New Jersey alone *F. diaphanus*, *F. heteroclitus*, *F. majalis*, *Cyprinodon variegatus* and *Lucania parva* are quite common. I don't know the present position on import licenses, however; a temporary import license was easy to obtain four years ago but because of the unfortunately successful introduction of alien species, particularly from North America, there could well be severe restrictions.

V. B. HUNT, Widley, Nr. Portsmouth.



SPOTLIGHT

THE most characteristic external features of the hatchet fishes or freshwater flying fishes, to which group of characoids the above species belongs, are the pancake-thin body, with a highly dilated chest and abdominal region (near circular in outline and housing powerful muscles that activate the upward-directed and wing-like pectoral fins), and a back that forms a straight or nearly straight line as far as the caudal peduncle where it takes a slight dip. In this indentation is placed the narrow-based dorsal fin. This fin is roughly in line with about the middle of the long-based anal fin, that terminates at the tail base. The ventral fins are, in general, insignificant or rudimentary. The forked caudal fin is of normal proportions. There is a small adipose fin, not present in all species of hatchet fishes, situated near the root of the tail.

G. sternicla, popularly known as the common hatchet fish (an epithet it shares with the similar looking *G. levis* from the lower Amazon), is native to many parts of the Amazon and its tributary streams. It attains a length of about 2½ in. The ground colour is yellowish to yellowish green overlaid with a sort of burnished leaden silver, darker on the back than the sides and underparts. Pin pricks of shining silver add a most attractive lustre to the flanks, more especially when the fish moves to and fro in a well-illuminated tank. A bluish stripe runs from the hinder edge of the upper gill-opening to the root of the tail. This stripe is margined above and below with paler blue or greenish yellow bands. In the main, the fins are colourless, though the dorsal fin is often adorned with a dark leading edge.

In common with all hatchet

THE COMMON HATCHET FISH by Jack Hems

*Gasteropelecus
sternicla*

Photograph: A. van den Nieuwenhuizen

fishes, *G. sternicla* is a surface-frequenting species. There it gulps in various living creatures of swallowable size. Indeed, the cleft of the toothed mouth, which opens upwards, is ideally formed for taking prey; gnats, *daphnia* and myriad aquatic larvae.

G. sternicla swims in schools and congregates not only in well-vegetated areas near the banks but in open water. To escape imagined or genuine danger (sudden death is an ever-present hazard in waters rich in predators), a school of *G. sternicla* will leap from its natural environment in a javelin-nosed brilliance of sparkling lights and may not dive into the water again until some 5 to 9 ft. or more has been put between the fish and the reason for their alarm. Their instant 'take off' is accomplished by rapid beatings of the pectoral fins and vigorous thrashing movements of the tail and caudal lobes. *G. sternicla* do not soar much above water level but glide or skim rather than 'fly' just above it. Their aerial excursions are carried out at great speed. Indeed, the pectoral fins plus the tail and caudal appendages provide quite extraordinary propulsive power.

To return to food. As has been mentioned earlier on, the natural food of *G. sternicla* (and other hatchet fishes) is made up of aquatic larvae, winged insects, and so on. In the aquarium, however,

the fish is easily satisfied with such things as tiny worms (nematodes), placed on a floating leaf or piece of expanded polystyrene, concussed houseflies (not touched by chemical spray), fruit flies, flake food, etc.

Any food not taken by *G. sternicla* will be eaten by fishes swimming in the lower levels of the water; for the common hatchet fish is essentially a peaceable species and well-suited to living in a community tank with other fishes as inoffensive as itself. (Incidentally, the smaller catfishes make ideal floor cleaners).

The aquarium to house *G. sternicla* (always keep them in trios or more) should be long rather than wide or very tall. It is of paramount importance to keep the tank properly covered—and never leave it uncovered while you are not attending to the occupants or apparatus used for maintaining it; for hatchet fishes do go in for sudden leaps. A temperature in the mid to upper seventies (°F) suits them well.

Breeding of hatchet fishes is not a common occurrence in the home aquarium, though a few species have obliged. Invariably, there is a preliminary chase about the aquarium—the male the driver. This is followed by spawning in feathery- or lacey-leaved plants. Sexing is a matter of observing body contours combined with the experienced aquarist's intuition: a female is sturdier in the body than a male, and a roe-filled female shows, naturally enough, swollen sides.

G. sternicla has been around in tropical aquarist circles (in Europe, at any rate) since 1912. It was certainly well-known in tropical fish keeping circles in the U.S.A. in the early 1930s—if not earlier. It was described for science by Linné (Linnaeus) in 1758.

THE GULF COAST TOAD

Bufo valliceps



by
**Christopher
Mattison**

THE Gulf Coast Toad is an attractive, medium-sized (3-4 in. average) species from the United States' big bend region—southern Texas and Louisiana. Although it is a common species, it is not often imported, which is a great shame because, like many species of toads, this one is easily maintained and long-lived in captivity. Its ground colour ranges from off-white, through yellow to brick-red and its back has two large triangular areas of darker pigmentation as well as a characteristic dark band which runs from the tympanum (ear-drum) to the groin. In common with several other American

toads, a number of bony ridges occur between the eyes and along the upper jaw.

In nature, the Gulf Coast Toad may be found in a variety of habitats: beaches, prairies, waste ground in and around towns etc., and its vivarium may be arranged in several ways. The best substrate is probably leaf-mould, which should be friable and not too wet. Sheets of moss, bark, flat stones, broken plant pots and so on may be added for effect, although the toads will probably spend most of their time buried in the leaf-mould with just their heads showing, lying in wait for prey. They will eat almost any invertebrate of suitable size: crickets, grasshoppers and spiders appear to be the most popular with my pair, but earthworms, flies and mealworms would doubtless be quite acceptable. Like

most toads, their appetites are invariably hearty.

The male (illustrated) can usually be recognised by his yellowish throat, that of the female being plain white. In addition, females grow quite a bit larger than males, particularly in girth. The male's call consists of a series of short croaks, repeated every few seconds, but although calling may occur frequently, breeding in captivity would seem to be unlikely unless a large area, such as a greenhouse or garden frame, is available.

A temperature of around 23°C should be maintained during the summer, but this may be allowed to fall slightly during the night. In winter, the toads can be hibernated if required by keeping them at a constant 6-8°C in a container of moist (not wet) leaf-mould or chopped sphagnum.



of the Aquarium

Algae Eaters

THERE is quite a range of organisms which incorporate algae as part of their diet. Among these are many species of aquatic snails, Mollies (*Poecilia spp.*), the Kissing Gourami (*Helostoma temminckii*) and many species of Cichlids. Various Crayfish species, such as the Louisiana Red Swamp Crayfish (*Procambarus clarkii*), are particularly avid filamentous algae eaters. They are very effective at clearing a tank of these normally troublesome algae but they also have the unfortunate habit of eating the other, decorative, plants as well.

Within the aquarium, most of these organisms have been used at one time or other to control the excessive growth of algae, with varying degrees of success. However, the most effective

species of all are the Sucking Loach (*Gyrinocheilus aymonieri*), also known as the Chinese Algae Eater, and the different species of Plecostomus Catfish.

The Sucking Loach is a bottom dweller with an underslung, sucker-like mouth which it uses to attach itself to rocks, plants or (in the aquarium) the sides of the tank. It also has a most interesting adaptation which allows it to attach itself to objects, eat and breathe all at the same time. This is a small aperture situated just above each gill cover which makes it possible for the fish to draw water into the gill chamber without having to release its hold. The Sucking Loach comes from Thailand. Therefore, the common name, Chinese Algae Eater, is a misnomer in the true sense of the word.

