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AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



Patterns (colour feature)
Why fish are coloured and patterned in such variety

Spotlight on
Freshwater Sharks

FREE AQUARISTS GUIDE
and FREE
pull-out
section

THE AQUARIST AND PONDKEEPER

Britain's Leading Magazine for Fishkeeping

Published Monthly 75p

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WHAT IS YOUR OPINION?



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

I'VE JUST HAD a glance at the January 1983 issue and note that I made mention of February marking my 18th year as a contributor to *The Aquarist & Pondkeeper*. I've counted again and worked out that this is my 19th year. That's even more frightening! A photograph on page 50 of the above issue, labelled "White Cloud Mountain Minnows bred quite happily under the conditions", illustrating an article by Mr. Barry Durham, almost had me reaching for the fizzy tablets—until I decided it had been printed upside-down; and that the fish shown were not white clouds. Two of my photographs, on pages 22 and 23 of the same issue, would appear to shed some light on the problem picture. One of my prints shows a white cloud; the other shows two white clouds (upper centre) together with three pencilfish. The upside-down fish in the photograph on page 50 look as if they are pencilfish—either *Nannostomus anomalis* or *N. beckfordi*. They are certainly not white clouds—although there is a slight similarity between white clouds and a few of the smaller pencilfish. Incidentally, I note that I spelt *anomalis* incorrectly under the photograph and in the body of the text on page 23 of the named issue because I copied the spelling out of the F.B.A.S. National Booklet No. 9—*A Dictionary of Proper and Common Names of Freshwater*

Fishes, by my friend Dick Mills. Any chance of up-dating the dictionary, Dick? My 1976 version has become rather grubby from continual use. By the way, I was in my local bookshop yesterday and was pleased to discover that Dick and Dr. Gwynne Vevers—curator of The Aquarium at London Zoo—had just published a beautiful, new book called *The Practical Encyclopedia of Freshwater Tropical Aquarium Fishes*. It's published by Salamander Books and costs £8.95—which caused me to put it back on the shelf because I could not afford it so soon after Christmas.

A non-aquarist friend, bought me a copy of Gwynne Vevers' *The Mitchell Beazley pocket guide to Aquarium Fishes* as a Christmas present. This attractive, little book was published in 1980 by Mitchell Beazley Publishers Ltd., and costs £3.95. It could be useful to those wishing to identify fish—especially in public aquariums or dealers' shops—and contains an interesting selection of coloured paintings and photographs from a variety of sources.

By the way, drop me a line, please, if you can tell me the differences between *Nannostomus anomalis* and *N. beckfordi*.

Things haven't been going too well for my tetras. Recently I mentioned my search for and subsequent purchase of ten cardinal tetras. Unfortunately they contracted some bacterial infection and all of them died off quite quickly. A single cardinal and some neons developed fin rot in another tank; and it has now spread to some other members of the tetra family. Some of the tetras appear to have developed velvet disease and others fungus. I had a chat with a dealer who suggested more frequent water changes to prevent a build-up of nitrogen-based compounds. He told me that he had had no bother at all with his last batch of cardinals. He said that the water supply in his area of Belfast had a pH of about 6.4—although it was slightly alkaline on coming out of the tap because of the addition of a buffer at the treatment plant. He said that it reverted to its normal acidity quite quickly. The dealer also made the point that fish in his shop tanks get regular changes of water because water is taken from tanks

to fill customers' polythene bags, and as the level drops daily, fresh water has to be added regularly. He intends to move his marine tanks to another part of the shop soon and he will be setting up a new type of central filtration—if I've got my facts correct.

He told me about his recent trip to America and of his visits to some fish farms where the farmer may specialise in one species of fish and know little or nothing about other common species. He then told me about visits to Holland and Germany and about the high standards set there. He made the point that many British aquarists are mostly amateurs when compared to the much more professional approach in Germany.

I purchased another 10 healthy cardinals (70p each), a most attractive *Nymphoides aquatica* (banana plant) also at 70p, and a box of 10 tablets of 'Salufit', a 'Remedy Complex' made in West Germany by Vitakraft-Werke, which the dealer recommended for the treatment of my diseased fish. (Some years ago, if I recall correctly, I reviewed 'Salufit' in powder form.) It states on the front of the box: "A new formula to cure all common fish diseases." Elsewhere on the box it states: "Use 'Salufit' to completely eliminate diseases in tropical fish... 'Salufit' is effective at all times... Fish diseases are no longer a problem... No further experiment—'Salufit' assures you of healthy fish..." I think you would agree that there is little ambiguity in the claims made for this treatment. I hope it will live up to its promise and I will report my findings because I treated four tanks several days ago. The ingredients in 'Salufit' are listed on the top of the box. The list begins: "Contents: 10 grams. 200 grams 'Salufit' contains 18 20g. Extr. biol. fungi...".

I'd be interested to know what the "... Extr. biol. fungi..." in 'Salufit' is. I hope the tablets, containing the new formula, cure my ailing fish.

I placed my 10 new cardinals in the tank containing my eight young angels and pair of young clown loaches. All seem to be fit and well.

While at the dealer's I was introduced to Mr. Trevor Campbell, a young

aquarist who lives in the seaside town of Bangor, in County Down. Trevor has a large fish house at his home and has bred literally dozens of different fish. Recently he obtained his gold award. He has just added neon to his increasing list of successes. He uses only rain water collected from the roof and swears by its use. Trevor kindly invited me to visit him and photograph some of his fish. If I can find the time to do so I may feature him in a future *Meet the Aquarist* article. Trevor's interest in tropical fish has taken him up the Amazon in search of fish. We could probably all learn a lot of interesting and useful things from him.

Mr. Robert Knowles lives at 916 Warwick Road, Acocks Green, Birmingham, and he writes: "May I first begin by congratulating you on an extremely informative and highly-entertaining article. I have been keeping tropical fish since 1974, and have used Gro-Lux lighting since 1980. I found that in my 48 in. x 12 in. x 15 in. high community tank the Gro-Lux seemed to cause a dark green furry type alga to cover everything, including the plants. The only plant I managed to grow with any success was Amazon sword; but even this remained short and very bushy and in no way resembled the original plant.

"Then recently I invested in a 48 in. Truelite tube, with what the makers claim is a power twist which gives off up to 30% more light. I found that the 48 in. tube fits into my 48 in. hood with a little manipulation. The results were amazing. My *Cobomba* and giant *Vallisneria* have gone wild, with great fronds trailing across the surface. Even my *Aponogeton*-type plant, which I'd given up on, has flowered. Even the alga seems to realise that my tank is not the place to be and is gradually disappearing.

"Although the tube is very expensive—£12.60 for the 48 in.—I can recommend it to any aquarist having problems with plants.

"I'd be very interested to correspond with anyone who has kept

discus in a community tank as I have had two in a tank for three months since their own tank sprung a leak. At present they are about 2 in. long and seem to be doing better than they did on their own."

While at the dealer's shop, mentioned earlier, I asked him for his opinion of combined heater/stats using the modern wonder of the silicon chip. He did not know my own opinion and I made no attempt to influence his reply. "They haven't cracked it yet," he said, and went on to tell me about the problems he'd had with one particular brand, and how he'd lost a lot of money when customers brought back faulty units and there were problems with the manufacturer. He did mention one, single unit that had worked well; and he showed me it working away well in its tank, maintaining a temperature of 74°F on the dot. He favours the conventional bi-metallic strip thermostat and prefers separate heaters and thermostats. He sells a lot of the German-made Jaeger brand of combined heater/stats and finds them very reliable. I don't know the brand in question but would certainly buy a bi-metallic-strip-operated unit in preference to a chip-controlled one.

I've been trying out the under-tank heater sent to me by a manufacturer but I'm not yet ready to make any comment on its effectiveness; but I'm in contact with the gentleman who designed it and hope to have something to report soon.

Miss Margaret Cairns, of 17 Watts House, 105 Wornington Road, London W10 5QG, writes: "Although I have sometimes found, on checking an aquarium which has been semi-ignored for a few days, that one of the fish has vanished without trace, the answer usually appears in the shape of a small, mummified body beneath the tank, or a proud parent tending fry. It is quite unusual for several fish to disappear, at regular intervals, without my having the faintest idea of what has happened to them.

"This recently happened in a tank containing small fry—3 angels (about the size of a 1p coin), 8 or 9 dwarf gourami (1 to 1½ cm.), 5 limia

(1 to 1½ cm.), 5 albino kribi (under 1 cm.), etc. The angels went first: the two smallest vanished over a three day interval; the smallest gourami disappeared four days later: to be followed by two of his siblings and the last angel—all at intervals of three to four days. I could see no bodies and no trace of sickness; the only solution seemed to be a hidden predator (although I was rather surprised that no kribi were missing as these bottom feeding cichlids were the smallest fish). The tank was furnished with rocks, plants and a strip of cork-wood which hid the heater/thermostat and extended above the surface to partially block the second, unused hole for a light-bulb holder, in the lid. A predator could well be hidden, but the tank had been carefully cleaned and checked before the fry were moved in and, since it is on top of the stand, no other fish should have been able to jump into it.

"I stripped the tank, transferring fry, heater and thermostat to a large washing up bowl. There were no predators, no bodies and no signs of sickness affecting the transferred fish. I decided to leave these in the bowl and watch them carefully. Having sterilised the tank, rocks, gravel and wood I set up the aquarium in much the same way as before and moved in some larger, normally-coloured kribi and three slightly smaller young convicts. The kribi were 2-3 cm., while the convicts averaged 1½ cm.

"There were no losses from the bowl, but two days later I found one of the convicts in poor condition; the tank also contained a brown object floating just under the surface. I could not identify this at first: it looked like a tangle of thick roots, but bubbles clung to it in places. I eventually found it to be a large wolf spider (of the brown, furry variety) floating upside-down with its legs drawn up loosely to its body. The creature appeared dead but the fish were very wary of it—and frankly, so

was I. The body of the spider was 2-2½ cm. in length but I made no attempt to stretch out the legs and measure accurately. (Would it convince anyone if I claim I was not quite sure it was dead and did not want to risk injuring the creature further?) It was tipped from a glass onto the garden below, where it would have a chance to dry out if still living.

"The small convict seemed to be recovering, but died about 36 hours later. There was a double puncture mark just before the dorsal fin began. I had seen the same symptoms twice before: once in a goldfish which had been brought into the shop (the customer assured me that it had "been all right until a spider ran over the surface and got onto the fish's back"; I am afraid that I then assured the customer that a spider could not harm a fish) and once in a goldfish which had been sharing a very small, very clear pond with several small, healthy goldfish, one very large, drowned spider, and absolutely nothing else. I had read the facts below in the interval before seeing the second fish, but was rather diffident about suggesting a cause of death even though double puncture marks were clearly visible just above one eye.

"John Crompton, in *Life of the Spider* (Fontana Books, 1955) quotes several cases in which apparently ordinary wolf spiders have 'gone fishing'. (Only one of the cases quoted involves a web-weaving species). The most dramatic involves an American spider, ½ in. in length and weighing 14 grains, which (according to Professor E. T. Spring, who witnessed the incident and caught the creatures involved) succeeded in catching and landing a fish 3½ in. in length and weighing 66 grains. The incidents are quoted on pages 220 and 221 of *Life of the Spider*; a variety of observers is involved, all under non-experimental conditions and, since the witness frequently owned the fish, the spider was usually destroyed rather than captured. (Incidentally,

spiders cannot eat solids, but McKeown states that they regurgitate digestive fluid through the punctures made by the fangs, dissolving the meat and ingesting the resulting liquid.) All the fishing spiders on record seem to have come from America, Australia or South Africa. I do not know whether the fact that Watts House is quite near a section of Portobello Rd. market which sells exotic fruit and vegetables could lead to unusual uninvited fauna. (The block is centrally heated in winter.) The largest British spider is *T. parietina*, almost an inch in body length with legs 4 in. across. It is darkish brown with legs banded in a darker shade. *T. atrica* resembles it but is smaller and lacks striping. The spider removed from my tank was a uniform light russet brown, with a longer body than *T. parietina* and with shorter, apparently thicker legs.

"I should add that the first goldfish, the owner of which stated that it had been attacked by a spider, came from Knightsbridge. The second, which appeared to have been bitten, was in a pond in a local garden. The second goldfish and the young convict had almost identical injuries (closely spaced double puncture wounds on the upper head/back). The first goldfish showed the same symptoms as the young convict: it was lethargic, seemed in pain, but ate and showed signs of recovery before suddenly refusing food and dying a few hours later. (The symptoms resembled those noted by Fabre in insects, small mammals and birds bitten by the French *Lycosa narbonensis*, and then separated from the spider and cared for. The bite took 60 hours to kill a young sparrow, 36 hours to kill a mole.)

"I have seen one spider which might, possibly, have been fishing. I was given some newly hatched goldfish fry some 4 months after moving to Watts House and noticed that a wolf spider (of the type which has a pea-sized yellow body and very long legs) habitually hid

under the rim of the tank, with its front legs stretched out and just touching the surface. Spiders presumably drink water (since those found in the bath are usually assumed to have gone there for a drink and been unable to escape) but this spider would stay close to the water for hours. It made no aggressive move while under observation—but when one of the fry vanished, observation stopped and the spider was deported through the window.

"If the spider drowned in my tank had actually been responsible for the losses I assume that it reached the water via the cork-wood; (the body was floating beside this wood). Spiders are strong and have excellent traction, and it could easily have lifted fish larger than the lost angels and gourami when on a rough surface. (In all but one of the cases on record the spider has moved the fish well away from the water). When I stripped the tank I had half expected to find a dragonfly larva (but was puzzled by the immunity of the bottom-dwelling kribbs; these should have been the first victims had I been correct). The lighted tank had tended to attract insects during the summer; however, *Aeschna* remains larval for over a year, and even had a larva metamorphosed and gone just before I stripped the tank; what killed the convict, and why did the spider drown? Wolf spiders have no difficulty in running across the surface of still water and I have seen a large specimen 'water-ski' triumphantly on the turbulent surface of a filling bath! I cannot imagine why the spider should have entered the tank at all, unless attracted by the fish, since clean water was available in the plant-tray on the window sill, about 15cm. from the tank itself.

"Although I have now made sure that the cork-wood is completely submerged I do find it difficult to believe that the spider could really have caught and killed fish—in spite of the evidence and in spite of the books. I wonder if any other

reader has seen or heard of such incidents, or could suggest any other solution to the mystery."

Well, there is a topic that has not been raised in this feature before. I've received letters telling stories about cats and birds removing fish from outdoor ponds; but this is the first time that spiders have been accused of killing aquarium or pond fish. Please drop me a line if you've had any close encounters involving an arachnid and a fish.

I have three more bulb-life figures for collectors. A Woolworth's Winfield bulb lasted for 84 days; another for 90 days; and a Mazda Brightlight bulb takes the lead so far with a very pleasing 257 days. A recently-bought Woolworth's bulb got a quick trip back to the shop when I discovered that one of the little pins that hold it in the lamp-holder was missing. I was given a replacement without any trouble. The best I got from the replacement was a laugh. I plugged it in, and switched it on—and got a short, bright flash. The filament appeared to vaporise and a white smoke deposited a white powder over everything left inside the glass globe. I may return the bulb later if I happen to be at Woolworth's; a trip there only to get a second replacement bulb would cost more for petrol than would a new bulb from a nearer shop.

It's now the 2nd January 1983 and since beginning this column yesterday I have lost several more tetras from the affected tank. My single cardinal—a survivor from a pair; the other one of the pair got killed by two young kribensis in the bag on the way home some time ago—has died; so have all my neons; two red-eye tetras; two bleeding heart tetras; and a pair of flame tetras. The two *Corydoras* in the tank look unhappy and I expect they will follow the tetras. Ironically, the only fish left looking healthy in the tank are two white cloud mountain minnows and five *Nannostoma anomala*, i.e. pencilfish; which is just about where I began this month's column. The 'Salufit', added to the tank several days ago, would not appear to have done much so far. It's very depressing to see fish getting ill and dying despite treatment; and it's soul-destroying to lift out the corpses, with tongs, and to

flush them down the toilet. I can but hope that the *Corydoras*, white clouds and pencils may survive. My 10 new cardinals, in another tank, are looking very healthy and very beautiful. By the way, the other three tanks I treated with 'Salufit' did not appear to contain any diseased fish when I added the treatment; I was just playing safe.