There has been (and still is), considerable confusion over the correct

scientific naming of the Plecostomus Cat. It is often referred to in the literature as *Plecostomus* which, written in this form, gives the name the status of a genus. It will be found in this form in a number of books whereas in others, it is referred to as *Hypostomus plecostomus*. In this form, the word "plecostomus" is written in the lower case and given species status. As far as the hobbyist is concerned, the word "Plecostomus" can be regarded as a collective term referring to a number of similar-looking fishes whose main claims to fame are their unusual (some would say, ugly) shape and their algae-eating habits.



Sucking Loach

Boxfishes



Long-horned Cowfish

Boxfishes, or Trunkfishes, belong to the Family Ostraciontidae. Despite their relatively high price, all species are much sought after by marine hobbyists because of their unusual body shape and the ease with which they become tame and 'respond' to their owners. However, Boxfishes should be treated with caution since some are far from easy to maintain in peak condition, can grow to a considerable

size—50 cm (20 in.) in the case of *Lactoria*—and have a tendency to produce highly toxic substances when alarmed or moribund. These substances can be lethal, not only to the other tank occupants, but also to the Boxfishes themselves.

When buying these fish, it is, therefore, always wise to check for evidence of the emission of toxic substances once the specimens have been bagged. If there are any bubbles on the surface of the water, then the poisons (which are secreted as a "foam") have been released. However, since the fish require some time to "re-stock" themselves, any risk of poisoning can be easily avoided by merely changing the water in the bag.

Despite this obvious difficulty, Boxfishes are worthy of serious consideration as aquarium fish. Not only do they endear themselves by the ease with which they become used to their owners, but also by their unique way of swimming which has often been referred to as comical or quaint. This effect is brought about by the restrictions enforced on the fish by their hard, inflexible body armour which, obviously, does not allow them to swim in the normal way. Instead, they use all their unpaired fins for propulsion, balance themselves with their pectoral fins and steer by means of the caudal fin which is extremely manoeuvrable.

The three most common species imported (all Indo-Pacific) are:

- | | |
|----------------------------|-----------------------------------|
| <i>Lactoria cornuta</i> | — Long-horned Cowfish |
| <i>Ostracion meleagris</i> | — Spotted Boxfish |
| <i>Tetraodon gibbosus</i> | — Thornback or Hovercraft Boxfish |

Anabantids

Anabantids have long been popular as aquarium fish. One of these, the Paradise Fish (*Macropodus opercularis*), was among the very first 'tropical' imports, not particularly because of its beauty but, rather, because of its hardiness, being reportedly capable of withstanding freezing temperatures. This claim is probably a bit too ambitious, but not excessively so.

The Anabantids belong to four separate Families of the Suborder Anabantoidei. Members of this Suborder are characterised by the possession of a modified accessory respiratory organ usually referred to as the Labyrinth. It is formed from one of the structures which, in other fishes, is a functional part of the gill apparatus. This organ allows Anabantids to take in atmospheric air at the water surface thus allowing them to survive in oxygen-deficient waters where other fish would either suffer or die. In fact, some species have become so dependent on the Labyrinth that

they will actually drown if prevented from surfacing.

Many Anabantid males build a bubble nest at the water surface into which they deposit the fertilised eggs after spawning. Spawning itself usually consists of an elaborate series of displays and spawning embraces under the nest. The eggs are usually lighter than water and, therefore, float into the undersurface of the nest of their own accord. This process is aided by the males which retrieve any eggs that go astray.



Colisa labiosa (male)

Family I—Anabantidae

This family consists of 3 genera, with about 40 species. Included among these are *Anabas testudineus* (the Climb-

ing Perch), *Ctenopoma* species, and *Sandelia* species.

Family II—Belontiidae

Most of the Gouramis as well as the Paradise and Fighting Fishes belong to this family which consists of 10 genera with about 28 species. These are:

Belontia species
Macropodus species
Trichopodus species
Malpulatta kreteri
Parosphromenus leissneri
Betta species
Colisa species
Trichogaster species
Sphaerichthys ophromenoides
Parasphaerichthys

Family III—Helostomatidae

This family consists of a single genus and species, *Helostoma temminckii*, the Kissing Gourami.

Family IV—Osphronemidae

Again, this family has a single genus and species, *Osphronemus goramy*, the Giant Gourami.

Barbs



Adult pair of *Puntius filamentosus*

Barbs belong to the Family Cyprinidae which also includes the Carps and Minnows. Much confusion has existed in the past, and still does today, concerning the naming of the various Barb species. This is hardly surprising when one considers how widely distributed these fish are. They are found throughout most of Africa, Sri Lanka, Europe, India, China, Indonesia and a sizeable part of Asia. They also form a very variable "group" in terms of

size, coloration and behaviour. Some of the large species such as the European Barbel (*B. barbus*) can weigh as much as 14 lbs. (over 6 Kg). However, the Barbel itself is dwarfed by the real giants, the Mahseers of India. One of these, *Barbus tor*, can, reportedly, grow to 9 ft. (2.7m) in length. At the other extreme, the majority of aquarium species rarely exceed 3 in. (7cm).

Repeated attempts have been made over the years to rationalise the classification of the Barbs. The result of this activity has invariably been a greater or lesser degree of confusion. One of the most influential and, in some ways, misleading of the classifications was that of Schultz who suggested that three genera of Barbs could be recognised according to the number of barbels they possessed.

Barbodes spp.—species with four barbels
Capoeta spp.—species with two barbels
Puntius spp.—species lacking barbels

However, these differences are not as clear-cut as they may seem at first sight. It has since been found that the number of barbels is not constant

with a species. Further, even individual broods from a single breeding pair can show variation in the number of barbels.

A major revision is currently being carried out at the British Museum (Natural History) in London which will, no doubt, considerably clarify the present confused state of affairs. Until this survey is completed, perhaps the best advice would be to maintain the status quo and accept the fact that four generic names may be variously used by authors when referring to Barbs. These names are: *Barbodes*, *Barbus*, *Capoeta* and *Puntius*.



Barbus tetrazona

Book Review

by
Jack Hems



Coldwater Aquarium plants

By W. Vivian De Thabrew

Published by Thornhill Press, Cheltenham. £8.95.

There has been great need for a really informative book on plants for the coldwater aquarium and garden pond and it seems as if this one is the answer. It is ideally presented and each species dealt with is illustrated by line drawings and photographs in black and white. The author, a Fellow of the Linnean Society, has spent a lot of time since he left the Royal College of Colombo and, later, the University of London, observing, collecting and studying aquatic plants in various parts of the world, including Britain. Besides all this, he has held important posts in horticulture, librarianship, teaching and training (among other things).

In his latest book, the second in a series of three (the first being *Popular Tropical Aquarium Plants*, which was favourably noticed in this magazine

in December 1981), Dr. Thabrew has selected some sixty different species which he has found well-suited to the garden pond or home aquarium kept at sitting-room temperature. Dr. Thabrew covers everything the interested reader should or ought to know about the plants he has picked out for attention such as the correct planting medium, temperature, chemistry and depth of water and, most importantly, the quantity and quality of light.

It is interesting to note that, *Potamogeton crispus*, commonly found in many of our still and running waters, may be grown indoors—even during the summer months—provided the overhead light is strong and for a long-day period: an essential for all native water plants tried indoors. *P. pectinatus*, the fennel-leaved pondweed, is about as easy to grow as its congener, that is in warmish water; but most of our native aquatics require the water cold—at least not above the 50°F except during the warm days of summer, when they will stand a temperature

slightly higher.

If our native aquatic species can learn to adapt themselves to a gradual change of temperature, it is almost certain that not a few of them do not take kindly to an abrupt change in the chemistry of the water. For instance, *Potamogeton natans* requires hard and alkaline water, with a DH of 9 up to about 22. In general, the nitellas demand almost identical conditions. On the other hand, *Pilodaria globulifera* will soon waste away unless given soft and acid water.

Towards the end of the book, the reader will find *A Quick Reference Chart*. This is most commendable; for it lists each species mentioned in the text in alphabetical order, with its temperature range, water and light requirements, and planting medium. There is an updated and well-chosen bibliography and a good index. All in all, the author and publisher are to be complimented on producing such a useful and instructive addition to the keen water plant enthusiast's library.

NEXT MONTH

David Sands brings us face to face with **THE ARMoured CONQUERERS OF SOUTH AMERICA**. A beautifully illustrated article in full colour.

THE EMPEROR ANGELFISH. Our SPOTLIGHT will focus on this somewhat expensive but deservedly popular marine fish.

An easier way to change the water in your tank by means of a **SIMPLE SYPHON SYSTEM**.

Roy Pinks gives us some useful tips on **BREEDING COLDWATER FISH**.

MEET THE SOCIETIES next month will feature Dunfermline and District A.S. and The Anabantoid Association of Great Britain.

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WHAT IS YOUR OPINION?



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

THE CURE I mentioned last month did not appear to cure any of the fish in the affected tank. *Corydoras* and white clouds followed the dead tetras. The only survivors are four of my five little pencilfish—*Nannostomus axonotus*. The largest one, which was also the oldest, although not very old, died from the disease. I am left wondering why the four younger pencilfish survived and everything else was wiped out completely.

Recently I ordered a few new aquarium plants from Everglades. They include two African fern plants at £1.50 each. No doubt I'll have something to say about them when they arrive.

It's almost the end of January now and I've just received instructions from my editor to cut my monthly feature down to two pages to make more space for other articles and features in forthcoming issues.

The first of this month's letters was written by 16 years old Steven Woodham, of 657 Blandford Road, Upton, Poole, Dorset. Steven said that he promised to keep me informed of the progress of his fountain plant and stated that after many months of doing nothing it turned yellow and died. Recently he put peat under the gravel and hopes to try again. He hasn't been keeping any records of the life span of light bulbs but he has found that Woolworth's bulbs have been blowing rather more frequently for

some reason. He tells me that they have started putting the name 'Woolworth' instead of 'Winfield' on their bulbs and Stephen says that it is the former that has been blowing more often. He asks for the opinions of other people. (I've also noticed the change of name on the Woolworth brand bulbs. The newer ones seem to have a shorter, thicker filament than the older ones—which had a longer, thinner filament.)

Mr. M. Hurle resides at 60 Harborough Avenue, Sidcup, Kent, and he has kept white clouds—which he thinks are lovely fish—over the past few years. He says they are lively fish which remain small and occupy the surface swimming area of the tank so they make good community fish. He recommends a separate tank in which to breed them. He finds the sexes easy to distinguish: the male is narrower and more brilliantly coloured. He reminds readers that the fish can tolerate a temperature range of 40°-90°F but he finds that they flourish best between 64°-72°F and are liable to succumb to prolonged high temperatures. Mr. Hurle adds fresh water regularly, and for breeding he uses a 24in. all-glass tank with a gravel bottom planted with feathery plants such as *Cabomba*, *Myriophyllum*, etc. He says that white clouds are "naturally schooling" and therefore require plenty of swimming space, plus a temperature of 70°F, for breeding. He feeds his fish on dry flaked food, plus live food fed twice weekly; and he considers the latter important to get the fish into prime breeding condition. One male and two females are a good ratio and as the female deposits the small eggs over several days the fish should be left together in the tank until the eggs hatch—which takes several days. He has never seen the adults eat eggs or fry.

Mr. Hurle feeds the fry on the usual sequence of *infusoria*, dried fry food and a progression to small, live *Daphnia*. The fish reach maturity in about five months. He thinks that it is unfortunate that the white cloud is also known as the poor man's neon because at the age of 10 to 16 weeks the white cloud outshines the neon tetra at the same age, he feels. He has tried to

breed the fish outdoors in a small pond during the summer but he has not been as successful—perhaps because the temperature could not be as accurately controlled. He says that in any case white clouds need to be viewed from the side—and in an aquarium—for their beauty to be appreciated.

Simon Grandidge is 12 years old and his address is Lumb Grange, Lumb, Edenfield, Via Bury, Lancashire. Recently he started to keep tropical fish. He has a 36in. x 12in. x 12in. community tank in which he keeps a number of different species of gouramies. (My photographs show four species.) Simon has had some trouble with his dwarf gouramies. Recently the male made a bubble nest which it started to defend—and in the process it damaged the fins of a number of other fishes. The female fish was not ready to breed so Simon removed the bubble nest; but the male kept on fighting. Eventually he had to confine the fish in a separate tank. He also had a thick-lipped gourami that he purchased from a friend. He had seen the fish previously and it was very tame; but after the first week in its new home it started to fight and killed his Siamese fighting fish. Simon checked his reference book but could not find any information about gouramies being vicious. He has not had any trouble with his other fish so he is thinking of specialising in gouramies. Simon concludes by saying that he has learned more from the letters in this column than from any book and he will continue to read *W.Y.O.*

A week ago I borrowed a portable VHS video cassette recorder, camera and tripod to make a video film about aspects of the curriculum in the school in which I teach. I brought the units home with me several times to do some editing and, naturally, I could not resist the temptation to try to film some of my fish. The video camera (Panasonic brand—as is the VCR itself) has an automatic aperture controlled by the intensity of the ambient light. I tried a few experiments during the hours of daylight; and decided the experiment would produce better results at night. I quickly discovered that the two 40 watt tungsten bulbs over a



Dwarf gourami — *Colisa lalia*



Golden gourami — *Trichogaster trichopterus*



Pair of opaline gouramis — *Trichogaster opaline*



Pair of pearl gouramis — *Trichogaster leerii*

24in. x 12in. x 12in. tank produced a low light level and caused the 'Low Light' indicator in the camera to light up. I replaced the bulbs with two 150 watt Photofoods in the aquarium hood. These produced adequate light to film—and enough heat to make the

water surface very hot. I kept a motor filter operating to try to keep the surface water from getting too hot. The experiment worked quite well—although the microphone on the camera handle was pointless in this instance because there were no relevant sound effects, and there is no way to cut out the microphone on the model I borrowed. Obviously one could overdub a commentary or music at a later date. I must admit that a couple of minutes of video film of any one tank of fish is probably sufficient: it tends to get a little boring after that. It would be interesting to film some fish spawning—but the excessive light and heat would probably frighten the fish and terminate their breeding activities. A video tape of a collection of two-minute films of numbers of different tanks would be more appealing and interesting—possibly for a club night showing. Please drop me a line if you've tried to film your fish using video equipment.

Sadly most of my many other letters are rather long for inclusion in my two pages so I'll use one written by Master Richard Bosworth who lives at 7 Meadow Park, Irwell Vale, Ramsbottom, Bury, Lancashire. He says that since he last wrote his father discovered someone who was selling a 60in. tank for £5.00, so Richard bought it. The tank is now in his bedroom together with one 48in. and two 24in. tanks. He points out that his bedroom is getting more like a mini fish house every day. He has got his Christmas present—a 12in. kin-matsuba koi—in the large tank. The fish was bought from the 'In-filtration' stand at Belle Vue show. Richard tells me that he really enjoyed Belle Vue: it was much better than he thought it would be. He is a member of Accrington District Aquarist Society and the club did well at the show, gaining first in killifish and second and thirds in various other classes. Richard hopes to show some of his own fish next year.

Richard's fish are getting along well, although he lost a favourite angelfish recently. He has bought a silver shark, *Balanitochelus melanopterus*, which he keeps in the 48in. tropical tank in the lounge; the fish is settling in well. Master Bosworth has constructed a

device for keeping ice off his pond—because the pond contains some 6in. koi. The construction consists of four pieces of cane bent in a hump-back fashion over the width of the pond with one long piece over the length, tied to the others. They are fastened to the ground by wedging them in between stones, or by pushing them into the turf. Either way works for Richard. The whole structure is covered with two layers of polythene sheeting stretched tightly over the top to let rain water run off. The sheets are secured by putting stones on top of the sheeting at the sides. Richard has left a small opening to allow poisonous gases to escape and fresh air to enter. So far it has stopped any ice from forming on the pond. Richard recommends this method to anyone with an outdoor pond that is not very deep. A few months ago Richard began his 'O' level courses and he says it is not easy doing homework and examination revision. He expresses regret that fishkeeping now has to take second place. (It's even worse when one has to mark all those English homeworks and essays, Richard.)