No. 2 Berwick, Oxclose, Washington, Tyne & Wear, is the address of Mr. George Thompson. He writes: "Last year I visited relatives in an army station in Germany. Having heard of the superior quality of German fish, I decided to get an import licence. A year's licence can be obtained from Ministry of Agriculture, Fisheries and Food, Room 307, Block C, Government Buildings, Epsom Road, Guildford, Surrey, by obtaining an application form from this address and returning it completed with the vast amount of 25p. They ask that four weeks be allowed for clerical delays.

"So, off I set, with my import licence and pocket money. I acquired a map of the area where we were staying and a copy of the German equivalent of *Yellow Pages*—a system I use touring Britain as well. After finding they are called 'Zoo Aquariums' I plotted a tour of the local fish shops and sent the wife shopping for a full day. My tour was very enlightening and entertaining. I was very surprised to find good quality fish shops inside super markets and large chain stores. I was not too impressed with the fish, which I thought were on par with those in my local fish shops; but I was very, very impressed by the variety and quality of plants available—not marginal plants, which we are offered, but true aquatic plants which would not rot after a few weeks.

"During awkward but good-humoured chats with the shop owners I found they thought they were years behind the Dutch with plants; apparently the Dutch are world leaders with plants. There was also a feeling that Britain was way ahead of them with certain

species, especially killifish.

"I collected my fish, which consisted mainly of dwarf, South American cichlids, and a pair of impressive swordtails—the female has just dropped in excess of 170 young in one batch. I maintained them for a few days in a 24 in. aquarium at a relative's house, and then bagged them up for the journey home. One of the local shops supplied me with two polystyrene boxes and numerous bags for the purpose. I had no problems all the way through until I got to Dover. No one had told me about V.A.T. What a shock! The wife wasn't too amused either because we had to miss out on the fish suppers, greatly discussed and looked forward to, until we found a shop that accepted cheques.

"All the fish survived the journey and are doing well. Before we go back next year I want to find out about plant imports—especially V.A.T. Perhaps another reader could help."

The following letter reached me—appropriately enough—from a reader in West Germany. He is Mr. D. H. Bowen, of Am Stienor 25-3, Wollbeck, Munster 4400, West Germany, and he writes: "I had better start by introducing myself as a very dedicated and determined aquarist stranded in a foreign country reaching out in all directions for help with my fishkeeping problems. In my many attempts I have not as yet found anyone interested enough or with enough time, to answer my questions properly. I have tried a multitude of so-called experts and column writers with no success worth mentioning and therefore, after a great deal of thought and consideration, I decided the only course of action left open to me was to write you a letter and hope that even though you are not covering the subjects of my questions in your article this month you will still have a little time left over to write me a reply, or to recommend to me some society that would help me solve my problems once and for all.

"My questions are all on the subjects of the Oscar, or *Astronotus ocellatus*, a truly magnificent fish but extremely difficult to look after. Before purchasing my four boys, I gathered together as much information as I could lay my hands on. I purchased the Neal Pronek book called *Oscars* and read it from cover to cover so many times that I lost count. The result was that I considered myself well and truly ready for my fish. At the time of purchase they were ½ in. long but looked very ragged and weak; however, as they are very difficult to come by over here I bought all the Oscars the dealer had in stock. I placed them in a 25 gallon tank and proceeded to observe their activities. There were 10 of them at this stage.

"For the first couple of weeks they accepted *Daphnia*—the more the better as far as they were concerned—but they soon became bored with these. I therefore started them on minced lamb heart, which they enjoyed very much; and after another couple of weeks their size had more than doubled. I was now on my way to keeping this king of *Cichlidae*. The months ticked on and after three had passed I started them on worms from my back garden. By this time two of the fish were much larger than their brothers so I decided to eliminate six of their companions in order to give what I thought to be the best of them ample room.

"After six months I was forced to buy a 30 gallon tank and transfer the two smaller fish into it. At this time the smaller ones were approximately 2½ in. long but remarkably the other two had reached 5 in. in length. All this time the only food that was acceptable to them was good, old worms. The method I used to catch the worms was to pour a bucket of detergent and water over the grass and wait for the worms to come up. It in no way harms the grass and gives you a good supply every day. I appreciate that detergents are not good for

fish but the small amount on the worms does not harm them. In fact, if you are bothered about the detergent you can rinse the worms under running water. It's much simpler than digging up half your lawn and maybe getting nothing but backache.

"A month and a half later they are still growing well with the smaller ones about 3½ in. and the larger ones a staggering 7½ in. and still growing. First, in Pronek's book he states that Oscars attain a length of 6 in. after two-and-a-half years—page 74, paragraph 2. This to me is baffling, to say the least. Next comes something that leaves me with no explanation at all. Most of the time the two larger fish engage in jaw-locking duels, butting each other in the flanks and often not eating their food for days on end. Their duels always start with both fish turning very dark, sizing each other up, then turning negative (*sic*) in colour, and then becoming very bright. The tails of the fish frequently flutter just before the colour change. What are they up to? This behaviour, as far as I know, is not typical of either breeding or aggressive behaviour. I did suspect breeding but it has gone on for so long that I feel there should have been some other symptoms. How can they have grown so quickly and how can I get them to accept food other than worms? I am not only getting tired of continuous worm gathering but it is also getting onto winter now and they will become difficult to come by. What food do you suggest I try?

"My next question concerns the maximum size they will grow to. I suspect 8 in. at the most. The larger two fish are in a 25 gallon tank, and the smaller two in a 32 gallon tank. I find the description of the juvenile fish a little vague. What is the typical colour pattern when they are this age? Is it possible to intensify the coloration in any way when they grow older or do I have to condition the potential parent fish prior to mat-

ing? Sir, I must stop this letter now as I have probably taken up far too much of your time as it is. I am certain you will forward this letter to some society; if so make it one that will have more than a passing knowledge of Oscars. Please feel free to reply yourself and give me some answers to my questions; or, to coin a phrase, what is your opinion?" (A good many years have passed since I kept a few young Oscars for a short time. I'm not an expert so I'll leave it to some of my readers, who may be experts, to answer the more esoteric questions. I will make the point that I consider earthworms to be amongst the best and most popular foods for fish, and earthworms do not carry fish diseases. Many young animals have fun by playing together. Perhaps your Oscars are just playing. I should like to warn readers to take care not to introduce any detergent into an aquarium.)

In the December 1981 issue I published a photograph of an unidentified plant and asked if anyone could identify it. I thought I had not received any letters about the specimen; but I've just discovered one that I obviously filed and forgot. It's obviously a year old now—but it is still of interest. It was written by Mrs. Liz White, who lives at 59 Whitebridges, Hoxiton, Devon, and she stated: "With reference to the picture on page 31 (of the December 1981 issue) I believe the plant to be *Bolbitis heteroclita*. It is often sold as Java fern: in fact it was under that name that I purchased some. It is a more difficult plant but similar to *Microsorium pteropus* (Java fern). Why do I find it so hard to get the genuine article; and why the wide range of prices? The last lot I had were not Java fern but *Bolbitis* and blanket weed; for that I paid 60p postage. I now buy my plants from Myrtle Farm Aquarium. They are very reasonable and supply good, healthy plants.

"Can anyone sell me a few *Marsilea quadrifolia* (four-leafed clover), or tell me why it is so hard to find? Is it difficult to grow? I'd love to correspond with other

aquarists as we don't have a club here in Honiton any more."

I was unable to find *Bolbitis heteroclita* in any of my reference books. There is a picture of *Bolbitis handelii* in *Aquarium Plants*, by Rataj and Horeman, published by T.F.H. Publications, Inc. Ltd., 1977. I must say it does not look at all like the plant in my photograph. I now have a few small plants from the original adults. They are growing—but very slowly—and the shape of their leaves is rather different to the adult plants' leaves. I've just spent £1.00 on the latest catalogue from Everglades Aquatic Nurseries and note that they offer plants of *Bolbitis handelii* at £1.50. It's named as African fern. Postage is 75p. I note that the firm also offers *Marsilea quadrifolia* plants at 35p each. I found the four-leafed clover quite difficult to grow when I tried it some years ago. Photograph 1 shows the plant as it was as the leaves began to decay. Leaves of



Marsilea quadrifolia—four-leafed clover

Java fern can be seen in the background. I dealt with the latter plant in *Plant Profile No. 4—Java Fern*, in the December 1981 issue of *The Aquarist & Pondkeeper*. I should be pleased to have details of the conditions under which you successfully cultivate the



Hygrophila difformis—water wisteria

plant in Photograph 2—*Hygrophila difformis*, formerly known as *Synsenna triflorum* or water wisteria, if you take the spelling from page 135 of Rataj and Horeman's book, and *Synsenna triflorum* if you take it from pages 131 or 442 of the same book. The latter would appear to be the correct spelling.

Photograph 3 shows a pair of sailfin mollies, and a black molly. Please send me details of your experiences with mollies. Photograph 4 shows two young discus. Please send me details of your experiences with young or adult discus. I should also like to receive your opinions on: (a) cures; (b) Oscars; (c) cultivating *Cabomba* species; (d) breeding angelfish; (e) live foods; (f) community tanks; (g) private tanks on public display, e.g. in foyer of a building; (h) aquarium gravel; (i) costs of heating fish houses and methods used; (j) combined heater/thermostat units; and (k) how interested in our hobby are other members of your family? I hope you'll pass on to us

some of your interesting findings as a professional or amateur aquarist. Goodbye until next time.



Mollies



Young discus

"Things they say" contributed by Graham Cox

"Students who had held their Director and 15 million insects hostage for five days promised Monday that there would be no further violence in efforts to press for more money for their school".

Caracas Daily Journal

Your questions answered...

Tropical

post-mortems . . .

Can you give me some names and addresses of people who are willing to carry out post-mortem examinations of fish?

To begin with you should check out your local vets (see "Yellow Pages") and also the Biology/Zoology Departments of any local colleges and universities. They may be willing to examine fish.

The two following organisations will carry out post-mortem examinations of fish, although a fee will be requested:

Institute of Aquaculture, University of Stirling, Stirling, Scotland.
Fishcare, Plough Lodge, Rectory Lane, Ifield, Crawley, Sussex.

In each instance I strongly suggest that you make contact with the people involved to check on the preferred method of presentation of material, ascertain likely charges, etc.

crayfish . . .

Can you give me some information on the aquarium care of the freshwater European Crayfish?

The common European Crayfish is *Astacus astacus*. It requires cool (18-20°C), well aerated conditions in a tank with plenty of hiding places and some soft vegetable matter in the form of aquatic 'weeds.' Feed on tablet and pelleted fish foods, taking care to avoid overfeeding. If your local tap water is soft, you should add one or two pieces of limestone to the crayfish tank. You should be able to keep a pair of these animals in a 12-15 gallon aquarium, although they can be a little aggressive towards each other at times. The 'Collins Guide to Freshwater Fish of Britain and Europe' by Muus and Dahlstrom has an interesting section on Crayfish biology.

TROPICAL



Dr. C. Andrews

COLDWATER



Arthur Boarder

brown algae . . .

I have a 36 in. aquarium which is illuminated by two 25 watt pearly light bulbs. My tank is plagued with a brown algae—can you advise?

Assuming your tank does not receive very much natural sunlight, I would suggest that you install something like two 30 watt fluorescent tubes, or increase your tungsten wattage to around 80-100 watts. The latter may, however, add a considerable amount of heat to the tank. Without doubt, too little lighting is at the root of your problem—I have sent a *Tetra Information Leaflet* to help you solve it.

unusual catfish . . .

Can you give me some information of the porthole catfish (*Dianema longibarbis*)?

This fish is a close relative of the strip-tailed catfish (*Dianema urostrata*). Your fish comes from northern South America. It is a mid-water swimmer with no real preferences regarding water conditions. Do avoid extremes of pH and hardness though. Feed on tablet and flaked foods. Very little is known of its breeding habits.

cichlids . . .

Can you give me some information on *Tilapia mariae* and *Herotilapia multispinosa*?

Tilapia mariae is a relatively hardy West African cichlid. Provide a temperature around 26°C and avoid extremes of pH and water hardness. A large tank, with one or two tree root hiding places and caves, is vital. It may reach 15 cm and since it is a

territorial species, you should consider keeping it in a species tank—or with other similarly sized cichlids. Feed on flaked foods and some 'safe' live foods.

Herotilapia is a South American cichlid with somewhat similar tank requirements to *Tilapia mariae*. It is an avid plant eater! C.A.

Coldwater

stone loach . . .

I have a Stone Loach in a tank and have had it for a year. It is in water temperature of 72°F., and is very tame. It will come to the surface to take food. How can one sex these fishes as I would like to breed some?

The Stone Loach, (*Neomachellus barbatus*) is rather difficult to sex. In the breeding season, April to May, the female is fatter than the male which is rather smaller. The pectoral fins of the male are larger than those of the female. These fishes are sexually mature at a year old, the eggs are usually laid at night and are quite large for the size of the fish. The eggs hatch in about eight days. Your fish is living at a higher temperature than that of water in which it is found, except I presume in a hot summer.

A reader, Mr. S. Bennell, wrote to me with a query, but as he did not enclose a S.A.E. or even his address I can only hope that he will see this reply. He has an 18 x 10 x 10 inch tank and cannot keep fantails alive for more than ten months. He feeds on *Daphnia* and flake food. The fantails go off their food and lose their balance, eventually dying. He asks why and

PLANTS

Vivian De Thabrew

KOI

Hilda Allen

MARINE

Richard Sankey

DISCUS

Eberhard Schulze

Our experts are always pleased to receive your letters which should be addressed to:
Readers Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex TW8 8BN.
 All queries must be accompanied by a S.A.E.

can it be the sealant joins in the all-glass tank?

Firstly, I do not think that it is a good idea to try to keep fantails healthy, and with a chance to grow, in any tank less than 24 x 12 x 12 inches. A small tank does not allow sufficient swimming space to enable the fishes to thrive. The sealant would not be harmful. I consider that the cause of the fishes not living may be due to feeding with *Daphnia*. Unless one is sure that the water from which these crustaceans were caught was free of pests and diseases, then using this live food is very dangerous. I used some *Daphnia* from a wild pond and introduced a crop of flukes to my fry. Once was enough for me. I know that many aquarists use *Daphnia* but this does not alter my opinion. Examining the water from which I caught the *Daphnia* I found flukes, larvae of water beetles and dragon flies, tiny leeches, water-batman larvae and eggs of some I could not identify. The safest live foods are those which do not live in water such as garden worms and white worms. Maggots are also fairly safe if they are allowed to clean in bran etc., for a couple of days.

If the fish had been ill when purchased it is very unlikely that they would have lived for ten months or so. Get a larger tank and cut out the *Daphnia* and you should have no more losses.

pool for lean-to . . .

I am thinking of installing a plastic pool in a lean-to greenhouse. Will coldwater fishes be all right in it and would they breed?

The plastic pool should do well with fancy goldfish. You can get them in



Water Crowfoot

various sizes and shapes. A rectangular one would be best. It could adjoin one wall and the other sides could have ornamental plastic rock work around to improve the look. Fancy goldfish will do well as they appreciate warm water in which to spawn. The water may be too shallow for a water lily but you can get some Water Crowfoot, (*Ranunculus aquatilis*); it is ideal for a shallow pond. It has fine leaves under water but has attractive shiny leaves on the surface. It flowers with small white flowers the shape of those of buttercups.

koi in plastic pool . . .

I am thinking of getting a plastic pool about 8 x 4 ft. Can I keep Koi in it and if so how many?

Your pond will hold about thirty inches of fish but I do not think that it is suitable for keeping Koi unless they are quite small. With correct conditions they could soon grow and be too large for the pond. These fishes can reach two feet in length but only if they have sufficient swimming space. I suggest that you stock with Shubunkins instead. **A.B.**

Plants**flowering conditions . . .***Eichhornia crassipes*

I recently bought a Water Hyacinth. The dealer informed me that it should flower easily in my tank, which is 36 in. x 15 in. x 12 in. Is this true? How can I get it to flower?

The secret of getting a Water Hyacinth (*Eichhornia crassipes*) to flower lies in providing two conditions:

1. Plenty of humidity.
2. Plenty of light.

First of all you should ensure that there is a sufficient space between the water surface and the cover glass. Ideally this gap should be at least six inches, thus creating adequate humidity and space for the flower-bract to develop. Strong light should be given for about 10 hours per day. Gentle aeration only should be provided. Spray the surface of the plants or dip them in the tank momentarily daily. If the plant is at the correct stage of its life-cycle, i.e. for flowering, then it will

flower. If it does not flower this year, it should flower next summer.

creeping jenny . . .