In the December 1982 issue I wrote an article about disease diagnosis and water analysis. The full name and address of the company that carries out such tests were not published in my article and I've had requests for the information. The required information is: Aquality Ltd, 137 Southwood Road, New Eltham, London SE9 3QS. The telephone number is 01-850 9266.

I hope that, when you read this, I'll have been a non-smoking smoker for four years and one month. I hope my fish also appreciate my efforts. For a future issue please send me your opinions on: (a) feeding aquarium plants; (b) breeding gouramis; (c) garden ponds in spring; and (d) dealers' shops. I hope the water workers' strike will be over by the time you read this. The water from my tap is rather brown at the moment and has to be boiled before being drunk. It does not appear to have affected my fish in any way; indeed, they may well be happier in water that has not been excessively filtered, or treated with chlorine and other poisonous chemicals. What is your opinion?



Coldwater Jottings by Frank W. Orme

DURING April, and the next couple of months, many pond-owners will be visiting water garden centres or browsing through catalogues in their search for suitable specimens to plant in, and around, the water. Probably the most sought after will be the ever popular Water Lilies, for these gems of the water garden are considered by many to be more beautiful than most terrestrial plants. Their attraction lies not only in their beauty of form and texture but also in that mysterious air of peace and tranquillity which they seem to create around themselves. It is evident that the ancients appreciated this fact, for they dedicated them to their temple gods; indeed they are still employed occasionally in some parts of the Eastern-world, in some religious rites and ceremonies. Back in the mists of time the Water Lily found favour with the Pharaohs and, despite the sophistication of our present-day world, it still exercises its attraction on the modern water gardener.

Many colours

Nearly all the colours known to the flower garden are embraced in the family—from snow-white, cream and yellow to pinks, reds, crimsons, blues,

and purples. Many of them are sweet-scented; some varieties float gently upon the water surface whilst others stand well out of the water. The majority willingly reveal their beauty by blooming between the hours of sunrise and sunset, there are a few, however, that shyly restrict their shimmering glory to the moon and stars. Even the leaves show a variety of coloration, varying from dark olive green through every stage of mottling to a rich dark purple. To this magnificent plant Von Linné bestowed the title of *Nymphaea*—after the Greek goddess of the springs, *Nympha*.

Over the years horticulturists have produced many excellent hybrids of the more easily managed types, and the Americans have been amongst the foremost in this work, but none have obtained the results which were achieved by the Frenchman, Joseph Bory Latour-Marliac, during his lifetime. Although he died in 1910 without ever revealing his methods, the present day water gardener can still enjoy the legacy which he left behind; he produced such a vast number of spectacular hybrids suited to water ranging from the shallow to those of considerable depth. The Laydekeri varieties are hybrids pro-

duced by this genius, which Marliac named after his son-in-law, Maurice Laydeker. Mostly suited to shallow water, the Laydekeri group are most colourful.

The *Nymphaeas* are simple to cultivate, requiring a minimum of attention when once planted, and enhance the ornamental pond as nothing else can.

The ideal situation for the Water Lily is one which allows the plant to enjoy full sunshine, and have its roots growing in a good heavy loam. The loam should, preferably, be screened to remove all fibre, and enriched with a little well-decayed cow-manure or sterilised coarse bone meal. Sand, peat, and leaf mould should be avoided in the pool. Organic materials are likely to rot and ferment in the water, poisoning plants and fish.

Lily Baskets

Although Water Lilies can be planted into a thickish base layer of loam it is, nowadays, more usual to plant into lily-baskets. This latter method allows the baskets to be removed, when cleaning the pond and so avoids disturbing the lily roots. However, it will be necessary, periodically, to prune the tuber—to avoid it becoming cramped—and renew the loam.

Some newcomers to water gardening can be puzzled as to which way up the Lily should be planted; a simple rule of thumb is that any roots that are attached should be directed downwards. Plant very firmly—so that they will not float loose—up to the crown, and just cover with water. Leave for several days to allow the roots to take hold, then add a little more. Continue in this fashion, adding a few inches of water cover at a time, until the pond is filled. This may take a little time, but it will benefit the plant by lessening the shock of moving. The depth of the water is governed to a large extent by the varieties chosen, but it is safe to say that no *Nymphaea* should have less than 4-inches or more than 4-feet over it. Whilst, in general, a variety inten-

Coldwater Jottings

ded for deep water will grow in shallow water, those which should be grown in shallow water will not do so well if planted in water of too great a depth. Quite often it will be found that the deeper the water, the larger the blooms, but the number will be greatly reduced in comparison to what might otherwise be produced. For most varieties, however, 1-ft. to 2-ft. will prove quite adequate; it is worth remembering that the older and stiller the water the more luxuriant the growth is likely to be, therefore disturb the plant as little as possible. The *Nymphaea* dislikes fountains and undue water currents from waterfalls, and, where possible, the Lily should be positioned away from these effects.

Probably the most favourable time to transplant Water Lilies is during May or June, when the plants are just starting vigorous growth. Before planting it is most advisable to thoroughly clean, and sterilize, the plant to avoid the introduction of any undesirable to the pond—adequate care and time spent in this regard could avoid future problems.

Varieties for all depths

Most water garden catalogues will list many varieties of the Water Lily, together with details of the recommended water depth, and the choice should be governed by the situation which it will eventually occupy. Amongst those varieties which have stood the test of time, and remained ever popular to the present-day are the following: *N. odorata*

minor is a very fragrant white variety; one of the finest yellow varieties is *N. marliacea chromastella* which produces primrose-yellow flowers, and grows very freely. Possibly the finest dark red is "Escarboucle"; it grows quickly, producing very large flowers in abundance. *N. marliacea carnea* and *N. marliacea rosea* are two old favourites, producing flesh and rose-pink flowers respectively. *N. marliacea albidula* is a white form. "James Brydon" is a *Nymphaea* of distinctive colouring. It bears large, deep rose-crimson flowers with broad petals slightly incurving, forming a beautiful cup-shaped bloom. It is a variety which prefers plenty of room. Ideally suited to the average small pond of the town garden is *N. laydeckeri purpurata*; it produces an abundance of flowers—sometimes displaying as many as thirty blooms at once on an established plant. The flowers, which are not large, are wine-red with a scarlet centre.

For those who like novelties there are two pygmy varieties which will grow in a container of 8-inches or so deep and about 12-inches across. Place 4-in. of heavy loam and a little charcoal (to keep the water sweet) into the container and plant the *Nymphaea* in the centre. Fill with water and keep in a sunny position. The two varieties are: white-flowered *N. pygmaea alba* and the yellow-flowered *N. pygmaea helvola*. Both produce flowers that are about the size of a ten-pence piece.

When the time arrives, Water Lilies can be divided and, by cutting through the tuber, the stock increased. Each section of tuber should contain at least one eye, or growing crown, and then planted in shallow water. As the leaves develop the depth of water is gradually increased, until it has reached full depth. Plants produced in this way may take two years to reach flowering size, but will mature into

plants equal to the original.

Select with care, give the correct position and planting conditions, and this Queen of Flowers will grace the garden pond for many years—and demand little in return.

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The sixth is in CONDITION but not in TERMS

The seventh is in LAKE but not in WATER

The eighth is in BRICKS but not in MORTAR

The last is in STATION but not in PORTER

NINNIERNS

'Things they say' contributed by Graham Cox

"If toads are having any problems with traffic there are (sic) a variety of ways of helping them—including road signs".

excerpt from *Natural World*

Meet the Societies



SOUTHERN LIVEBEARERS AQUATIC GROUP



IN the mid-70s, a number of apparently unrelated events gave rise to an upsurge of interest in livebearers in UK. The main of these were several collecting trips made to Mexico by Howard Preston and some of his friends from Essex, the importation of specimens of a Goodeid species, *Ameiops splendens*, by the Ministry of Agriculture, Fisheries and Food laboratories at Lowestoft, and the showing of a number of "new" species sent over by members of the American Livebearer Association for the 1975 Newcastle Guppy and Livebearer Society Show.

As interest in livebearers grew, so did the need felt among "Southern" aquarists for some form of organisation based in this part of the country. This resulted in the formation of the Southern Livebearers Aquatic Group (SLAG) at a Livebearing Fish Open Show held by the Basingstoke A.S. on 22nd July 1978. The aims of the new society were (and still are):—

- (i) To promote the keeping, breeding and distribution of livebearing fish.
- (ii) To protect, maintain stocks and identify strains of those species at present being kept by members.
- (iii) To encourage the distribution of these species, and of any other species that come to hand.
- (iv) To record information of receipts and transfers of these fish, and also details of maintenance and breeding for the benefit of all members.

Since its inception, SLAG has attempted to bring as many "new" species as possible into the hobby. This has been achieved by collecting trips made by members and through organised exchanges between the society and its counterparts in America (A.L.A.) and West Germany (D.G.L.Z.). Links have also been established with the British Museum (Natural History) and ichthyologists in this country and abroad.

Although the original idea was for SLAG to be a "Southern" society, the level of interest shown nationwide, together with the ever-increasing number of species being imported, led to the formation of a number of Area Groups

NAILSEA AND DISTRICT AQUARIST SOCIETY



WITHOUT doubt, the backbone of any club is the small nucleus of people who volunteer (some would say, rashly!) for positions as club officers and committee members at the inaugural meeting and are then prepared to put in the time, effort and dedication required over the years to get things properly organised to keep the club afloat. The Nailsea and District A.S. is fortunate in having several such members who joined at the start, in 1973, and are still going strong. Of course, "new blood" also comes in regularly to maintain the flow of fresh ideas which are so vital for a club's survival.

In their efforts to attract new members, the committee organise a wide range of activities which bring the society to the notice of the public. They do this by mounting displays at Flower Shows, setting up and maintaining aquaria in local pubs, the Nailsea Health Centre and Nailsea Public Library. These activities are being expanded to include displays at the local Crafts & Leisure Activities Exhibition, Clevedon Comprehensive School, the local Keymarket Superstore and the Portishead Flower Show. In addition, a major exhibition is planned during May to celebrate the society's tenth anniversary.

Since the subscription rates are low, the society requires a number of good fund raisers in order to subsidise its wide range of activities. The most successful of these, by far, is the Open Show which is held every summer. The first one was held in the inaugural year of the society and they have never looked back. The Nailsea Open Show is now regarded as the major one in the West of England and regularly attracts entries from all over the UK, West Germany, Austria and the United States. This has earned it a considerable international reputation.

Meetings are held monthly (on the fourth Tuesday of every month) at the Highcliffe Hotel in Clevedon, starting at 7.45 p.m. The accent is on informality, although prominent speakers from the fish world are also regularly invited to lecture. This year, greater membership involvement is planned by organising more discussion meetings, without neglecting an input by a quality speaker. Beginners'

in Yorkshire, Scotland, South and South West and Essex. Regular meetings are held by the Area Groups, and these include lectures, table shows, slide shows, auctions and discussions. The 1st SLAG International Livebearer Show took place last October in Howden, North Humberside. A second one is planned for this year.

SLAG also has a quarterly magazine and distributes slides to members with the aim of building up a comprehensive collection of the livebearers kept in UK.

Subscription Rates:—

Single Membership £5.00. Family Membership £7.50
Junior Membership £2.50. Senior Citizens £2.50.

Apply to:—

Mr. Colin Taylor (Treasurer), 96 Rustenburg Street,
Newbridge Road, Hull, Humberside. Tel. (0482) 797251.



Newly born *Ameca splendens*

evenings are being planned for the near future where anyone may attend, free of charge, to learn about the basics of fishkeeping. In-house competitions in the form of Table Shows and "Home Aquaria" are also run regularly.

The main aim of the society is "to promote interest and study of all aquatic life."

Subscription Rates:—Single Membership £2.00. Family Membership £3.00. Junior Membership £1.00 (under 14 years). Senior Citizens £1.00.

Apply to:—Mr. John Walters (Treasurer), 24 Friendship Road, Nailsea, Nr. Bristol, Avon. Tel. (0272) 854353.



Dwarf Gourami — the Nailsea logo

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TRADE ENQUIRIES INVITED



The Pygmy CATFISH

by
F. J. & J. P. Juliatti

THE Corydoras catfishes comprise a group of droll and delightful fishes which for many years have endeared themselves to aquarists. The owner of a single show tank will usually include one or two to act as scavengers and there is no doubt that in many instances they have saved the other aquarium occupants from their owners' over enthusiastic feeding.

The smallest common member of the genus, the pygmy catfish, *Corydoras pygmaeus* (Knaack) deserves far greater popularity than it currently enjoys, for it has several advantages over its larger and more ponderous cousins.

Basically the little fish, which seldom exceeds an inch in length, has a greyish green back and a bright silver belly. A black stripe runs from the eye and terminates in a spear shape in the caudal fin where it is surrounded by a narrow creamy white band.

For many years the fish was shown in text books as *Corydoras hastatus* (Eigenmann & Eigenmann) and then the taxonomists had one of their controversies which, while probably important to them, are the despair of the aquarist. At one stage it was suggested that the fish was not even a *Corydoras* but should be classified as a *Microdoras*.

The current situation is that *hastatus* is shown as an almost identical fish varying only slightly in its markings. From the aquarist's point of view the two species can be treated identically.

Both are shoaling fishes and unlike the other *Corydoras* species spend a lot of their time in midwater where they tend to hang with a rapid vibratory motion for a while before darting rapidly, as a shoal, to another position. Like all *Corydoras* they make the occasional frantic dash to the surface for a gulp of air. They also have the

disconcerting habit of perching on horizontal leaves where they resemble mischievous sparrows. Although they are excellent scavengers, because of their habit and small size, they do not stir up the mulm on the bottom of the tank to anything like the same extent as the larger *Corydoras*, and since a shoal of about six fish is only about the body weight equivalent of one *C. aeneus*, their advantage in the show tank is obvious. They are also much less prone to hide away in dark corners than the larger species and a small group is usually fairly obvious in even a well planted aquarium.

We have found them relatively easy to breed and the procedure we have used is as follows:

About six or eight fish, approximately half each of males and females, are introduced into an 18 in. x 10 in. x 10 in. tank containing 8-9 inches of West London tap water (pH 7.2-7.3; hardness about 400 ppm) which has been aged for a few days. The bottom of the tank is covered with a thin layer of dark gravel. The tank should be heavily planted with broad leaved plants such as *vallisneria* or *cryptocoryne* and the temperature maintained at 78-80°F. Illumination should not be too high. A 40 Watt filament lamp at a distance of about 7 in from the top of the tank is adequate. We use a foam filter of the UNO or Tetra type with a fairly slow throughput. Feeding should be tubifex with occasional feeds of dry food.

When spawning starts the female can be seen swimming about with an egg clasped in her ventral fins looking for a suitable site to place it. It is said that the female takes some of the male's milt into her mouth and applies it to the site on which the egg is to be attached. The eggs, which are transparent and about 1½ mm in diameter appear singly all over the tank on every conceivable flat surface. Sometimes only one female will spawn, sometimes two or even three simultaneously. Each female will lay about fifty eggs and it is our experience that about ten per cent will be infertile and will turn milky fairly quickly.