Is *Lysimachia nummularia* suitable for planting in my coldwater tank?

Lysimachia nummularia (Creeping Jenny) is indeed suitable for your coldwater tank. It will grow well in unwashed sand, but a mixture of clay and peat will produce the best specimens and very rapid growth. Propagation is easy by cuttings, which readily root from the nodes. It requires moderate or subdued light and a winter temperature of around 50°-60°F (up to 68°F in summer), and soft, slightly acid water.

V.T.

Koi

green water . . .

During last year I made a 35,000 gallon pond (with the help of a J.C.B. excavator) and stocked it with several medium to large Koi in the expectation that they would multiply in due course. The water went very green and on advice that I needed a filter, I piped up a $\frac{1}{2}$ horse-power pump to a 500 gallon tank filled with gravel, but this had no effect whatsoever and I would like to know whether it will ever be possible to see the Koi again?

From the details of the filtration applied and the fact that your pond is totally exposed to full sun, I must say that it is extremely unlikely you will ever have clear water with your present arrangement.

I would hesitate to advise on the number of such external filter tanks and water pumps required to achieve clear water in your pond, the enormous running costs involved, and the amount of work in servicing both pond and tanks.

Some filtration, either external or under-gravel within the pond is necessary, together with a healthy return of water providing essential aeration throughout the year. Equally important is the provision of some shade from direct sunshine to inhibit the growth of algae or protect the fish

from potential damage during high summer.

Thus, when considering all the problems in your case of a very large pond it may well be a matter of returning to nature and filling at least one-third of the pond with a selection of water-lilies and oxygenators.

Unlike in the confines of small ponds these plants should thrive and serve a useful purpose in conjunction with some effective filtration.

If possible, you may be able to incorporate a large under-gravel filter in the pond of say one-quarter the surface area, using at least 2½ to 3 inch diameter pipework which may then be connected to 2 or 3 outside pumps giving a choice of flow-rates through summer and winter. You may of course consider increasing the number of filter tanks, each with its own pump to give a greater throughput of water.

Assuming your $\frac{1}{2}$ h.p. pump is rated about 3,000 gallons per hour it may in fact only be returning about 2,000 gallons per hour because of friction losses in the pipework and the positive head in feet from the pond surface up to the tank. I shudder to think what could happen when your present 500 gallon tank becomes blocked, because what you are trying to do is totally inadequate for the volume of water in your pond. It is always more practical to make a sensible Koi pond before rushing to stock with Koi. The problems arise when folk want to not only keep large Koi but to have more than a fleeting glimpse of them without first considering fully how this is made possible. Your large pond will become established and I wish you well with your Koi, but please do not expect any over-night miracles whatever you decide to do.

Marine

angler fish . . .

I have recently bought a small Angler Fish, and am having problems with the feeding of it.

None of my reference books

give any information on feeding Angler Fish. I have tried all the usual methods including Worms, Prawns, etc., but wonder whether it would be worth while trying a few small fresh water fish, e.g. Guppies. Advice about the feeding of what I find a most fascinating fish would be greatly appreciated.

Angler Fish are often very difficult to start feeding in the home aquarium. They rarely go straight onto any form of non live food. In the wild Angler fishes camouflage themselves on corals and algae-covered rockwork and when unsuspecting small fishes come along they wave a tiny piece of "bait" on the end of a "fishing rod" in the hope that their prey will mistake it for planktonic life and attempt to catch and eat it. Meanwhile the Angler Fish make absolutely no other movement. The bait is superbly positioned above the Angler Fish's mouth and as the small fish swims across the Angler fish will swallow it in one great gulp. They will quite comfortably take a fish at least half their own size, and may often not be bothered with very small fry.

In the aquarium I usually recommend that the hobbyist first tries a live fish of some sort and then eventually either live or frozen shrimps can be used as long as they are reasonably large. It is also important that the Angler Fish feels that it is doing all the correct work for its dinner, therefore it must first of all feel secure and not under attack by larger predatory fish. It should also feel that it is well camouflaged and in an ideal fishing spot. If necessary small live fish are available for feeding and subsequently small frozen fish attached to a fine piece of wire at one end can be waved around in front of the Angler fish, but it is important not to scare him. The Angler Fish is only likely to gulp dead fish if it believes that its prey is alive and proof of this will be that once convinced the Angler fish will start its own fishing technique.

As they very rarely move they do not require very much food to sustain them. Feeding just 2 or 3 times a week is usually adequate. Most of the Angler Fishes can adopt a chameleon like attitude and modify their colour

and marks to camouflage themselves into their background. They can become a very interesting item to keep in a marine aquarium. **R.S.**

Discus

no appetite . . .

I have been keeping Discus fish for six months. They are kept in the following conditions:

Tank—15 in. × 15 in. × 18 in. All Glass.

Lighting—Gro-lux 30 watt for 14 hours per day.

Filtration—Small internal power filter.

Plants—Vallis and Amazon Swords in pots, "Duckweed" on surface. No gravel on tank bottom.

Water conditions—7.5 pH, 12 DH. Temperature 86°C. Water changes every two weeks with tap water. No water conditioning attempted.

Feeding—Freeze dried tubifex, frozen bloodworms and shrimps, flake and a beefheart spinach, Bemax mixture. Occasionally live daphnia, white worms and midge larva. Feeding carried out twice daily.

The fish consist of two 5 inch Greens, one 4 inch Blue, one 3 inch Blue and one two and a half inch Brown. Of these fish the two large Green Discus seemed to have "paired off" and are non aggressive towards each other after 4 months of domination by one. This loss of domination did not apply to the other fish. The two smaller Discus fish seem to take this in their stride and continue to grow and thrive, but the 4 inch Blue Discus fish became very timid and therefore got little food and has become very thin. I have also noticed that its faeces are long, thin and white.

By reading various books, I thought that the fish might have threadworms or something similar I have treated the tank with Sterazin several times at the recommended dosage but the Discus

fish shows no change. Recently I have partitioned the tank in two so separating this fish with the two smaller ones from the two dominant larger Greens.

Some improvements were observed: i.e. the fish became less nervous but still its appetite was poor though it does eat small amounts especially live food.

My questions are:

(1) Am I making any errors in my general set-up?

(2) In the case of the Blue Discus, is my diagnosis of threadworms correct? Could you suggest a cure for this fish.

(3) Will water conditioning help with the health of the fish and will it significantly increase the chances of the two large Greens breeding? If so, what is the best way to go about it.

If you could answer these questions me and my Discus fish will be most grateful.

To comment on your set-up I can only presume that your stated tank size is a writing error since 15 × 15 × 18 seems somewhat small for all these fish. As far as lighting is concerned, Discus fish will get used very quickly to almost any intensity of overhead light and the deciding factor must always be the amount of light needed for the plants: in your case Vallisneria and Amazon Swords. I have found that these two plants do very well—even at the high water temperatures needed for the well being of the fish—if the tank is dosed with a water soluble iron based plant fertilizer like FERROGAN at 0.2 mg/l. Ferrogan will not only prevent chlorosis of plants—especially in Amazon Swords—but will also enhance the red colouration in the Discus fish. In a plant-free aquarium, the amount of light would make no difference to the fish. Discus fish often look their best without any overhead light.

Your small internal power filters seems OK; it is certainly far better than any U/G filter one so often finds in aquaria. An outside power filter, of the right size, would, of course, be a very good tool to keep your aquarium and Discus fish in a better condition. With it one could use Carbon to

remove medications, Optima to remove Nitrite, Nitrate, Uric Acid, etc, Peat to reduce the pH of the water as well as the Hardness or use something like Eheim's Substrat as a long term biological filter.

Your mixture of food should certainly keep the fish healthy but you must remember that with live Daphnia you can also introduce trouble into the aquarium and no serious Discus keeper today will take chances like this. Although all fish, including Discus fish like to chase after Daphnia, there is no real 'goodness' to be had, therefore why take chances? More Discus fish have died or became ill from dirty live food (and a little bit of a disinfectant for a few minutes will certainly not make any live food safe) than from any other cause.

Your Blue Discus fish did not become thin because of lack of food but because this fish suffered from a disease called Spironucleus. (See also *Aquarist & Pondkeeper*, November 1982 page 57). There are excellent medications available specifically to deal with Spironucleus. I see no point in using anything else.

To summarise let me say that on the whole your set-up is OK, but it could be improved with an Oxydator to stabilise the aquarium water to an ideal redox potential and with an outside power filter for the reason stated above. Your diagnosis of threadworms was not correct. To condition the water will certainly improve the chances of breeding from your Green Discus fish. Although Discus fish will spawn in hard water and sometimes even the eggs will hatch out in these conditions real success can only be guaranteed when a 'good' water supply is available. The cheapest system in the long run would be a two column deioniser with colour indicating resin to produce your own. One of the basic requirements for successful Discus fish keeping and breeding is the availability of plenty of a suitable water and in most cases this means a deionising unit.

I hope that you can save the Blue Discus fish but even more, I hope you can breed your Greens.

E.S.

A LETTER FROM THE CONSULTANT EDITOR



Dear Readers,

Vol. XLVIII, No. 1 (April 1983) will see the first of a series of major changes in the *Aquarist & Pondkeeper*. We are aiming to make the magazine more varied and appeal to a wider readership by increasing the range of subjects that we cover and giving a new look to existing ones. Some of our current regular sections will, therefore, have to be limited to a greater or lesser extent in order to create the extra editorial space required for our brand new features.

Prominent among these will be a series entitled "A to Z of the Aquarium". As the name suggests, a number of aquatic subjects connected with the various letters of the alphabet will be highlighted each month. The

format will allow those readers who may wish to file these illustrated items to cut them out without destroying or damaging any other section of the magazine. We hope that this series will ultimately develop into a form of illustrated dictionary of the hobby which readers can build up by instalments.

A second new series which will appear regularly as from April will be "Meet the Society". This is a free service that we hope to offer societies by featuring two per month, a "general" and a "specialist" one. We also hope that this will help societies nationwide to reach a wider public, thus helping them either to recruit new members or establish new contacts, both with individuals and other organizations. We would, therefore, be delighted to receive contributions from societies, large or small, new or established, for possible inclusion in the series. Don't miss this opportunity of bringing your society to the notice of the many thousands of *Aquarist & Pondkeeper* readers.

In June, we will be introducing yet another new section. This one will be aimed primarily (but not exclusively) at our younger readers. Although all the details have not yet been finalised, it is likely that this section will include letters and short articles and items from

readers of school age, plus regular, exciting competitions with valuable prizes. Therefore, whether you are five or eighteen (or more), this section is especially designed for you. We would like to know about your school projects (including 'O' and 'A' level ones); your views on the hobby, the activities which your local society runs for its younger members (competitions, outings, etc.), school visits to Public Aquaria, and so on. Have you ever wondered how a fish keeps its balance, or how it catches its food, or selects a mate, or swims, or "hears", or sees, or breathes...? Well, keep an eye on this section as from June.

Many other new features and ideas are currently being planned for the magazine and these will be introduced on a regular basis over the coming months. However, we are always open to suggestions and constructive criticism. Obviously (and for a variety of reasons), not every suggestion or idea can be implemented, but we can guarantee you that we will give every one of them serious and fair consideration. We, therefore, invite you to write in with your suggestions for improving the magazine. Tell us what you like and why as well—we all like a bit of praise from time to time!

John A. Dawes

NEXT MONTH

WESTERN ATLANTIC BUTTERFLY FISHES. Robert Goldstein discusses these fascinating creatures and compares his findings with those of Warren Burgess Ph.D, author of "Butterfly Fishes of the World" illustrated in full colour.

Our popular monthly SPOTLIGHT feature focuses on **THE COMMON HATCHET FISH.**

A FIERCE AND COLOURFUL KILLIFISH. Rudolph Zukal tells us about the nature and spawning behaviour of the genus *Aphyosemion sjoestedti*. Fully illustrated.

BUILDING AN ECONOMIC FISH HOUSE. Part 3 of this extremely helpful series of articles by Dr Peter Lewis.

AND

Two brand new regular features:

A-Z OF FISHKEEPING AND MEET THE SOCIETIES

see panel above for further details

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COMMENTARY

by
Roy Pinks

SOME time ago I promised a correspondent some advice in this column about what sort of materials may safely be used to furnish aquaria, and hope that this short review will not prove too tardy to be of interest. At the outset I should emphasise that I am not here concerned with what goes into aquaria incorporated into exhibition tableaux: these have conventions and practices all of their own, and even if they are sometimes outrageous by all other standards, at least they are temporary. Nevertheless, even if plastic water wheels and glass goblins do find their way into some of these tanks, at least the materials from which they are made will be safe in the environment of fish, and it is this aspect which concerns us.

A few guidelines are needed to emphasise what NOT to put into your tank. Perhaps the greatest temptations to the freshwater aquarists are seaside materials, from the sand itself to some of the beautiful shells found in rock pools. Whilst some specimens may be perfectly safe after proper treatment it is best to disregard items which have come from this source, and rather to look at them as

possible candidates for inclusion in marine aquaria. Even then, do remember that unless you are collecting from a proven pollution-free area, invisible toxic elements may well be present which could completely wreck an already successful tank if thoughtlessly introduced into it. Secondly, never consider any rock which is crumbly or so deeply indented that its crannies may contain harmful materials. Finally, ALL wood is suspect from the very start, and although some may be rendered safe by proper seasoning, never view new acquisitions as potential instant decoration.

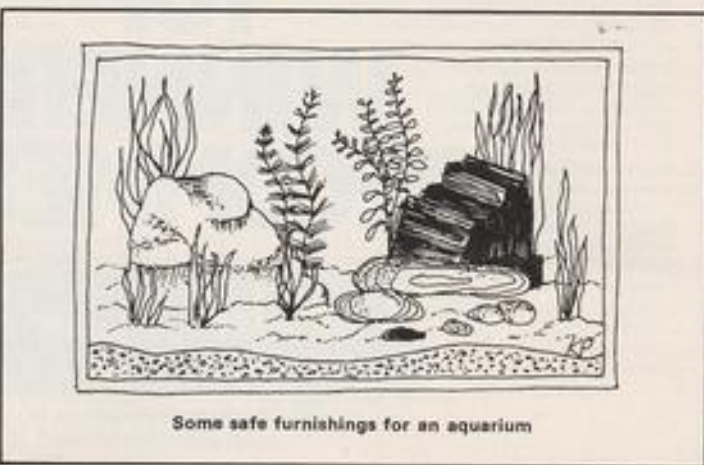
In all cases of doubt there will probably be three elements you should consider. First, latent poison is an increasing danger. This may range from absorbed detergent from some beach to agricultural weedkiller carelessly sprayed from a helicopter. So, the casual selection of wood from the countryside can prove most harmful if taken from the wrong places—and who knows which are the safe ones? The next point is whether the substances emit acids or alkalines into the tank water, and the third consideration is whether the hardness or softness of the water is affected.

There is very little you can do about the matter of poisons unless you have a friendly analytical chemist willing to help you. As to the matter of alkalinity or softness, the substances,

should be tested in water for at least a week, and then readings taken. Aim for neutral or slightly acid water, slightly soft: this will suit most types of freshwater fish. However, I must stress that a week's test is a bare minimum, and several months of soaking may be necessary in some cases. Where valuable fish are concerned—and regard ALL fish in that category—play safe.

If impatience overcomes you it is possible often to obtain an earlier reaction by boiling the material under test for an hour or so. Then subject the water to test using the standard pH or softness kits. In cases of doubt, err on the cautious side.

You may trust aquatic retailers to supply you with safe materials—very few nowadays make the mistake of retailing dangerous substances. Our native stone is so very variable, with a host of local names which few of us can recognise, let alone understand the chemical characteristics, that it is usually safest to obtain this from the retailer. However, slate is usually reliable, and so, generally, is the harder, flinty type of material you may collect: in fact, the harder, the better, with soft material falling into the reject class. Pebbles from streams are quite safe and you can often pick out nice large ones, worn by the passing flow to fascinating and agreeable shapes and shades. Hard polished



Some safe furnishings for an aquarium

COMMENTARY

coal which clearly shows stratification is also inert and if you can obtain large pieces, a highly dramatic effect can be achieved. The highly realistic man-made materials like Simlawood which emulate natural manifestations are also perfectly safe but they make for a sameness from tank to tank, somewhat soulless.

If you must have wood it should be soaked for several months in, say, a discarded sink in a corner of the

garden. Cork bark, probably one of the cheapest and best materials should also be treated this way in order to waterlog it. If it is introduced untreated it simply bobs to the surface and defeats most attempts to peg it down. An alternative is to stick a pane of glass to the lower edge of it, using silicone sealant, and to bury the glass under the tank compost.

Willow root, varying in colour from white to coral red, is usually safe enough, and it may be collected by sawing off pieces from the roots of willows which are actually growing under water or by the waterside. Quite dramatic, too, in its overall effect, this is better for coldwater

tanks than tropical ones as in the latter cases it tends to disintegrate after a few months. One of the cheapest, most decorative and easiest to manipulate materials I have used is bamboo. If you can get some of the giant types to grow in your garden (but preferably a friend's), as they spread like mad, you are home and dry. All you do is to cut off about a foot of stem and leaves and arrange this in your tank—several heads are needed for the average 2 ft. aquarium. These will stay fresh and good looking for several weeks, after which they can be replaced by a different positioning, to add even more variety to the overall look of things.

Book Review



The Complete Guide To Water Plants by Helmut Mühlberg, published by EP Publishing Ltd., Bradford Road, East Ardsley, Wakefield, West Yorkshire WF3 2JN. £6.50.

Dr. Mühlberg is a member of the Biological Society of the G.D.R. and received his doctorate in 1963. He has published a number of scientific works on morphology and systematics of grasses and aquatic plants but some of his books are for the reader who has no formal academic training.

Translated from the German by Ilse Lindsay and revised by the late Colin D. Roe, this is a well illustrated work with 109 superb colour and 112 black and white photographs. Nearly two hundred species are covered and each is described with notes on cultivation and propagation.

Much research on water plants has been conducted in Europe and in Germany particularly and the findings of both professionals and amateurs have made a major contribution to the literature on the subject. There has been considerable confusion over the names of many species and it is hoped that some of these may be clarified by the text and detailed photographs.

The opening chapters lead the reader smoothly and comfortably through the seeming labyrinth of technical terms

and descriptions and with explicit diagrams show the differences between compound pinnate and obovate leaves, for example, and variations in flower structure, etc. The author then describes the various methods of propagating aquatic plants and instructs in this respect on the nurturing of slips, cuttings, submerged shoots, rhizomes, adventitious shoots and tissues culture.

There follows a chapter on classification and then we are into the genera and species covered in the main core of the book where each species has its characteristics described along with its distribution, cultivation and propagation.

Many will derive great interest from the Explanation of Scientific Epithets section and enjoy learning that *palustris* means bog or swamp loving, that *nana* means dwarflike, *pulcherrima* — most beautiful, *crispipes* — with a thick stem and *hederaceus* — ivy like. Such is not extraneous knowledge; while we may be familiar with *Cryptocoryne lucens* and even grow it successfully, it is worthwhile knowing that the generic name stems from the Greek Kryptos (hidden) and Koryne (club, spadix) and that *lucens* means shining, glistening. Anyway, this information is here available for the taking or leaving.

Of high quality, this work of reference is modestly priced and will be a very worthwhile addition to the aquarist's bookshelf. L. E. PERKINS

THE DEVIL FISH! (or is it E.T.?)

Photographs by S. I. Misson



The subject of these photographs is owned by George, a Cypriot, who is manager of the Glenwood Hotel, Cliftonville, Margate, Kent.

We invite readers who can throw any light on the subject's identity to write to us in this connection.



CRUCIFIX FISH

With reference to the caption accompanying the photograph of the crucifix fish in the October issue of *Aquarist and Pondkeeper*, we would like to point out that this is a fish well-known to ichthyologists and others. It is the skull of a member of the *Ariidae* (a family of marine catfishes). These catfish are common in the Caribbean and in this region such skulls are decorated in the form of the crucifixion scene and sold as souvenirs which often find their way to this country. These skulls are the subject of one of our most common enquiries.

Illustrations of a decorated specimen may be found in 'The British Museum Natural History', page 73, written by Peter Whitehead and Colin Keates. Details of the iconography may be found on page 434 of 'The History of Fishes', third edition, by J. R. Norman and P. H. Greenwood.

Fish Section, JIM CHAMBERS
British Museum GORDON HOWES
(Natural History) BERNICE BREWSTER
Cromwell Road,
SW7 5BD.

COSMOPOLITAN CRASSULAS

I was interested to read Mr. Roy Pinks on the subject of an aquatic crassula (Commentary, December, 1982). The plant in question has been growing in and out of the water in my garden for many years. The family *Crassulaceae* contains 35 genera and 1,500 species (*Water plants of the World*, C. D. K. Cook and others,

Junk, The Hague, Holland, 1974). The plants are cosmopolitan and only the genus *Crassula* contains water-loving species. It seems that the crassula that not a few of us have found to do so well in our ponds or habitually moist places outdoors is none other than the *Tillaea recurva* (an outmoded name) which Miss Frances Perry describes in her classic work *Water Gardening*, first published in 1938 and still, I believe, in print after several revisions. Miss Perry states that *T. recurva* is from Australia, and suited to tropical and coldwater conditions. I have had no success with this plant in heated tanks pre- or post-World War Two. Outdoors, however, the plant just romps away in water depths of 15 in. or thereabouts and forms tangled masses of much-branching foliage at water level. Ice on the water puts an end to all its greenery; but provided the rootstock is in thick soil well below frost level, the plant has survived our hardest winters (up to now). When the cruel days of winter are over, cut out all the slimy yellow growth left lying on the mud. Within the space of a few weeks, as the sun stays longer in the sky and the temperature warms up, new growth will put in an appearance. In summer, the plant will grow out of the water and spread invasively over nearby beds. Indeed, it will establish itself well on land, and flower in and out of the water. Again, penetrating autumnal and winter frosts must be guarded against. Leafmould or granulated peat scattered over the prostrate growth will maintain life in most parts. *T. recurva*, or *C. intricata*, or *C. aquatica* (the plant needs proper botanical investigation) must have maximum bright light if it is to succeed in a room temperature (coldwater) aquarium. The plant was given to me by my old friend, Colin Roe, whose death a few years ago was a tragic loss to plantsmen interested in aquatics and pondkeepers in general. The plant used to prosper in quite shallow water on the grafted willows outskirts of Mr. Roe's fish and plant farm near Shirley, Birmingham.

JACK HEMS

PATTERNS

by Dr. Robert J. Goldstein

PART of the wonder of being a novice aquarist is discovering that fish aren't coloured the way they're supposed to be. Ask the man on the street what colour a fish is, and he'll invariably answer that they are silvery, green or something in between. And, for the most part, that is the right answer. At least, until you get into this hobby.

Fish have colours and patterns for all sorts of reasons. It's fun to explore some of them in an organized way, in order to discover those principles which can make us better aquarists. For the more you know of an animal's needs and abilities to express those needs, the more successful you will be in the husbandry of that animal, whether it be a guppy, horse or chicken.

First of all, we must distinguish "fish" as belonging to two major groups of aquatic animals, as far apart as reptiles and amphibians. These groups are the bony fishes and the cartilaginous fishes. If that's a foray into evolution, there's a point. The cartilaginous fishes (sharks, rays and skates) never developed the ability to perceive colours. That may be a bit surprising, in the light of the reasonably common occurrence of patterns (in tiger and leopard sharks and in most skates) and occasionally bright colours (in certain South American stingrays). Bony fish, on the other hand, do see colours because they have both rods and cones in their eyes. Thus, *whether a group of fishes is characterised as being coloured or being shades of gray, has nothing to do with the colours those fish can perceive.* As they say in my neighbourhood, you don't have to be one to spot one! An example of this in the

non-fish world is the excitement of bulls by bright (usually red) colours. We have an equal example in an Atlantic coast fish that many of you may know. The bluefish, *Pomatomus saltatrix*, is typically "fish-coloured" in that it tends to greenish blue above and silvery white below. It has no other colours, no spots, no markings of any kind. Yet anglers who fish for them know that a bluefish will attack anything bright red. Why? They have no enemies in nature other than bigger bluefish and sharks. They don't eat anything red. Yet red just makes them strike furiously with their slashing teeth.

This brings us to the basics of colours in fishes. There are two main categories of coloration. These are called cryptic coloration (for hiding) and signal or poster coloration (for advertising). And that makes sense. Fish either want to be seen or they don't. Aquarists sometimes mistake one for the other, as in the case of vertical bars. The reason is that in almost all the waters of the world, vertical bars are cryptic mechanisms which serve to break up the profile of the fish, so that it is not recognised as prey by a potential predator. When the bar is on the nose of the fish, it breaks the fish into two halves that are hard to put together. When on the sides, it makes the fish blend in with submerged grasses, long stems of water plants, and sunken roots. That is the case with angelfish, discus, and the salt water sheepshead, spade-fish and black drum. Further, in many Central and South American cichlids (and other fishes) it is an appeasement signal to competitors or rivals, indicating that the loser wants to go hide in the bushes. In nature, that's probably

exactly what happens; the fish runs away, vertical bands displayed, and seeks vegetation as shelter from attack.

However, because we have all been keeping Lake Malawi cichlids over the past decade, we have come to have a different interpretation of bands. We see aggressive males displaying bands when establishing and holding territories, while submissive fish that are going off to hide (such as oral-incubating females) lose their bands and get muddy coloured. Well, as with so many of the *mbuna* phenomena, we should not let those observations colour our ideas of fish in general, because they are not typical.

In the case of the *mbuna* we see the same species having the capability of both cryptic (muddy) and signal (bands) coloration, although they are reversed compared with most fishes. Many kinds of fishes don't have this capability of switching. For example, those fish which are locked into schooling as a way of life can only exist in a single coloration or pattern phase (in general). This is the case with herrings, anchovies, some of the silversides, pomfrets and other marine fishes. If they have the ability to flash a pattern or alter a colour, it is a schooling capability, where all the fish in the school simultaneously go through the same protective behaviour. The advantages of schooling are not immediately apparent to one 'schooled' as an aquarist, but it really is quite simple. If all the animals in the group act exactly and look exactly the same, then the predator is unable to focus on one individual and effectively wear it out, cut it out, or otherwise maintain concentration on that prey animal until it is taken. Every hunter knows, for example, that you'll never kill a duck or a quail by aiming into the flock. You have to pick your target in order to bring it down. This is also why wounded or parasitised school fish are often

picked out by predators, and why sick or wounded aquarium fishes are often attacked by other members of the tank. Anything weaker or different from the main pack is recognised as prey, and immediately becomes the focus of attack.

For many fishes, there is no easy shift between cryptic and poster coloration. Just as herrings are always cryptic (dark above, silvery below), many fish that hold territories (just the opposite of schooling) are always poster-coloured. Poster or signal coloration in coral fishes, for example, might range from a solid yellow or red overall colour, to the highly complex pattern of a clown triggerfish. That is not, repeat not, to say that all members of a group are one or the other.

While clown and queen triggers are brilliantly poster-coloured, we have other triggers (such as the gray and some less well known kinds) that are, if anything, cryptic. The closely related filefishes also are mostly cryptic in their patterns and colours, although we do have a few species with bright poster coloration.

Bright colours are generally a warning. Sometimes this warning is to potential predators that an attack is a waste of energy (you cannot catch me), or will produce a bad experience (bad taste or a cut from a slashing spine, or an injection of toxin). Sometimes the warning is to conspecific competitors, that this territory belongs to this individual, and members of the same sex and species ought to move on or risk being attacked. Bright colours can also advertise sex for rent, as when a fish is ready to breed. Generally, however, it is important to recognise that bright colours can be a disadvantage to a marine fish when placed in an aquarium. Unlike many freshwater fish, these poster-coloured marines cannot signal that they are in trouble with bands, fading or other tools available to, for example, cichlids. Our first indication that something is wrong is when the problem has



An extreme case of poster coloration is displayed by this highly aggressive clown triggerfish, which "owns" all the shellfish in its territory

progressed very far and the fish is beyond saving.

If this is getting complicated, then there is more to come. Let's look at the common bluegill sunfish and its principle predator, the largemouth black bass. An important paper on patterns and behaviour in these fishes just appeared in the *Transactions of the American Fisheries Society*, volume 111, number 3, pages 255 through 266.

In a sparsely vegetated area, such as the rocky shoreline of a lake, young bluegills appear unbanding and tend to form schools. This affords them protection against bass, which prowl these areas looking for fish to cut out of the bunch.

However, when the vegetation becomes rather dense, the young bluegills disperse into this vegetation, develop bands, and hide as individuals. The largemouth bass, to counter this strategy, also stops roving around. Instead, it sits quietly and waits for an unsuspecting individual bluegill to swim within attack range.

Thus, we see prey fish adapting themselves to different survival strategies according to the nature of the habitat. Likewise, the predator adapts itself to changes in the prey's strategy. Although one might think that the bass is carrying



Like a ray, the bottom side of a flounder is white while . . .

. . . the upper side is coloured to blend with the bottom sediments





It's also advantageous for a weak-swimming predator to have cryptic coloration. It "hides" from detection by its prey, for starvation is just as sure to cause death as being eaten by another fish.



Here a tang demonstrates a poster coloration that resembles the cryptic coloration of angelfish and discus, only carried to an extreme.



on a game of chess with the bluegills, it's really not that complicated. The bass, like the rest of us, simply adopts the strategy that will fill its belly with the least output of energy. All you guys with the 46 inch waists know what I'm talking about.

What can we learn from all this to make us better aquarists?

First, the only fish that should be kept in open, bare aquariums are those that school either solely or preferentially. Certain topwater killifishes fall into this category, as do many of the tetras, rasboras and barbs. Even neon tetras and similar fishes fall into this category, despite their bright colours, for they are all alike and tightly school-

ing, making it difficult for a predator to select one out of the pack for a successful attack. Where the schooling fish are very attractive, as with neons, cardinals, pencil-fishes, certain barbs, etc., tank decorations should be used to supplement the habitat and provide a picturesque background or dark greenery against which the reds, blues, silvers, golds, etc. will stand out. But let's make sure we understand what we're doing. *The purpose of this decoration is to please us, and not primarily for the benefit of the fish.* The fish will benefit by having a large open space in which to school, without impediments like centre piece plants, and without heavy predator pressure.

Suppose these pretty schooling fish won't school? Make them school by putting in a predator! You don't have to sacrifice a lot of fish. After all, there is no reason the predator has to be efficient and successful. Stick in a mediocre predator or even a fish that will confuse the school into thinking it is a predator. Such as? Well, any strong territory holder, no matter what it feeds upon (it could be insectivorous), will make thrusts at invaders of its territory. These thrusts are indistinguishable from predatory rushes, and the prey fish will bunch up and school, responding to what they perceive as a predator's attack. Or, use a real predator (such as a big cichlid), but one that prefers other foods or is ill-equipped for capturing these prey. For example, some predators prefer (or only eat) shellfish, but will make thrusts at small fish. I do not recommend putting in a serious predator and trying to keep it satiated with excess food, in order to protect the prey fish in the tank. That works in public aquaria, but then they don't advertise their failures, either.

Some fish, including certain dwarf cichlids, will display different patterns and behaviours according to the amount of cover available.

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THAT plants are sensitive to light is elementary gardening. But what exactly controls the differing depths of aquatic plants in the garden pool? Work by Leicester University botanists shows how plants use photoreceptors, highly-specialised molecules converting visible light into activities. The best known is green chlorophyll. Another is a protein called phytochrome, absorbing red and near infra-red or far-red, and reacting according to the relation between these two parts of the spectrum. Phytochrome's perception of this ratio probably doesn't provide aquatic plants with the information on their depth of submergence, but detects shading by other plants, trees or footbridges. Chlorophyll does not absorb far-red, which virtually passes through leaves.

The changing ratio between red and far-red, rising at sunrise and falling at sunset, gives the plant its information on lengths of day and night, and the anticipation of coming winter. Maybe this is the answer to how water-starwort remains floating in winter when most other aquatic plants die down to the bottom.

Leeches

The medicinal leech, which still lingers in ponds in parts of Anglesey, South Wales, Lakeland, the New Forest and western Scotland, is returning to favour as an adjunct to modern micro-surgery though often quoted as extinct and outdated. Last Christmas a child, scalped in an unfortunate accident, received micro-surgery at St Thomas Hospital, London, and then had medicinal leeches applied twice daily to restore

by Eric Hardy

blood-circulation. In 1940 they were used to cure a case of acute biliary colic. In the 19th century, specially inscribed ornate jars for storing leeches were made in Staffordshire potteries. They were reserved for wealthy patients to avoid the pain of surgery. Medicinal leeches drank 200,000 pounds of human blood in Paris alone in 1850. American surgeons still use European leeches because they are easier to obtain than the American medical leech. Medics in France and the U.S. have also found this modern use as an adjunct to microsurgery.