Eyes can be seen in the eggs after about twenty-four hours and they hatch after five to six days, depending

on temperature, and are free swimming about twenty-four hours later. The fry are about three millimetres long, very thin and transparent with two or three tiny black dots along the body. Although the parent fish do not touch fry or eggs, the baby fish are incredibly well camouflaged and we have found them difficult to rear because of the difficulty of establishing just how many there are and if they are feeding well. For this reason we have taken to removing the eggs from the spawning tank to a separate small container containing some of the water. The eggs are rather tough and, like those of some killifishes, easily handled with reasonable care. Only fertile eggs are transferred and hatching of these is nearly one hundred per cent. The parents will normally spawn again in three or four weeks in the original tank.

After hatching, the fry can be transferred to another aquarium which has the bottom covered with a fine light sand so that they can be more easily observed. Light aeration is desirable. We have also introduced them into aquaria containing hatchlings of similar sized fry which prefer to eat near the surface (*fighters*, *bedotia* and some killifishes). The *pygmaeus* fry will dispose of that portion of the food which falls to the bottom before it has had time to deteriorate. With a little care a nearly perfect balance of food consumption between the predominantly surface feeders and the fry can be achieved.

Initially we feed with a commercial fry food, followed after 3 days by finely ground dried food, at which stage filtration can be introduced. Growth is rapid and after about six weeks the fish should be a quarter of an inch long and the markings will have coalesced to resemble those of the parent fish.

Pygmaeus is a gentle omnivorous nicely marked fish with a happy temperament. It is as well armoured for its size as the other members of the family and can survive easily with any fish which is not large enough to swallow it whole. The price is usually fairly reasonable so it has much in its favour. With everything going for it, why is it not more popular?

NEWS...



From Aquarists' Societies

Monthly reports from Secretaries of aquarists societies for inclusion on this page should reach the Editor by 3rd of the month preceding the month of publication.

SOUTH EAST



AT the a.g.m. of South Park Aquatic (Study) Society honorary member Dave (Mac) Mackay presided and the meeting elected the following officers for 1983: Chairman, Dave Brooks, Secretary, Marguerite Dudley; Treasurer, Bob Road; Show Secretary, Lily Gray; Asst. Show Secretary, Sid Collins; Public Relations Officer, Tony Jacques. The outgoing committee made their report and the club was shown to be in a strong position in terms of both finances and membership for the new year. Tuesday 15th February was a milestone in the history of the Society when Bill Leach was made the first S.P.A.S.S. President. Following the presentation by Chairman Dave Brooks, Bill gave a very interesting and informative lecture on showing fish, and explained what a judge looks for when a fish is on the bench. He answered members questions on a variety of related aquatic topics. South Park Aquatic (Study) Society specialises in coldwater fishkeeping and meets at 8 p.m. on the third Tuesday of every month at the Wimbledon Community Centre, St. George's Road, London SW19. New members and visitors always welcome. Full details from Mrs. Marguerite Dudley, 163 South Park Road, Wimbledon, London SW19 8RX. (Tel: 01-446 5662).

AT the meeting of the Tonham Aquarists on 2nd February, a talk on Killifish was given by Mr. R. Norris. There was also a table show. Results: Class 20: 1 and 2, R. Cooke. Class 5: 1, J. Orley; 2, M. Birch. A.O.V.: 1 and 3, M. Martin; 2, R. Cooke, Judg. S. Norris. At a meeting on 17th February, Mr. Mervin Strange of Basingstoke A.S. gave a very interesting talk on fishkeeping. Table show was judged by Mark Mitchell. Results: Class K-O: 1, 2 and 3, R. Cooke. A.O.V.: 1, A. Orley; 2, D. Berrit. The society meets at the Victoria Hall, Ash Hill Road, Ash, on the 1st and 3rd Thursday of each month. New members are very welcome and details can be obtained on Aldershot 310862.

A REMINDER that the New South-Eastern Section of the British Koi Keepers' Society is thriving and expanding at a tremendous rate. Meetings are held every third Sunday in the month at Badgers Mount Cafe (plenty of parking) on the A21 between Badgers Mount and Bromley, starting at 2.30 p.m., when knowledge is pooled, advice given to new members and either a film, lecture or slides are always on the agenda. A Koi show is planned for Sunday, 15th May and several Koi-orientated excursions throughout the year. Further information may be obtained from Membership Secretary, Chris Ball (tel: 01-497 5087). Meeting dates for the remainder of 1983 are: 20th March, 17th April, 15th May (Closed Show), 19th June, 17th July, 21st August, 18th September, 16th October, 20th November, 18th December.

DESPITE arctic weather conditions outside, Tropical Fish Keeping was the subject of a Quiz devised by Chairman Bob Spoores for the February meeting of the East Kent

Aquatic Study Group. Twenty-nine members braved the elements to attend the meeting which was held at the Memorial Hall, Bellingham, Herne Bay. The Quiz was not competitive and all the questions could be answered as either true or false. This gave the newcomers to the hobby a fifty-fifty chance of answering correctly. The Chairman then gave the members a chance to elaborate on each question and explain the reason for the answer. This proved to be a novel way of learning more about this fascinating hobby. Judges for the table show was John Gilbert. He expressed his surprise at the keenness of members who had bought their fishes along on such a cold night to enter the competition. He awarded place cards to: Clutchids: 1 and 3, T. Wehrell; 2, D. Bridgeman; 4, K. Woby. Swordtails: 1, T. Wehrell; 2, T. Matthews; 3, S. Mason; 4, S. Wehrell. Danios: 1, S. Wehrell; 2, S. Mason; 3, D. Woby; 4, T. Wehrell. Meetings are held at the above venue on the second Tuesday of each month at 7.45 p.m.

SOUTH WEST



SPEAKING to Bristol A.S. on "Conditioning Goldfish for Breeding," Jim Day said that he kept his fish cold throughout the early part of the winter and practically without food. In February he brought in selected fish and warmed them up very gradually over a period of six weeks to reach a breeding temperature of 63°F. Early in this procedure he uses a salt bath and some Malesite Green to cleanse the fish from excess mucus that had accumulated during the cold spell. He starts to condition males about fourteen days earlier than females. He believes in keeping the sexes separate before spawning. On the same subject Vic Cole said that he followed the same general routine and for preference used 2-3 year old fish, but contrary to the previous speaker found small garden worms a useful food. He placed emphasis on the care of the parent fish after spawning in that any rough treatment could cause death. If the parents were kept under optimum conditions they could spawn again in fourteen days.

MIDLANDS AND WALES



AT the a.g.m. of Cannock & District Aquatic Society on 1st March they elected a new committee: Chairman, Robert Potts; Secretary, John Brown; Treasurer, Ben Smith; Show Secretary, John Shaw; Assistant Show Secretary Andrew Potts; Minutes Secretary, Peter

Griffith; Librarian, Maureen Hall; Committee Members, D. Dunn, J. Shorthouse, F. Smith, A. Rogers, and J. Gough. They are still meeting at Edward Street Working Men's Club, and are arranging talks on fishkeeping at future meetings. Any people interested please contact John Brown, 18 Pembroke House, Leamore, Walsall, West Midlands WS3 2AP.

A NEW CLUB, Black Country Aquarists, is holding its meetings on the first Tuesday of the month at the Woodside Community Centre, Highgate Road, Holly Hill, Dudley at 7.30 p.m. New members welcome. Reduced fees for the under 16s and O.A.P.s free. Further details can be obtained from the Chairman, Mr. D. Horner, 7 Ellows Road, Lower Gornal. (Tel: Sedgley 72456) or the Secretary, Mrs. C. Greenall, 23 Chichester Avenue, The Berches, Netherton, Dudley, West Midlands.

EAST



AT a time when some of the aquatic societies are struggling in East Anglia, St. Edmundsbury & District A.S. has outgrown its previous headquarters and has now moved to a larger room at the Ripley House Hotel, Northgate Avenue, Bury St. Edmunds. They meet alternate Thursday evenings at 8.00 p.m.