On higher moors, finished with late frosts, wriggling tadpoles bunch together to conserve heat in cold spells. Fish eat young frog tadpoles, not toads'. Too many tadpoles in garden pools might eat the mucous of fantails heavy with spawn. Frogs don't eat under water, but newts take fish-fry.

Water plants

Reed-mace's brown, drumstick-heads, one of the latest waterside seeds and mistakenly called "bulrush", begin to burst and float on the water on a glume which opens on wetting and allow the seed to fall. Remove the last marsh-marigold flowers as they fade in future weeks, to encourage more lush green leaves for summer. Their double kingcups now reach their prime, as does moisture-loving *Primula juliae*. The bog-garden at Wisley reveals green-bracted yellow posies of a quaint little umbellifer, *Hacquetia epipactis*, which can be propagated now by root-divisions, like many aquatics.

From now to autumn is the main season for the water-gardener to transplant: creeping roots of flowering rush, roots of *Sagittaria*, *Nuphar*, *Nymphaea* and *Caltha*, for shallow pools. These can be started in a foot-deep stone propagating trough with small stones on the bottom, then a bed of moist, light loam-peat topped with a mulch of moss. It's also time to sow seeds of sedges and water-lobelia (in gravel) where they are to grow in shallow margins, and of *Sagittaria* and kingcups, 1 in. deep in baskets of rich soil to be sunk into position.

Unlike true water-lilies, seeds of so-called fringed water-lily are worth sowing in mud. Water-lilies with more than 3 crowns need thinning before they choke the pond. *Andromeda*, bog-myrtle, *Myosotis* and some gentians may be planted along the banks, but first rake any decaying matter out of the pond before it encourages fish-pests or turns the water stagnant. Elegant Japanese water-iris,

laevigata, flowers into autumn and its clematis-like offspring *haempferi* planted in groups will provide a bewildering range of colours. Bergamot for your bees will increase by runners in any sunny, damp site.

Big, silver water-beetles, our biggest and vegetarians unlike predatory yellow-bordered *Dytiscus* now laying eggs, build their egg-cocoons in mid-March. They eat mostly blanket-weed, filamentous algae. Sticklebacks, now building nests, are predatory on fish-fry.

Most pondfish, now making ripples

on the water, won't need feeding until it warms above 45 to 50 deg F. Then start once a week with chopped earthworms, cooked porridge or young tadpoles, increasing to daily when it is 55 deg. Fungus causes most spring losses later on, but spores now attack any injured or which lost their mucous through rough handling. Most coarse fish start spawning when the water reaches 60°F., but one or two male pike may be nudging the flanks of a female to stimulate egg-extrusion in February courtship. Perch start in March; in April carp, goldfish, bream,

mod-dwelling tench and loach. They are earlier after mild winters, late after severe ones when many roach, perch, ruffe, carp, goldfish, bream and stickleback may not start till May. Even in June after 1963's frost, carp, tench, roach and rudd were starting; crucian carp and tench were still spawning in July and tench, last of all, in August. That cold winter delayed many river trout normally spawning in autumn till February or later.

OBITUARY



Alfred Field an appreciation

FOLLOWING the recent death of "Alf" Field (78), a former President of East London Aquarist and Pondkeepers' Association, our Society felt that the following appreciation was appropriate.

Alf was a member of E.L.A.P.A. for some 30 years and during that time held many offices on the various committees formed over the years (Treasurer, Vice-Chairman, etc.). He was elected President of our Society in 1978, a position he retained until his retirement from the fishkeeping scene.

E.L.A.P.A. has been so very fortunate during its many years of existence in having some outstanding aquarists among its ranks who also had the ability to organise and present the Society in a first class way, without doubt Alf ranked amongst these.

A quiet, unassuming man, Alf was always extremely popular with everyone and none more so than the newer members, Alf spent hours both at the Society and his own home in encoura-

ging the inexperienced aquarist to breed and keep fish in the right way and thereby retain interest in the hobby for many years.

He was an excellent aquarist and freely shared his knowledge with anyone who would care to listen. His wife, Lillian, was regularly bombarded by all and sundry descending on their home on a Sunday morning for a 'Fishy' chat.

He was a past master at furnished aquaria and regularly took first prizes in various competitions, particularly our Society's Annual Home Furnished Aquaria Competition. And such was the measure of the man that in his own unassuming way he volunteered to withdraw from the competition: "to give newer members a better chance of getting a Card". Perhaps in someone else this would appear presumptuous, but with Alf it was the natural thing to do—no fuss, but just thinking of other people rather than himself. He bred many tropical fish and for years specialised in top quality Angels, producing excellent specimens which regularly took prizes at the Society's Annual Shows, indeed his name appears on most of our Society's large collection of Cups and Awards.

He tried to remove any mystery surrounding the breeding of tropical fish, and encouraged members to approach their specimens in a sound, commonsense way.

It is extremely difficult to do justice to "Alf" with a few words here, but anyone who had met him will know what I'm trying to convey.

The hobby in general, and E.L.A.P.A. in particular, can ill afford to lose the likes of Alfred Field. He will be sorely missed by his friends in the hobby and remains by his attitude a shining example for all members of our Society to try to emulate.

Goodbye Alf, and thanks again.

K. H. WRIGHTSON,
on behalf of E.L.A.P.A.

DISCOVER THE FISH

by Pisces—

The first is in SNAIL and also in SHELL

The second in DWELLING and also in CELL

The third is in MOUNTAIN but not in HILL

The fourth is in ROSEMARY but not in DILL

The fifth is in BALANCE but not in EQUAL

The sixth is in AFTER but not in SEQUEL

The seventh is in EGGS but not in SPAWN

The eighth is in SUNSET but not in DAWN

The ninth is in FRESH but not in SALT

The last is in FAIL and also in FAULT

VERBIL NOUNET

PATTERNS

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the complexity of the habitat, and the density of other fish of the same and different species. You can set up aquaria to bring out the colours and patterns you want to see. Remember the case of the small bluegills. To get them to band and disperse, you need a heavily vegetated habitat. In a lightly vegetated one, they will fade and school. *Neither condition is preferred, and both are acceptable.*

Aquarists often see pictures in books or real fish in other people's tanks and, for the life of them, they just can't get their own fish to do the same thing. The remedy? They feed too heavily, often with the wrong foods (such as homemade beef heart) and when that fails they begin pumping in all kinds of medications from the shelf. Quite often, they fail to recognise that the habitat is all wrong for the behaviour they want displayed.

Sometimes, you just cannot duplicate in your aquarium what the fish do and look like in nature. We most often forget this when keeping marines. Many of our marines, such as angels, butterflies, tangs and wrasses, are collected from and best adapted to live reefs. Even some pomacentrids, such as the yellow-tailed damsel, occur almost exclusively in live coral areas. Well, our aquaria are not duplicates of such areas. In bottom material, in hard substances, in surge, and even in the irregularity of the food supply, our marine aquaria resemble the subtidal near-shore zone far more than the deeper, quieter live reefs. If you've collected in the Caribbean, then you know the odds of finding a baby angel or butterfly in the shallows. You find them where the water is somewhat deeper or at least quiet, and where there is lots of living material, such as the reef itself, or live grass bed edges, heavily over-

grown pier pilings, or other regions of live growth. It is no surprise that most of the fish that have been bred in marine aquaria are those that occur in the near shore surf zone, such as pomacentrids (clown anemones, *Dascyllus*), or gobies associated with bulkheading and rubble.

These poster-coloured fish cannot signal discomfort. Anticipate their needs, vary their habitats, don't expect them to give you early warnings of distress, and above all provide them with stimulation but not to the point of exhaus-

tion. Set up the aquarium for the convenience of the fish, not yourself, and once established, leave it alone. There is no stress quite like a sudden, permanent change of habitat, even when the water quality remains the same.

It has often been said, in this hobby as in other of life's endeavours, that patience is the key to success. It cannot be said too often that the first test of patience is getting things right the first time around, and the second test is then leaving things well enough alone.



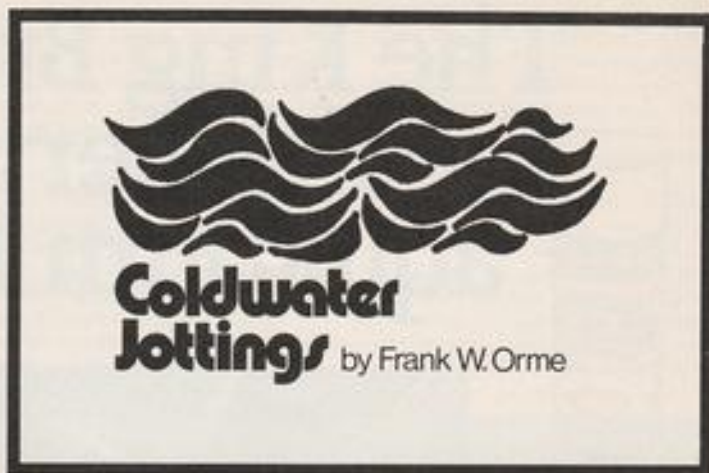
Here a black drum (top), sheepshead pogy (centre), and spadefish (bottom) all demonstrate the convergence of a banded pattern best suited for living on a high-profile complex bottom structure. All are inshore marine fishes of the Atlantic coast, common in deep, grassy areas of large estuaries and associated with ship channels having sunken debris, bridge stanchions, and similarly complex bottoms. The spadefish will move out over open, barren, sandy beach areas as well. Under these conditions, it forms large schools, and most members of the school lose their bands and become silvery.

MARCH usually signals that annual awakening of the coldwater fishkeepers' active interest. The fish are free of their winter-induced dormancy, and seeking food. Plants, both aquatic and terrestrial, are showing evidence of revived growth. Life, in nearly all spheres, is reacting to the gradually rising temperatures and lengthening hours of daylight in anticipation of the warmer days that, hopefully, lie ahead.

During this month the opportunity should be taken to remove any dead and rotting vegetation from in and around the garden pool. Silt can be removed from the bottom of the pool, although this should not be too excessive if the pool was given a thorough pre-winter clean-out, and a partial change of the water made. If, on the other hand, no attention was given to the pool during last autumn, it may pay to remove the fish and then empty the pool of all water, clean it, and refill with fresh water—especially if the pool is of only moderate proportions. The fish must be treated with care and not given any undue shock by subjecting them to a sudden change of water temperature. In fact, if a major overhaul is considered necessary, it would be wise, if possible, to delay it until next month when the temperatures will be a little higher and the fish more able to withstand the upheaval. As with the garden, a pool will soon lose its ornamental value if it is neglected.

Ryukin features

Not so very long ago I was asked whether I had noticed that some varieties of fancy goldfish, with quite pronounced humps where the back met the head, were appearing on the show benches in some places. My questioner wondered whether this was something to be encouraged or not. It was, in his opinion, the result of either the breeder trying to produce fish with a very high dorsal contour and deep body, or breeding from imported stock, which gave rise to this Ryukin-like feature. Whatever the reason, he felt that fish of this



type should not be encouraged, especially as they did not conform to any Standards that he knew of.

Now, I must admit that I had not noticed any great trend towards the type of dorsal contour to which he objected, but I do know that some breeders are producing varieties with a quite pronounced hump behind the head. Whether this is desirable, I am not too sure; however, it is certain that this type of back is not depicted for such varieties as the Veiltail, Oranda or Moor. That being so, they would, or should, be penalised by judges by a loss of possible points. Unfortunately, it is not unknown for an award to be given to a fish which does not comply with the governing Show Standards, and that I am very much against.

Of course, many fishkeepers have not the slightest interest in exhibiting their fish in shows but, if they breed their stock, surely it is sensible to breed to a known Standard—where there is a recognised Standard for the type of fish which is being raised. The breeder may not have any inclination to enter the fish in open shows; however, subsequent owners may well hope to do so. The experienced exhibitor will recognise the potential of any fish which are offered, whereas

the novice must, very often, rely upon luck and the advice of the breeder—and these are not always reliable.

Newcomers to the hobby are, in general, unaware that societies catering for their interests exist. Only when their wish to learn more has prompted them to read a book, or one of the magazines devoted to the hobby, are they likely to realise that there are such groups. It is not often that any posters, or suchlike, are seen in the average pet shop to advertise the local society.

The determined person will usually, eventually, locate the whereabouts of any local society but, in the case of the societies which cater for the interests of the coldwater fishkeeper, it may take some searching. The publisher of my books has even sent letters to me from people who had been unaware of the *Aquarist & Pondkeeper* magazine until they had seen it mentioned in *Fancy Goldfish Culture*, and enquiring whether I knew of any coldwater society in their particular area. It does seem a pity that more publicity is not available in pet shops to promote our hobby; after all, it is in the local pet shop that many potential hobbyists' first enter the world of fishkeeping.

Coldwater Jottings

Goldfish Societies

It puzzles me why there are not more societies devoted to the interests of the goldfish keeper, especially when there is the example of the Koi societies. The British Koi-Keepers' Society, for instance, has over 2,000 members and has local sections in many parts of the country. The Yorkshire Koi Society has a membership which reaches far beyond the boundaries of its home county, and the Midland Koi Association also boasts a strong membership. It must be said that both the B.K.K.S., and the Y.K.S., are very good at public relations when it comes to promoting their respective societies. One aspect of this is the distribution of their magazines to various non-members. For many years I have had the very great pleasure of receiving, each month without fail, a copy of these journals. Both are

excellent productions, full of information and various snippets of news, sometimes with photographs, and of a near professional standard of presentation. These publications alone make membership of the Societies worth while to the Koi enthusiast.

There can be little doubt that membership of a specialist society can be of benefit to all fishkeepers. To be able to share interests and discuss problems with fellow fishkeepers can be very helpful, especially to the novice. Much can be learned from the various functions, such as talks, demonstrations and slide shows, etc. It will normally be found that newcomers will receive a warm welcome into a relaxed, friendly group—all of whom share a common interest in the coldwater fish. Any reader who is not a member of a society, and there must be many, is recommended to join one if possible. Nearly all of the following societies publish a newsletter, thus ensuring that members who are unable to attend meetings regularly are kept informed.

When writing, to ask for further details, to any of the societies please enclose a stamped, self addressed envelope for the reply.

British Koi-Keepers' Society—Mrs.

E. Liddicoat, 2 Horncastle Road, Moston, Manchester M10 9GD.

Yorkshire Koi Society—Mrs. B. Hoyland, 2 Herrick Road, Barnby Dun, Doncaster.

Bristol Aquarists Society—Mr. V. Cole, 10 Hardwick Close, Brislington, Bristol BS4 4NL.

South Park Aquatic (Study) Society—Mrs. M. Dudley, 163 South Park Road, Wimbledon, London SW19 8RX.

The Rancho Society—Mrs. E. Davidson, 14 Garnetts, Takeley, Bishops Stortford, Hertfordshire.

Northern Goldfish and Pondkeepers Society—Mrs. P. Hodgkinson, 9 Stratford Close, Farnworth, Bolton, Lancashire.

Association of Midland Goldfish Keepers—Mr. D. Southworth, "Kon-Tiki," 4 Wyberton Low Road, Boston, Lincolnshire.

Goldfish Society of Great Britain—Mr. A. C. Law, Bracken, 4 Elgin Crescent, Catterham, Surrey.

Scottish Goldfish Group—Mr. T. McLean, 36 Corston Park, Craigshill, Livingston, West Lothian, Scotland.

Although, in some cases, the officers may have changed since I last received news from the particular society, I feel sure that any enquiries will be dealt with promptly.

UNITED KINGDOM AQUARIST GET TOGETHER

THE 1982 British Aquarist Festival at Belle Vue, Manchester, saw the launch of a new venture—"THE CONFEDERATION OF AQUARISTS."

Much discussion had previously taken place, but the twenty one or so delegates from some eight aquatic organisations, gathered together under the Chairmanship of the President of

the Northern Federation (FNAS), for a friendly, cordial meeting.

The meeting soon saw the delegates, all of which have a genuine and active interest in the hobby, coming to a unanimous agreement as to the format and aims of the Confederation of Aquarists.

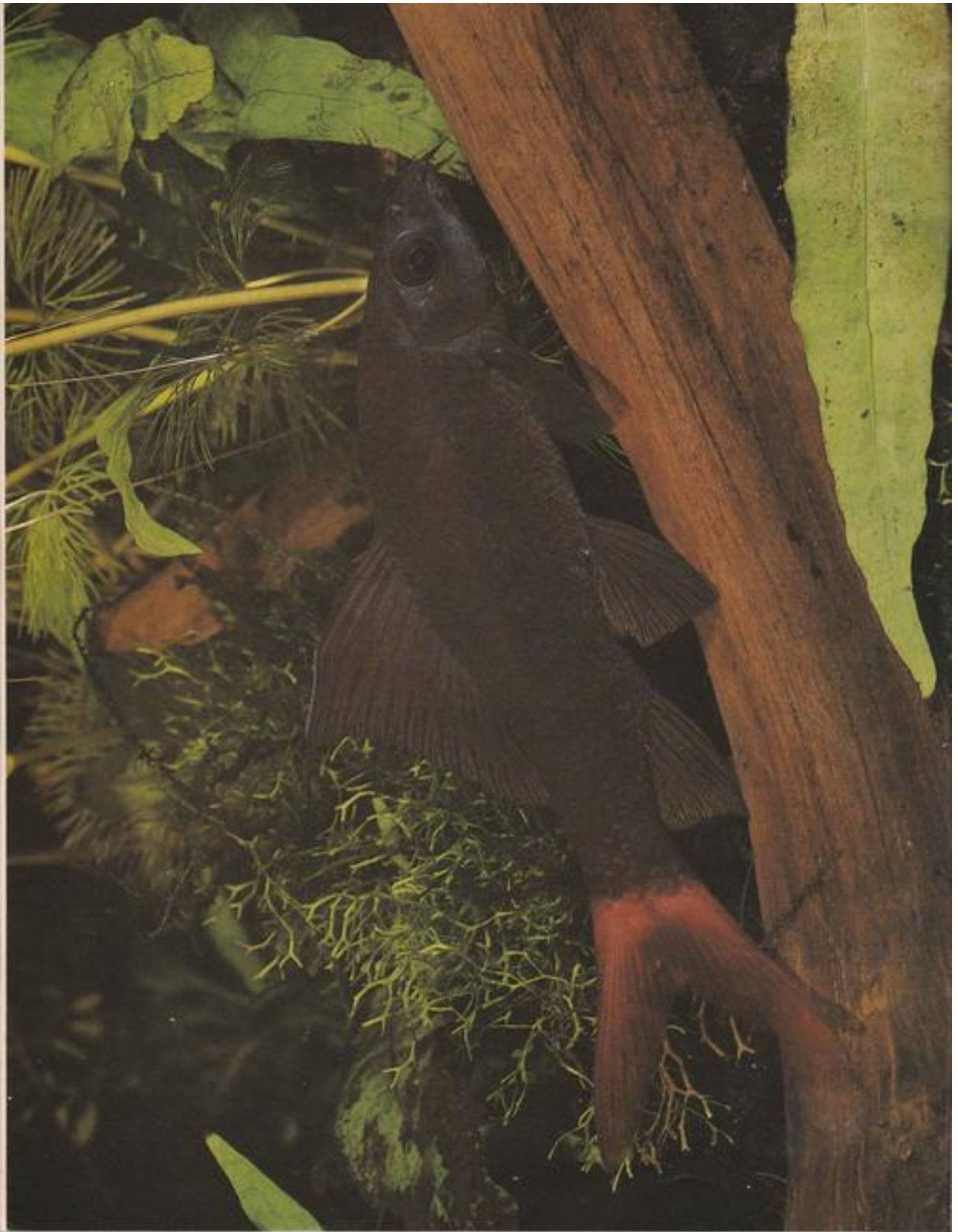
The forming of such a collective body to promote the furtherance of the fishkeeping and breeding hobby, will draw upon the expertise within the A of A, FNAS, NEFAS, YAAS & FSAS and valued specialist support from the BKA, SLAG & CAGB, though hopefully, the future will see the knowledge expanded with other organisations and specialist groups join-

ing the Confederation's activities.

One of the first topics to be undertaken will be the co-ordination of a nationwide listing of norm sizes for fishes. A preliminary step in the listing will be made at the Confederation's next meeting during the 'Scottish Aquarist Festival' at Motherwell.

Any organisation or specialist groups wishing further information about the 'Confederation of Aquarists' are requested to contact the joint administrators—

Mr. & Mrs. W. Bennett,
15 Coulter Avenue,
Wishaw, Lanarkshire
ML2 8SZ.



SPOTLIGHT

Some Freshwater Sharks

of the
genus *Labeo*

by Jack Hems

THERE are several species of the genus *Labeo* native to Africa and south-eastern Asia. Many of them are well-suited to aquarium life and are popularly known as 'freshwater sharks' (mud suckers in Africa). They are so called because, with a little stretch of the imagination, they can be said to bear some resemblance to the true sharks (in general shape and finnage)—cartilaginous fishes scientifically referred to the order *Chondrichthyes*: almost entirely inhabitants of salt waters and as distant, anatomically speaking (among other things), from the 'freshwater sharks' of the aquarium as sticklebacks are from squids. In point of fact the labeos are, like the barbs and danios and the ubiquitous goldfish, members of the widely distributed family *Cyprinidae* (Carps).

The jaws of carps are toothless, but in the back of the throat are bony processes (pharyngeal teeth) which reduce food taken in to a swallowable pulp. Then again, like most of the carps, labeos have food- and object-sensitive barbels, of various lengths according to the species, on the mouth. They also have fleshy and protuberant lips which they use to great advantage to rasp algae—they are gluttons for soft greenfood—growing underwater. Further, these protuberant lips are most effective when it comes to dredging edible matter out of the mud or the interstices of a gritty river or aquarium bed.

The most commonly seen and, undeniably, one of the most beautiful species of the genus *Labeo* is

L. bicolor—the red-tailed black shark. In the wild state it is almost certainly confined to Thailand. It is, at any rate, indigenous to parts of the Mekong river and many of its tributary streams and adjacent irrigation ditches.

In well-coloured specimens, the body and grey to white-tipped dorsal fin are a plushy matt black. The ventrals, like the dorsal and anal fins, are the same colour as the body; the caudal fin is the colour of blood. Young (small) fish are paler in coloration than adults. For the guidance of the newcomer to tropical fishkeeping, permit me to say at once that when the purpose of a visit to a dealer is to purchase a red-tailed black shark, always make a point of choosing a fish which shows a well-filled body, swims on an even keel, and combines vigorous fin movements with a lively interest in its surroundings. 'Sharks' with shrunken sides and 'caved in' underparts seldom, if ever, remain alive for any length of time; and if, by some miracle, they do stay alive for several months, they hardly ever show much, if any improvement in coloration.

On the other hand, a healthy young 'shark,' introduced into a tank which suits it, will colour up magnificently as it increases in size. Also, it is not uncommon for a well-nourished 'shark' to live for upward of ten years. Ordinarily, a black red-tailed 'shark' will attain a length of about 4 in. in half this number of years. After this rather rapid spurt, growth continues at a much slower pace. The maximum length attained

by a black red-tailed 'shark' is about 6 in.

Never be tempted to buy more than one 'shark' for a mixed species tank. The reason can be explained in a few words. Two 'sharks' living in the same tank fight almost every time they meet. In course of time, the less dominant and leaner built of the two will die of the injuries brought about by excessive bullying and deprivation of introduced food.

Talking of food, it is customary for 'sharks' to do a lot of scavenging; but every so often they lie up, as it were, in a shady part of the aquarium, among thickets of plants, drifts of sediment, or behind or among camouflaging rockwork.

'Sharks' do not appear to be unduly faddy about the chemistry of their aquarium water. Neither are they concerned about large drifts of sediment lying about the bottom. But to see them at their best, in coloration that is, the water should be aged and clear. A slight tinge of brown is often indicative of healthy maturity. But here a word of warning: it is a matter of great importance to change some of the discoloured water for fresh—but not straight from the mains tap—every now and again. This procedure guards against too great a build up of urea and other toxins.

The ruby shark or green shark or rainbow shark (in America) is more enchanting in coloration than its congener mentioned above. It goes by the technical name of *L. erythrurus*. Youngsters of this splendid species wear roughly the same garb as young *L. bicolor*: but given a few years to increase in size (it has about the same lifespan as *L. bicolor*) it becomes increasingly beautiful.

The basic hue of the fish can be variable, as is to be expected of a species distributed over a wide range of Thailand and adjacent

SPOTLIGHT



countries. In general, however, it is clothed in bronzy to olivaceous green overlaid with slaty to lilac-blue. The underparts display a non-reflective gold and silvery white coloration. The body is more elongated than that of *L. bicolor*, tapering from a slightly arched dorsal ridge to a markedly rounded snout. The hind part of the body is compressed and terminates in a black lozenge-shaped marking. The eye is large, outlined with shining gold which enhances the lustrous black pupil.

L. frenatus or the red-finned shark is yet another attractive species from Thailand. Northern Thailand, to be precise. It is an

olive-grey to dark olive-green fish adorned with a dark band extending from the tip of the snout through the eye to the gill cover. There is a dark marking on the tail base. The fins are blood red in contented fish; less red in fish not quite happy in their surroundings or in poor health. Be this as it may, colour can change quite rapidly according to the quality of the light and the temperature of the water. *L. frenatus* seldom grows any larger than 3½ in.

Several of the African species of *labeo* have appeared in dealers' tanks over the last three decades. One of the well-marked species is *L. variegatus* or harlequin shark. This 'shark' hails from the upper Congo. It is a long-lived fish that attains a larger size than the 'sharks' mentioned above, and is handsomely coloured at every stage of its growth. Young specimens are yellow mottled with black and shades of brown and red, mature fish are dark brown on the back

shading to golden brown on the sides, and thence lightening to greyish lower down. The scales are adorned with a splash of red. The fins are streaked and spotted red, brown and gold. This fish tends to be aggressive towards any other fish smaller than itself or easily frightened or intimidated by its sudden rushes and unfriendly mouthings. It is a hearty eater and takes dried, flesh, live or green food with about equal relish.

Another African *labeo* from the Nile and its tributaries is *L. forskali*. This 'shark' is one of the largest species known to the informed tropical aquarist and reaches a length of some 18 in. It is a greyish green species. Darker above than below. The scales on well-grown fish have some pink reflections in them. This fish is only suited to living in a tank with fish as well-built as itself and capable of ignoring its threatening rushes or warding off the occasional bullying attacks. It is not overtly aggressive,

Labeo frenatus



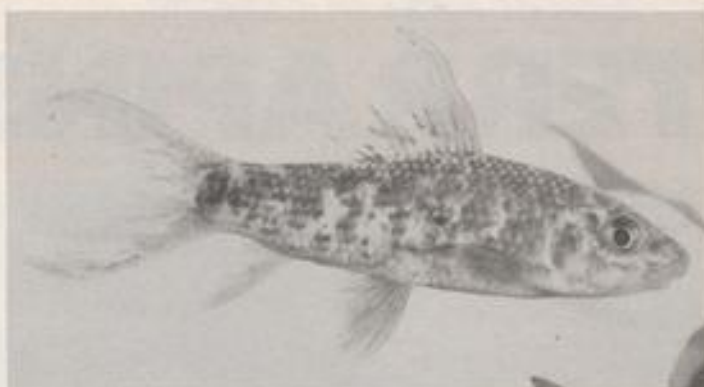
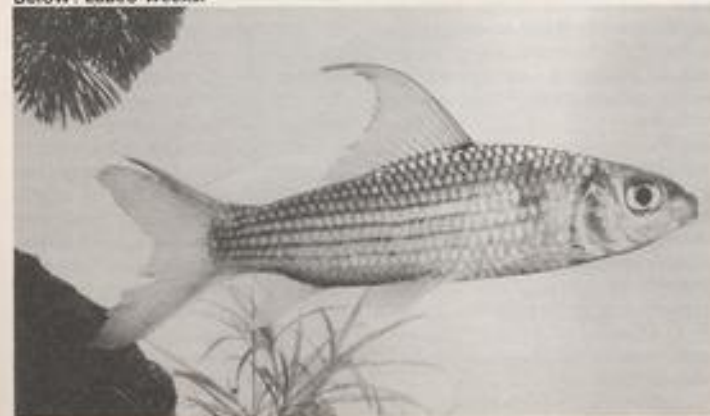
however, towards all other fishes of a different species, and of substantial build; but is noticeably pugnacious and spiteful towards any member of its own species.

L. weeksi is found in the middle and upper Congo. It is characterised by a well-developed dorsal fin with the anterior rays much prolonged. Body colour is yellowy green adorned with brown horizontal lines extending between the scales. The scales are made conspicuous by their black edges. Like the other labeos dealt with in this article has catholic taste in food, is quarrelsome, and attains a length of about 10 in.

In the matter of temperature, most of the labeos I have kept in times past have stood a temperature range of from about the upper sixties (°F) to the upper eighties (°F). I do believe that the lives of these fishes are lengthened if the temperature of the water they live in is maintained in the lower to the middle seventies (°F).

Breeding in captivity does not appear to be all that common. A few species, however, such as *L. bicolor* and *L. frenatus* have rewarded their owners with eggs. Large tanks of about 25 gal. and upward have been used. Water in the several records of spawning I have come across has been low in hardness and neutral to low in pH.

Top right: *Labeo variegatus*
Below: *Labeo weeksi*



Temperature has been maintained in the low to middle eighties (°F).

A desire to couple is denoted by enhanced coloration in the caudal fin of the male (all the red fins in *L. frenatus*) and a noticeable swollen abdomen in the female. This bloated appearance in the female is particularly apparent just prior to egg-laying.

Although the placing of several 'sharks' in the same tank is not normally recommended (for fear of damage done during quarrels); for spawning one has to take the risk. Introduction of likely looking fish is best done last thing at night. Each fish will take over a piece of 'territory.' And defend it against intrusion. Feeding is best confined to a high protein diet such as scraped lean red meat or finely mined earthworms or soya-flour fed

Enchytraeus albidus. If spawning is the intention of some of the fish, then a couple will forget all about guarding territory and get together after chasing around. In due course, they will assume a side-by-side position an inch or two from the top of the compost. There, after shimmying about for a while, and displaying, eggs will be ejected by the excited female and milt extruded by the sexually aroused male. The eggs drop between the interstices of the compost or get washed, so to speak, into drifts of sediment or the risen roots of plants or plant thickets themselves. It has been mentioned somewhere, but the source escapes me, that on occasions the fish will spawn inside overturned flower pots or in caves contrived out of pieces of stone. A large female, it is said, can produce an estimated 1,000 eggs. The eggs are non-adhesive. The fry hatch out within the space of some 36 hr. From thence onward raising the fry follows the usual practice of supplying minute live food and, later, powdered dried food. The snag about spawning the 'sharks'—the ones that usually give extra life and colour to our tanks—is the fondness they have for their own eggs. They gobble them up as fast as they are extruded. This presents the ambitious tropical aquarist with a challenge. But there will come a day when, I suspect, spawning some of the popular sharks will become quite a commonplace.

Practical notes on keeping...

TERRAPINS

by
Julian C. F. Sims



The author feeding some of his terrapins with soaked pellets of dog food

IN THE PAST, reliable information on this subject has been difficult to obtain. Many popular books on reptile keeping, including those which specialise in terrapins or "turtles", provide insufficient advice or appear to be written by authors with little practical experience regarding this subject. In fact, such lack of knowledge on the problems which can occur or which only become obvious with personal observation must have contributed to the deaths of hundreds of thousands of terrapins, particularly hatchling Red-Eared terrapins (*Pseudemys scripta elegans*) imported from North America.

The following advice is written to ensure that many more captive terrapins will survive for much longer and

to discourage the use of plastic "turtle bowls" and tubs of "turtle food" as recommended by many American publications. These items are of no use whatsoever in the maintenance of healthy terrapins and should not be purchased.

Tank size

Almost without exception, terrapins kept at the correct temperature are very active reptiles. The tank or container in which they are kept should therefore be as large as possible. Relatively deep water (minimum 15 cm. for a terrapin of 10 cm. carapace length) should be available together with a basking rock or platform with dry surface area above the water level.

A basking area is essential to allow the terrapins to climb out of the water and dry their shells. (The shell is composed of an upper half called a carapace and a lower plastron). Drying the carapace allows the outermost layers of the shields (scutes) to gradually loosen at the edges and eventually completely peel off. As new shell material has previously formed underneath, continual loss of the upper, outer layers is essential for even growth. Terrapins which are denied basking facilities often have a stunted, deformed carapace because thick layers of old material have built up over each shield. These thick layers act as a "corset" restricting even growth.