NORTH



ONCE again the weather was kind for the monthly meeting of West Yorkshire Marine Aquarist Group allowing some 18 members to attend. The first item on the agenda was the report from Secretary Steve Preston on the current affairs. Some discussion took place on a proposed visit to "Nancy Aquarium," but it was regrettably decided there was insufficient support to make it economical. This was followed by two films, "Deep Blue World" and "Looking at Rock Pools." The former was not really an aquarist film, although all the subjects were marine fish, it was more an exercise on photography and editing. The second film however, was of interest to most of the members and was an ideal introduction to their next meeting, a talk by Mr Richard Sykes on Native Marinas.

OFFICERS elected for 1983 to the Long Eaton A.S. Chairman, Mr. P. J. Simpkins; Secretary, Mrs. P. J. Simpkins, 47 Pinfold Lane, Stapleford; Treasurer, Mr. D. Reynolds; Show Secretary, Mr. D. Burton, 21 Lancaster Avenue, Stapleford.

Dates for the diary

A monthly information column to keep you up to date on forthcoming events.

APRIL

- 2nd April: MALVERN & DISTRICT A.S.** 10th open show at Christ Church Hall, St. Barnabas Green, Malvern. 1st place trophies as well as perpetual trophies. Enquiries to: Show Secretary, S. K. Yallop, 3 Moorlands, Yarkhill, Ledbury, Herefordshire. HR9 7TX. (Tel: Trunsept 562).
- 3rd April:** The Norwich Section of the **BRITISH KOI KEEPERS' SOCIETY** monthly meeting in Bradwell at the home of T. D. Battersby. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.
- 3rd April: ROTHWELL A.S.** 3rd annual open show at the Backburn Hall, Marsh Street, Rothwell, N. Leeds. Details and schedules from the Show Secretary, Mr. G. Dighton, 46 Sandy Hook Avenue, Rothwell, Leeds LS26 9EL. (Tel: Leeds 624555).
- 7th April: KINGSTON & DISTRICT** Bring and Buy session at Raynes Park Methodist Church Hall, Worpole Road, Raynes Park, S.W.20.
- 10th April: TAUNTON & DISTRICT A.S.** open show at the Taunton Youth and Community Centre, Tangier, Taunton. Schedules from Mr. E. Cooper, 14 Rochester Road, Taunton TA2 7LD.
- 10th April: BISHOP AUCKLAND A.S.** open show at the Bishop Barington Upper School, Woodhouse Lane, Bishop Auckland. Booking 12—until 2 p.m. and judging at 2.15 p.m.
- 10th April: KETTERING TROPICAL FISH CLUB** (late Aquarist Society) annual open show at the Boys School, Windmill Avenue, Kettering. Show schedules are available from the Show Secretary, Chris Wright, Ashtree Cottage, Church Street, Woodford, Northants. (Tel: Thrapston 2943).
- 17th April: KIRKCALDY A.S.** annual open show at Balwain High School, Balwain Gardens, Kirkcaldy. Schedules from A. Little, 38 Ivanhoe Drive, Glenrothes, Fife.
- 17th April: POCKLINGTON A.S.** 2nd open show. Contact Show Secretary, R. Sney, 55 George Street, Pocklington, York YO4 2DQ.
- 17th April: CROYDON A.S.** 52nd annual table show at the Endeavour Hall, Millford Road, Thurston Heath, London SW16. There will be 35 classes plus 2 classes for the Amphibian and Reptile section. For further details contact Mrs. A. Hurde, 34 Timberop Road, Biggin Hill, Kent. (Tel: Biggin Hill 74108).
- 24th April: YEOVIL A.S.** open show, Parish Hall, Martock, Somerset. Schedules (S.A.S. please) from T. C. Perry, 328 St. Michael's Avenue, Yeovil, Somerset BA21 4NF.
- 24th April: BRITISH CICHLID ASSOCIATION** auction, principally of cichlids, but also of books and other fish-related items, at the New Imperial Hotel, Temple Street, Birmingham (near New Street station), commencing at 12.00. Further details can be obtained from Ian Sellick, 14 Kingsley Road, Bewlsey BS6 6AF, on receipt of a stamped addressed envelope.

24th April: MERSEYSIDE A.S. open show at the Rainhill Village Hall, Rainhill, Lancashire.

24th April: KING'S LYNN A.S. open show at the Corn Exchange, King's Lynn. Schedules from D. Rye, Field End Close, Gaywood, King's Lynn.

MAY

- 1st May:** The Norwich Section of the **BRITISH KOI KEEPERS' SOCIETY** monthly meeting in Norwich at the home of Mr. C. E. Page. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.
- 1st May: HULL A.S.** open show at the Shire Hall, Howden. Booking 12 noon to 2.00 p.m., judging 2.00 p.m. Show Secretary, G. Andrews, 4 Church Mount, Sprotbury, Hull HU11 4PW.
- 1st May: WHITBY & DISTRICT A.S.** open show at the Spa Pavilion, Whitby. Schedules are available from Mr. G. Taylor, 28 Renswick Avenue, Whitby, North Yorkshire.
- 1st May: STRETFORD & DISTRICT A.S.** open show at Hunsbury Park Community Centre, Hunsbury Lane, Stratford. Booking 12 noon to 2.00 p.m. Further information with S.A.S. to Mr. G. Hoey, Show Secretary, 12 Kingswood Road, Monks, Botes, Manchester.
- 7th May: NORTH AVON A.S.** open show at The Hanham Folk Centre, High Street, Hanham, Bristol. Schedules from Show Secretary, Mrs. K. M. Gadd, 17 Braddon Avenue, Little Stoke, Bristol BS12 6EH. This is a change of date.
- 8th May: I. & E. A.S.** show day at Monks Dyke High School. Booking 11.00 to 13.00; judging 13.15. If any clubs have plaques or cups belonging to the Louth & District A.S. would they please return them to Secretary, J. Johnson, 17 Florence Wright Avenue, Louth, Lincs. LN1 1BE.
- 8th May: BOURNEMOUTH A.S.** annual open show at Kinross Community Centre, Feltham Park, Kingston, Bournemouth. Show schedules available from 1st April from Show Secretary, Jack Jeffrey, 13a Woodland Avenue, Bournemouth BH5 2DJ, Dorset. (S.A.S. would be appreciated).
- 8th May: MACCLESFIELD A.S.** are staging their annual open show.
- 8th May: THROCKLEY A.S.** 4th open show at the Grange Centre, Throckley. Booking 11—1.15 p.m. Video film for children at 2.30 p.m. Schedules (S.A.S. please) from Show Secretary, Mrs. D. Lakey, 57 Hawley Crescent, Throckley, Newcastle on Tyne NE15 9PX. (Tel: 0632 477236).
- 14th May: SOUTHBEND, LEIGH & D.A.S.** open show at St. Clements Hall, Leigh-on-Sea, Essex. Show Secretary, D. M. Chewright, 2 Cedar Avenue, Wickford, Essex. (Tel: Wickford 2531).
- 14th May: NORTH AVON A.S.** 4th open show, at the Church of the Good Shepherd, Church Hill, Kings Drive, Bishopston, Bristol. Further details from Show Secretary, Mrs. K. M. Gadd, 17, Braddon Avenue, Little Stoke, Bristol.
- 14th May: ST. EDMUNDSBURY & DISTRICT A.S.** exhibition of furnished aquaria, show exhibit, club activities stand. Open to the public 11.00—5.00 p.m. at the Guildhall, Guildhall Street, Bury St. Edmunds.
- 15th May: CORBY & DISTRICT A.S.** open show in the Festival Hall, Corby Civic Centre. Schedules from Alan Henderson, The Nook, Corby, Northants. Tel: Corby (05363) 66269.
- 15th May: BEDFORD & DISTRICT A.S.** 2nd open show at the Banyan Centre, Mile Road, Bedford. Further details from Mick Doodwood, 27B, St. Michaels Road, Bedford.
- 15th May: BLACKBURN AQUARISTS WATERLIFE SOCIETIES'** annual open show. This is a special jubilee show commemorating 25 years of fishkeeping by clubs in the town. The venue is the Windsor Hall, Northgate, Blackburn. Further details from Show Secretary, Michael Whelan, 11 Fountains Avenue, Little Harwood, Blackburn, Lancs. BB1 5RX.
- 15th May: YORK AND DISTRICT A.S.** open show at Morton Livestock Centre, York (on York to Biddlington Road). Further details from Mr. M. Fawcett, Show Secretary, 16 Scarcroft Road, York YO2 1NF.