Deep water is essential around the

basking platform so that terrapins do not injure their head, limbs or shell when diving into the water, either when disturbed or at feeding time. Terrapins will be able to swim in deep water, getting essential exercise. Most species must also swallow food under water. Relatively deep water is also essential for courtship and mating.

The larger the tank, the less often it will need a total change of water. Terrapin tank water can turn green very quickly with development of colonies of microscopic, single celled algae. Although these tiny plants might be so dense as to make it difficult to find the terrapins underwater, the presence of algae is not necessarily a bad thing. These tiny plants absorb some of the nitrates present in the waste material excreted by the terrapins and chemically use it to synthesise protein (primary production). The green algae also release oxygen into the tank water during photosynthesis.

As the terrapins swallow their food underwater, some of these tiny plants also accompany the food into the stomach. Fresh plant material is an important source of vitamins.

Filtration

Terrapins do not shed the skin from their limbs in one piece. Small skin fragments are constantly being lost and together with the solid waste material released by the terrapins, can quickly form a layer in the corners of the tank. This material must be removed regularly, preferably once a day or at least every other day. A convenient method is to use a rubber or PVC tube as a syphon (internal diameter approximately 9 mm). Suitable tubing is sold by "home brewing" centres. The length required (from base of tank, up and over the side and down into a bucket on the floor) can be cut and bought from a reel as required. The amount of debris that collects per day is of course proportional to the number of terrapins in the tank.

Filters can be used to help prevent the build up of suspended particles in the water. The cheapest type are box filters which work by a column of bubbles from an air line drawing tank water through a filter medium of

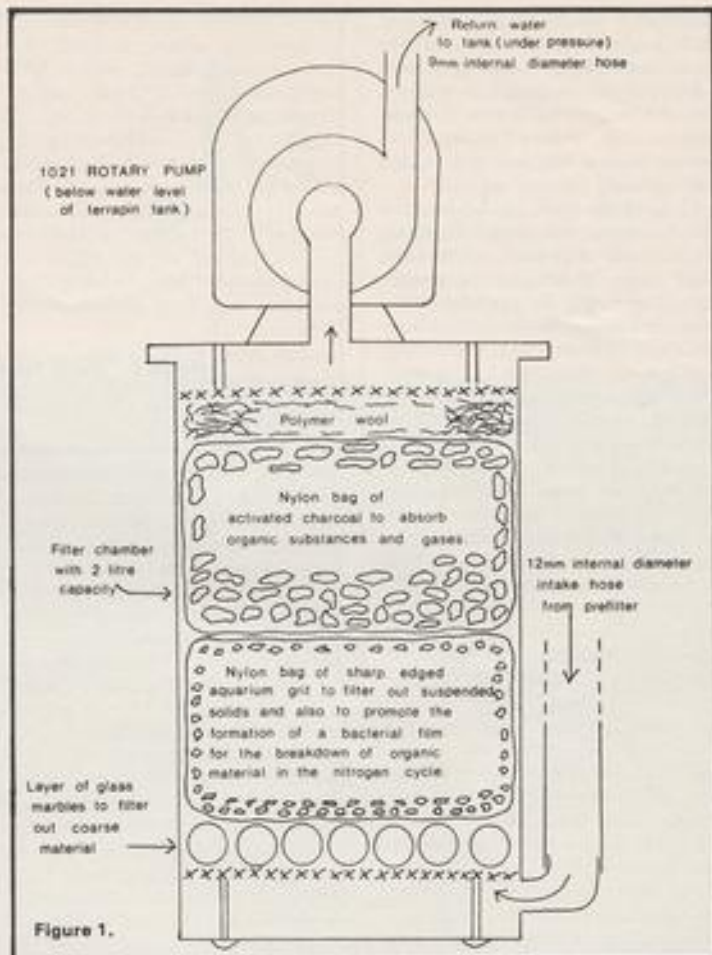


Figure 1.

activated carbon and polymer wool. A fairly powerful air pump is needed such as a Hy-Flo piston pump manufactured by Medcalf Brothers Limited, Cranborne Road, Potters Bar, Hertfordshire.

Alternatively an external (and more expensive) power filter may be used such as Eheim unit with internal submersible pre-filter.

The filter medium in the external filter chamber should include from the intake at the bottom, and flowing upwards, a layer of glass marbles, a region of sharp edged aquarium grit, a region of activated charcoal and a layer of polymer wool (Figure 1). For easy rinsing when the unit is

cleaned, the grit and charcoal can be contained in separate permeable bags made from old nylon tights. The length of time between removing and cleaning this medium, which involves completely dismantling the filter unit, can be greatly increased by using a pre-filter inside the tank. A pre-filter contains an all-nylon kitchen scourer and some polymer wool and can quickly be removed once a day for rinsing—only two or three minutes work. The removal of suspended material in the water by this method is very efficient.

If a fairly powerful rotary pump is used, e.g., a 1021 capable of delivering 240 litres of water per hour, the return stream can be used to aerate

the filtered water, using a diffuser. Such a system creates a good current in a tank 1.5 metres long, against which the terrapins swim for exercise resulting in the development of strong limb muscles. Figure 2 shows a flow pattern inside a long tank with central basking island.

Only Eheim hoses should be used for the intake and return of water. Cheaper, pliable plastics used to make some types of flexible tubing may contain up to 40% by weight of plasticizers such as Polychlorinated Biphenyls (PCB's). In service, these can dissolve out into the water and have a toxic effect on livestock, while at the same time the plastic becomes brittle and liable to fracture.

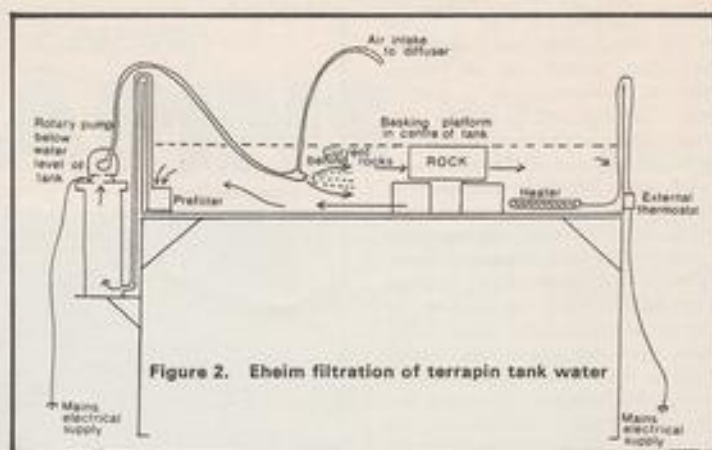
Further details of the West German Eheim filter units and accessories such as pre-filter and diffuser can be obtained from the importer: John Allan Aquariums Ltd., Eastern Way Industrial Estate, Bury St. Edmunds, Suffolk.

It is also beneficial to completely change all the water in a terrapin tank regularly. This prevents the build up of disease causing bacterial and fungal colonies. However, if the water is changed just before feeding, the water will quickly become fouled and smelly. This fouling does not usually occur if a good, green algal colony is present in well established tank water.

If a simple syphon is used to remove suspended particles into a bucket, only some of the tank water is ever removed at any one time. This can be replaced with fresh, clean water of similar temperature. It is important not to use gravel or larger stones as a covering on the base of terrapin tanks. Although such a substrate is widely used with tropical fish, gravel will trap faecal and skin particles, making thorough tank cleaning impossible.

Illumination

Natural sunlight has no substitute for basking terrapins. Even after passing through several layers of glass, sunlight still has a strong psychological effect if a terrapin needs tempting to feed. However, exposure to strong, direct sunlight can be harmful, especi-



ally if it is artificially concentrated by the sides of a glass tank containing water, resulting in a coloured prism effect. Such distortions can strain and damage terrapin eyes.

Natural sunlight, besides having a warming effect on basking reptilian bodies, also contains ultra-violet electromagnetic radiation. This is important for vitamin D formation. Certain types of fluorescent tube at present on sale, have a high emission from the blue end of the visible spectrum extending into the ultra-violet wavelengths. Such tubes include "True-Lite", manufactured in the USA by the Duro-Test Corporation (imported by Sale Tilney International Ltd., Weybridge Trading Estate, Weybridge, Surrey), and "Tropical Daylight" manufactured in Great Britain by Thorn Electrical, Thorn House, Upper St. Martin's Lane, London WC2H 9ED. A word of caution. Too high a concentration of ultra-violet rays can be dangerous, one side effect being clouding of the normally clear parts in the front of the eye.

Heating

Reptiles are Poikilothermic, which means that they have a varying body temperature which approximately follows that of their surroundings. During the day time, much heat is absorbed from the sun's radiation, either directly by basking or from contact with sun-warmed rocks and water. Thus poikilothermic animals have the advantage of absorbing warmth directly

from their environment and therefore requiring much less food than a homoiothermic animal (e.g. a mammal which maintains an almost constant body temperature) of the same body size.

If terrapins are kept indoors away from the warming action of the sun, artificial heating must be provided so that they can (a) digest their food completely, (b) form the necessary antibody protection against bacterial infection, equally important, (c) remain active and grow.

Many pet shop assistants incorrectly inform potential terrapin owners that "terrapins don't need artificial heating". They will probably add that the very small hatchling red-eared terrapins (sold at a carapace diameter of about 2 cm.) do not grow particularly large. What is not said is the fact that hatchlings kept cold (and fed on dried *Daphnia* from a "turtle food" tub) do not live very long. A female red-eared terrapin kept at the correct temperature, e.g., approximately 26°C, and fed properly can grow to a size of almost 23 cm. in about four to six years.

Terrapins which are reluctant to feed can often be tempted if exposed to sunlight and/or their tank water temperature temporarily increased to 28°C for red-ears.

Artificial heating is best provided by separate submersible heater and thermostat units. Some heaters are now marketed with aluminium cases (e.g., UNO Regal Heaters manu-

factured by C. Ellison & Co. Ltd., UNO House, Arnold Street, Nantwich, Cheshire). These are particularly useful for terrapins, which being active animals, can break glass units during swimming or even by biting a glass tube with their jaws. Terrapins are inquisitive—keep tank "furniture" to a minimum. This is especially true of glass thermometers with enclosed lead shot for ballast. Terrapins snap at such items, the thin glass is easily broken and the shot swallowed.

Always disconnect electrical heating units from the mains (and allow to cool) before changing tank water. Calcium deposits, which sometimes build up on the outside of glass covered heating units, can be cleaned off with dilute hydrochloric acid or electric kettle cleaning fluid based on formic acid. If deposits get too big, the unit can make a "fizzing sound" and the life of the internal element will be much reduced, due to over-heating. Heater cleaning must be conducted

in a glass container well away from livestock. The heater must be thoroughly rinsed afterwards—traces of acid would cause distress to terrapin eyes.

Diet

For healthy growth, the diet fed to terrapins must be as varied as possible. Red-eared terrapins, and many other species will take soaked pelleted dog food. Pelleted dog food is a complete diet of protein, vitamins

European (female) pond tortoise basking on terraced banks of the enclosure



and minerals. The pellets can be brought loose in most good pet stores—approximately 28p per lb. However, you must soak the pellets for about 35-45 minutes in water to make them totally soft so that a terrapin can bite into them.

Soaked pellets usually float on the surface of the tank water where Red-eared and Spanish terrapins (*Mauremys leprosa*) will readily swim up to them and feed. However, some terrapins, e.g. the Black Malayan terrapin (*Siebenrochiella craticollis*) prefer to feed near the bottom of the tank and floating pellets can be made to sink by squeezing them between the fingers.

Different brands of dog pellets have varying ratios of ingredients. Some of the most beneficial types for terrapins are those formulated for pregnant bitches. These pellets have a higher calcium content (for bone formation in unborn puppies and to aid milk production by the bitch after their birth). The higher calcium content is useful for carapace and plastron growth in all terrapins and for egg formation by adult females.

Pellets that appear oily before soaking should not be purchased as these will quickly foul terrapin tank water.

Not all species of terrapin will feed on pellets. The European Pond Tortoise (*Emys orbicularis*) is a classic example.

Finely cut lean meat and fish are favourite foods of most terrapins, including Emys. Essential vitamins and mineral can be provided by coating the meat and fish with Cod Liver Oil and/or multi-vitamin powder such as Vionate (manufactured by E. R. Squibb & Sons, Regal House, Twickenham, Middlesex). Such additives must be fresh because vitamins deteriorate with time. Therefore it is important to buy such supplements from a shop with a quick turnover, e.g., the pet counter of large Boots chemists stores.

Other foods which can be offered

for variety include cheese, small earth-worms (not the red worms from compost heaps) and chopped lambs liver.

Many species of terrapin also appreciate eating vegetation, particularly floridana sub-species (*Pseudemys floridana*). Many types of pond weed, duck weed (*Lemna* sp.) and cress (as sold in 10p plastic pots by Sainsbury's) are all taken with relish, together with lettuce leaves, banana and slices of bread covered with vitamin and mineral rich marmite spread.

Extra calcium can also be provided by placing entire cuttle-fish bone as sold in pet shops for cage birds, in the tank water. Terrapins bite into the cuttle-fish bone, whether it floats or sinks. Another readily accepted source of calcium in the diet is the shell of hen eggs. Before being dropped into the terrapin tank, the half egg shells should be thoroughly washed to remove all traces of dirt from the outside and the remains of egg albumen on the inside, thus helping to prevent fouling of the water. It is not necessary to remove the membrane from the inside of the egg shell. Not only is calcium important for healthy growth, but terrapins also get a great deal of exercise in pushing the half shells around their tank before crunching them up between their jaws.

Many terrapin owners feed trout or garden pond pellets to their terrapins and good, even growth results. However, due to the ingredients of these pellets, indoor tank water rapidly becomes fouled.

Medication

Wounds do occur on the necks, limbs and shells of terrapins, often as a result of biting during courtship or due to attack by fungi. Most treatments on the market recommended for skin ailments have, for economic reasons, been developed for use on

mammals (a group which includes humans). Reptilian biology is different to that of mammals and many preparations, including certain antibiotic creams, would prove fatal to reptiles. However, a safe treatment for reptilian wounds is Betadine antiseptic solution (Povidone-Iodine) manufactured by Napp Laboratories Ltd., Watford WD2 7RA. This will prevent the development of bacterial and fungal lesions.

Outdoor Enclosures

A blue PVC paddling pool with tubular steel frame, 2 m. x 1.3 m. x 38 cm. high, manufactured by Dekker-toys and obtainable from Argos discount showrooms, makes an excellent temporary outdoor pool for large terrapins in the summer months.

With only 15 cm. (6 inches) of water in the pool, the smooth PVC sides prove to be an effective barrier against terrapin escape.

A basking island made of bricks and constructed in the centre of the pool is essential. Well away from the pool sides, such an area cannot be used as an escape route. The lower bricks of the island must be placed on thick foam rubber to avoid cutting the PVC pool lining. Similarly, to avoid damage to the PVC, the ground on which the pool rests must be very carefully prepared with no sharp protuberances or plant roots which could grow up through the pool lining, puncturing it.

'Things they say' contributed by Graham Cox

"The Tecoma Pupfish was removed from the U.S. Government's list of endangered species yesterday because there aren't any more".

from *Toronto Globe and Mail*

Press Release



Waterlife pond products

THE PRINCIPAL reasons which can be advanced for the gradual rise to pre-eminence of Waterlife Research Industries Ltd, as Britain's largest manufacturers of aquatic disease treatments, test kits, sea salts and associated aquatic equipment are the very high standards of technical excellence of the product range, generous packing which results in a low cost-of-use factor for the aquarist and an unrivalled level of product efficacy.

Waterlife's pond products offered for 1983 are:

"Waterlife" Narrow and Broad Range pH Testkits

Is your pondwater too acid, too alkaline, or just right for pondfishes? The pH number of a water sample is the measure of the water's acidity or alkalinity. The pH scale extends from 0 up to 14, pH 7.0 being Neutral, ie, neither acid nor alkaline. Numbers smaller than pH 7.0 are increasingly acidic whilst numbers larger than pH 7.0 indicate increasing alkalinity up to an ultimate alkalinity of pH 14.0.

The best pH range for pondfish is from pH 7.6 up to pH 8.4 and fishes kept in this quality water are always healthier and more vigorous than otherwise.

Both the *Waterlife pH Test Kits* are very simple to use, have complementary pH ranges and contain *safe* buffering powders to correct any pH imbalance found on testing your pondwater.