- 21st May: BRITISH MARINE AQUARISTS ASSOCIATION** Marine Seminar at the Dewsbury Club and Institute, Gates Street, Dewsbury, commencing 10.00 a.m. Guest speakers include Dr. C. Andrews. For further details write to Mr. S. Preston, 16 Fountain Drive, Roberttown, Liversidge, West Yorkshire WF15 7PX, enclosing S.A.S.
- 22nd May: ABERDARE A.S.** first open show at Aberaman Y.M.C.A., Cardiff Road, Aberaman, Abardare. Booking between 9.30 a.m. and 12.00 p.m. For further details write to: Mr. J. Lily, 109 Daisy-Hood, Pen-y-wan, Abardare, or phone 06851 814669 or Mr. B. Ross 0685 877119.
- 22nd May: ACCRINGTON & DISTRICT A.S.** open show at New Jerusalem Church Hall, Hargreaves Street, off Manchester Road, Accrington. Details from S. Walsh, 133, Lammack Road, Blackburn, Lancs.
- 22nd May: BRIGHTON & SOUTHERN A.S.** open show to be held at the Palmer High School, Lewes Road, Brighton.
- 22nd May: WORKINGTON & DISTRICT A.S.** 4th open show at the Carnegie Arts Theatre, Workington at 2 p.m.
- 22nd May: SUTTON & DISTRICT A.S.** open show at Sutton County Primary School. Further details from Mr. R. Hay, 25 Eastfield Place, Sutton-in-Craven, Nr. Knaights, West Yorks.
- 25th May: DROITWICH A.S.** first open show at the Salway Village Hall, Copcut Lane, Nr. Droitwich, Worcs. Booking 10.30 a.m. to 2.00 p.m. Schedules from Show Secretary, 47 Oakleigh Rd., Droitwich, Worcs. WR9 0RF.

JUNE

- 4th June: SWINDON A.S.** open show at Park South Community Centre, Cranmore Avenue, Swindon. 1st place trophies as well as perpetual trophies. Show Secretary, Mr. C. E. Curtis, 78 Beech Avenue, Swindon, Wilt. (Tel: 0793 32920).
- 8th June 1982: SUDBURY A.S.** 11th open show at Nassen High School, Quaston Street, Nausden, NW10. Further details from Barry Witteridge (tel: 01-904 0818).
- 8th June:** The Norwich Section of the **BRITISH KOI KEEPERS' SOCIETY** monthly meeting in Norwich at the home of J. R. Beane. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.
- 8th June: MID-SUSSEX A.S.** open show to be held at Sydney West Sports Centre, Leylands Road, Burgess Hill.
- 8th June: ARBROATH A.S.** open show in the Community Centre, Marketgate, Arbroath. Details from Show Manager, John Steven, 35 Breckie Road, Arbroath.
- 15th June: NAILSEA & DISTRICT A.S.** open show at the Clevedon Community Centre. Details from Show Secretary, Mr. M. J. Black, 7, Burroughs Close, Nailsea, Bristol. (Tel: Nailsea 854158).
- 15th June: LLANTWIT MAJOR A.S.** open show at the School Hall, Ham Lane, Llantwit Major, South Glamorgan. Further details from the Secretary, Mr. J. Baker, 79 Bishopwood, Brackla, Bridgend, Mid. Glam. (Tel: Bridgend 66258).
- 12th June: NORTHWICH & DISTRICT A.S.** open show at Hartford High School, Greenbank Lane, Chester Road, Northwich, Cheshire, details from Show Secretary, D. Valentine, 43, Hartford Road, Devenham, Northwich, Cheshire. (Tel: Northwich 6624).
- 12th June: DUNMOW & DISTRICT A.S.** open show at the Foskes Hall, High Street, Dunmow, Essex.
- 18th June: CORRINGHAM & DISTRICT A.S.** closed show, run in conjunction with a fishkeeping exhibition open to the public.
- 18th June: EAST DULWICH A.S.** open show at Paisley Community Hall, Stophord Road, Walsworth, London SE17. Enquiries to: Mrs. D. L. Windsor, Show Secretary, 32 Eddystone Road, Brockley, London SE4 2DE.
- 18th June: Basingstoke & DISTRICT A.S.** 25th open show at the Carnival Hall, Basingstoke. Schedules from Show Secretary, M. Strange, 10 Loddon Court, Neville Close, Basingstoke. (Tel: Bas. 67039).
- 25th June: TONGHAM AQUARISTS** open show. For schedules and information contact Show Secretary, Mark Mitchell, 12 Ash Church Road, Ash, Aldershot, Hants.

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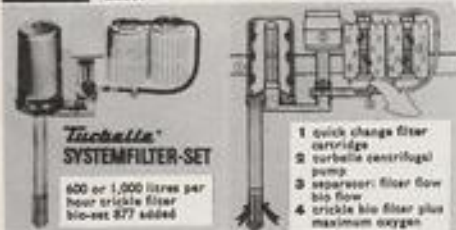
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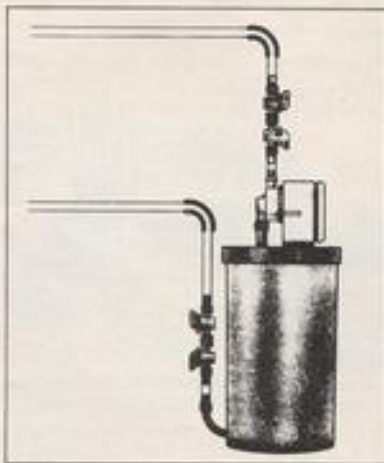
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The firms listed are wholesalers or retailers or both in fishes, tanks, plants, appliances and accessories, reptiles and amphibians. Abbreviations: W.—Wholesale only. R.—Retail only. WR.—Wholesale and Retail. C.—Coldwater. T.—Tropical. M.—Marines. P.—Plants. AA.—Appliances and accessories. B.—Books. R. & A.—Reptiles and Amphibia. E.C.D.—Early closing day.

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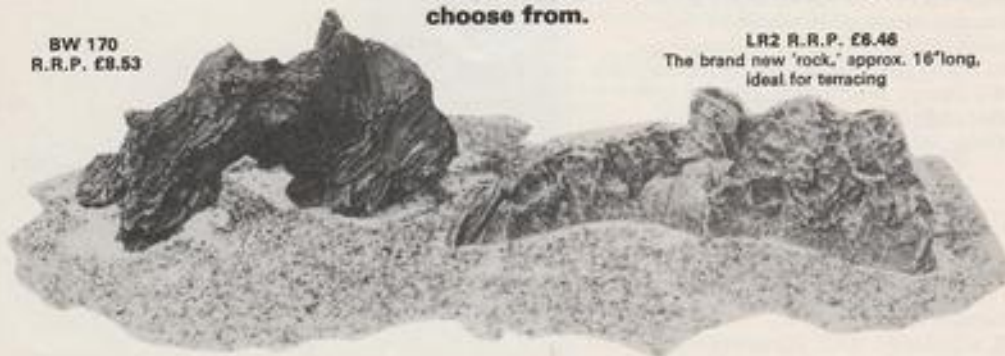
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