"Waterlife" Carbonate Hardness Test Kit

Pondwaters which are hard have been traditionally regarded by fish farmers as being very *fertile* waters which are excellent for fish culture since they support a good population of the zooplankters used as supplementary livefoods by pondfishes. The *minimum* water hardness desirable for koi and goldfish is of the order of 50DH. The *Waterlife Hardness Test Kit* gives a quick, simple test of water hardness measured in German degrees ("DH").

"Waterlife" "Pondsals"

If your pH and hardness tests reveal that your pondwater is unsuitable for fish culture, ie, *too soft and too acid*, resulting in ailing, listless and periodically sick fishes, you can easily correct both your pH and water hardness characteristics *at the same time* by using economical Waterlife **Pondsals**. **Pondsals** will not only swiftly aid the recovery of your fishes but will also speed up the beneficial action of **Algizin "P"**, **Protozin**, **Sterazin "P"** and **Myxazin** treatments.

"Myxazin"

For the destruction of those organisms in the culture water causing finrot and ulcers as well as other pathological conditions caused by Gram negative bacteria including those of the genera *Pseudomonas*, *Aeromonas*, *Vibrio*, *Mycobacterium*, *Streptomyces* and others.

Myxazin is a broad-action bactericide under correct water conditions.

Myxazin should be used as a sterilising agent for *Tubifex*, *Daphnia*, nets and other equipment by the addition of 4 drops to 9 litres of water, (2 Imperial gallons).

Dosage: In the aquarium and garden pond: 4 drops to 9 litres of water per day until the symptoms disappear. Filtration through active charcoal must be stopped for 4 hours during the treatment.

"Sterazin 'P' "

A modification of the now world-famous "**Sterazin**" for aquarium use, **Sterazin 'P'**'s Formulation is suitable for garden-pond usage only and is effective in the destruction of parasitic crustaceans (eg, *Argulus*, *Lernae*, etc), insect larvae (Dragonfly larvae, etc) "flukes" (monogenetic and digenetic trematodes), nematodes, cestodes, etc. **Do not use Sterazin at all in ponds containing Orfe!** In such ponds, first remove the orfe to a temporary plastic pond or aquarium, treat the pond with **Sterazin 'P'** and allow the **Sterazin 'P'** to biodegrade for 5 days before re-introducing the orfe to the garden pond. Alternatively, use "**Paragon**."

Sufficient to treat 2,000 gallons (approx 10,000 litres).

"Algizin 'P' "

A pond algicide and general tonic for pondfishes of all species. *Algizin 'P'* is the only pond algicide so far developed (1981) which actually destroys "blanket-weed" (=masses of green thread algae which grow from the walls of the ponds and on the higher plants). NB: *Algizin 'P'* should

not be introduced into a pond until all the green or brown water has been flushed out of the system. This is most safely effected by trickling a slow-running garden hose through the pond, night and day until the water is crystal-clear. The overflow is allowed to spill onto the lawn so that the garden plants benefit. Now, with crystal-clear water add the correct amount of *Algizin 'P'*, and the water will remain clear for a considerable period of time until the next treatment is required.

Algizin 'P' also contains two powerful fungicides and a protozoacide ensuring that regular usage controls fungal and protozoan diseases as well as algae.

Sufficient to treat 2,000 gallons (approx 10,000 litres).

"Halox". Water conditioning preparation for freshwater.

Halox is a preparation for the rapid neutralisation of all toxic halogens (chlorine, fluorine, bromine and iodine) which may be present in the city tap water. Additionally, colloids are present which protect the fishes' delicate gills. Within an hour the water is safe even for the most sensitive fishes.

Halox also adds naturally occurring organic components which are to be found in tropical and temperate rivers. *Halox* should be added to all new water before the re-introduction of plants and fishes, and automatically added to "topping-up" water and partial replacement water.

Halox does not affect plants nor the helpful bacteria which are essential for the biodegradation of organic material. **Neither do any other products from Waterlife Research Ltd.**

Dosage: 4 drops to 9 litres of water (-2 drops/gallon). Aerate the water for at least 5 minutes before fresh introduction of fishes and plants.

"SeaVita". Vitamin supplement for both fresh and saltwater.

SeaVita is a multiple vitamin and essential mineral supplement in liquid form which is of vital importance to the modern pondkeeper who for the most part relies on dry prepared foods to feed his fishes.

The majority of the world's leading fish pathologists subscribe to the view

that many diseases of fishes can be traced back to *avitaminosis stress*, i.e., a dietary deficiency of essential vitamins and mineral salts. *SeaVita* provides an inexpensive and convenient means of correcting and preventing this imbalance in diet. Fishes whose food is treated weekly with *SeaVita* are stronger, more colourful, more disease resistant and breed more regularly than vitamin-deficient fishes.

A few drops of *SeaVita* solution added at least once each week to pelleted, flake or freeze-dried foods will produce a wonderful improvement in the vitality of all Koi, Goldfish, Orfe, Tench, etc.

"Paragon"—an exciting new broad-spectrum disease treatment for *multiple infections*, i.e., where the fishes are so weakened that pathogenic viruses, bacteria, fungi, protozoa and metazoan parasites may all be implicated in the disease condition.

Alternatively, *Paragon* is most aquatic dealers treatment of first choice where, owing to beginner's inexperience, the hobbyist is insufficiently skilled to give a detailed description of symptoms which would have enabled a positive diagnosis to be made.

Paragon is not harmful to any pondfishes, including Rudd and Orfe, when used as directed.

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TRI-S—over 20 varieties to choose from, has added 33% more product to each package. The previous 3 oz. package is being replaced by a new 4 oz. package and the most exciting fact is the price . . . 4 oz. of product for the low, low 3 oz. price.

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the only natural key to success. Now with TRI-S the hobbyist can rotate their fish diet and come as close as possible in duplicating nature within a closed system.

TRI-S Products, Inc., P.O. Box 6507, Cleveland, Ohio 44101, 216-589-9704. Free brochures and price sheets available upon request.

Fishy tips

First are perhaps the most serene pets giving so much pleasure for very little effort on the owner's behalf.

Below are some tips from Dow Corning on how to build your own small fishtank. The company has just introduced a new easy to use injector cartridge version of its popular Aquaria silicone rubber sealant which provides a permanently flexible and waterproof seal for building aquaria, repairing cracks, mounting valves and sealing connections.

To construct a 15 gallons size tank, order quarter-inch plate glass with dimensions of 450mm x 300mm (24 in. x 12 in.). If you insist on accurate measurements, corners should arrive perfectly squared. First clean and dry glass thoroughly and then cut nozzle of cartridge to a quarter-inch aperture. Next place the bottom glass on a table near a wall and apply sealant to top back surface of bottom glass. Position back glass lower edge on the sealant strip on the bottom glass, leaving back glass against the wall. Continue by building up the other three sides in the same way.

If there are any air bubbles in the sealant, remove by applying pressure on the surrounding glass. Hold the glass in position with masking tape until finally cured, usually about 48 hours. Trim away excess sealant with a sharp blade, then apply a thin strip of sealant all along the inside seams of the tank. Leave entire aquarium untouched for a further 48 hours to ensure a thorough curing of the sealant before filling with water and fish. Once cured the sealant is harmless to fresh and saltwater fish and will provide a strong, flexible bond which

Press Release

is guaranteed not to shrink or crack for at least ten years.

Dow Corning Aquaria is available from most D.I.Y. and hardware stores including a number of hobbyist and pet shops. RRP is £2.20 (excl. VAT) and until 30th April 1983 there is a chance to win a free holiday for two in America with each purchase.

For further information, please contact: Pamela Wentzell, J P Communicators 0703 32738.

Pollution free shells from Barra

"The seas around the Isle of Barra in the Outer Hebrides must be as free from pollution as any in the British Isles according to Mr. H. E. Couzens of Barra Shell Ltd., and it is from this area seas that his company obtains its supplies in order to produce Barra Crushed Cockle Shell.

The shells used are clean, empty and free from any organic matter and are not residual shells after the processing of cockle meat.

The company has for many years supplied crushed cockle shell graded from 8.0 mm to 2.5 mm but is now in a position to supply a finer grade i.e. 2.5 mm to 1.0 mm.

For further details contact: Mr. H. E. Couzens, Barra Shell Ltd., Blencowe Limeworks, Penrith, Cumbria. Telephone: 08533317."

The Highgate Aquarist offers guarantee

It has become quite clear to me from the very many hobbyists I see and the correspondence I receive that "The Discus Fish Hobby" has greatly increased in stature over the last years. Many more hobbyists are now willing to have a go keeping these fish whereas in the past they would have shied away because of the very many problems so long associated with this genus. We have learned a great deal about them in the last years, the equipment has become more reliable and now, many more enthusiasts are willing to take a chance. As a result of our gained knowledge, our capabilities of keeping these fish in perfect conditions and even propagate them without too many difficulties, a certain element of 'nastiness' has also become part of the whole scene: How many times have I been told that certain dealers sold 'guaranteed' Schmidt-Focke Turquoise Discus fish. The Highgate Aquarist has been the Sole agent for the last 8 years or so

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Certificate of Origin

Species.....

Volumes.....

Age.....

Date of Purchase.....

It is hereby certified by The Highgate Aquarist that the Discus fish sold to.....

are of a description as set out in the Schedule above

E. Schulze

Fish.....

for Dr. E. Schmidt-Focke and no other dealer, whether they are in Wales or Scotland, in certain parts of London or basically just anywhere, will have any genuine Schmidt-Focke bred Turquoise Discus fish for sale. Genuine Schmidt-Focke bred Turquoise Discus fish are only available from *The Highgate Aquarist* and in future any hobbyist, whether he will purchase just one, or one hundred or a breeding pair will be issued with a Certificate of Origin; this will be his Guarantee and Pedigree.

E. Schulze

OSCAR



G. Robinson

The Zambian TIGER BARB

by Glen Melhuish B.Sc.



The Zambian Tiger Barb—*Barbus fasciolatus*

Introduction

Barbus fasciolatus (Günther 1860—1868) was originally collected by Dr. Welwitsch in the Cunene River in Angola. Another comparable species namely *B. bariloides* (Boulenger 1914) was described from the Solwezi River (Kafue River system). Both species were originally thought to be two distinct species on a basis of lateral scale counts, but further examination of material revealed that a modal scale count of 26 was recorded for both species by Dr. Jubb (1963) so that the latter species can now be considered a synonymy of *B. fasciolatus*.

Description

Fin/Ray Counts. Dorsal 111—8 with the third simple ray largest but flexible. Anal 111—5.

Scales are radially striated with 24—28 along the lateral line and 12 around the caudal peduncle. The two pairs of barbels are well developed, the anterior one usually as long as the eye, and the posterior one about $1\frac{1}{2}$ times the eye diameter. It is usually a characteristic feature of Zambian barbs and indeed African barbs in general, for the species to possess two pairs of barbels although exceptions do occur e.g. *B. hulstaerti*—the Butterfly Barb of Zaire.

It is one of the prettiest little barbs and the only species from our tributary streams to possess a series of vertical bars. The basic body colour is olive to bright red—more intense on the dorsal surface and fading through a silvery to red mid-body, to a pink or white belly. The brightness of the

coloration was found to be mainly associated with age and breeding condition. The narrow black vertical bars vary in numbers and shape and range from 10-16. The last bar generally ends as a spot on the caudal peduncle. The colour of the posterior part of the fins is brighter than the anterior part and varies from white/pink to bright red.

Habitat

It is a species of well aerated tributary streams and is rarely found in lakes but is certainly absent from major rivers. It is not weed loving and found only where there is a sandy or rocky substrate. This is a migratory species during the rainy season where collections during January to April prove difficult in known localities. Migrations to upper reaches of tributary streams into catchment areas or flood plains occurs. It is in these quiet back-water areas that spawning takes place where adequate weed cover affords protection to fry from predation.

Distribution

Upper Zambezi, Kafue, and Zambian/Zaire river systems. It is fairly evenly distributed but nowhere common or abundant.

Personal Observations

The writer first encountered this species in April 1970 in a flooded low lying area (dambo) which was utilised for rice experiments and very adjacent to a tributary stream feeding the Kafue River. In the above location it was found associated with *B. lineomaculatus* with equal abundance—both species exhibiting shoaling characteristics. Other associated barb species of minor importance were *B. eutaemia* and *B. multilineatus*—the latter in more weedy locations towards the embankments. Non barb species were *Apolcheilthys katangae*, *Ctenapoma*

multipinnis, *Pseudocrenilabrus philander* and one unidentified *Tilapia* species.

All earlier literature states that the species do not take kindly to transport. This has been borne out by that fact that transport in oxygenated bags to my home within easy walking distance often resulted in 50% casualties on arrival.

Water conditions in which the species have been found are very soft, giving 44 ppm CaCO_3 and a pH of 7.4. This species is, however, easily acclimatised to much harder water conditions which characterise some of our Copperbelt soils particularly in South Eastern areas of the Copperbelt Province. Complete, hygienic water conditions must be maintained when this species is kept in aquaria. If this condition is not met this species is the first one of the Zambian barbs to succumb.

The most common symptoms are fungal like in nature appearing either as woolly tufts or as a fine coating over the whole body. Despite a whole range of remedial measures taken in an attempt to eradicate the disease the species was found not to respond to medication. Pathological examination of dead diseased specimens have revealed the specimens to be affected by "columnaris disease." Bi-weekly partial water changes were found to be the best prophylactic measures to adopt. Another disease encountered and which also affects other barbs species is the condition commonly known as "wasting away" disease which appears to be a symptom of a dietary deficiency—a condition greatly reduced by the inclusion of mosquito insect larvae into their diet. In the absence of this source of livefood other forms may be used e.g. *Daphnia*. It is a

species of lower water levels and cantolerate lower temperature levels of less than 50°F during the Zambian Winter months from June to September.

Conclusion

With the exception of the Malayan Tiger Barb, *Barbus hexazona* the Zambian Tiger barb, in the writer's opinion, rightfully warrants this name because of its markings and coloration. So put a Tiger in your Tank!

References

1. Bell-Cross, G. 1965. Additions and amendments to the checklist of the fishes of Zambia. The Puku, Occ. Papers Dept. Game and Fisheries, Zambia, No. 3: 29-43.
2. Bell-Cross, G. 1976. The Fishes of Rhodesia. Trustees of the National Museums and Monuments of Rhodesia, Salisbury, Rhodesia.
3. Jackson, P. B. N. 1961. The Fishes of Northern Rhodesia (A checklist of Indigenous Species). Government Printer, Lusaka.

Using a Seine Net made up of Archery netting material to collect Zambian Barbs in tributary streams. All photos by the author



PRINCIPLES OF BREEDING BREEDING

by
Frank Orme

Part 2

PART ONE of this article dealt with genetics, now we can, with greater understanding, examine the various methods of breeding which can be used in an attempt to perpetuate and improve wanted characteristics. Having absorbed some of the basic facts of heredity, we can now make use of the genes in their infinite combination to so improve the quality of our fish that the evidence of our touch will show for all to see and recognise in the years to come. The real objective of the breeding programme should be to raise the quality norm to the highest degree possible.

If we are to achieve the greatest good from our chosen breeding programme, there are some important traits which we need to examine and which are essential to our success. (1) **Fertility.** The lack of fertility must be guarded against—it has been the cause of some complaint during recent years amongst some goldfish breeders. Use only those fish which produce a good quantity of viable, fertile eggs. (2) **Vigour.** This is very important to

the well-being of the stock. It implies a hardy resistance to disease and similar ills, and encourages good coloration. Vigorous, fertile females will produce eggs, and spawn, under the correct conditions. Similarly, the males will have little difficulty in fertilizing the eggs in a satisfactory manner. (3) **Long Life.** Longevity allows a fish with outstanding features to be used so much longer than its shorter lived kin. This is a factor influenced by both genes and the environment in which the fish is kept. (4) **Quality.** Only the best type available should be used for breeding; they should conform to any required standard. No inferior specimen of unknown genetic make-up should be bred into an established line. To do so can undo many years of carefully planned breeding.

It will be found that when trying to produce top quality fish there is a strong regressive pull towards the average, even when the parents have been well above average. The same can be said for progeny produced by below average parents, although in this case there will be a lesser number of young that can be classed as of average quality, the majority being less than average. In the case of the better quality parents, some of the young will stay above the average but many will regress to a greater or lesser extent. From a breeding point of view it is far better to use a fish of average quality from known above average stock, than a top quality fish from poor, below average stock. This is not so strange when we remember that it is not the fish, as such, which produces the traits in the progeny, but the genes of which it is custodian.

Any of the following breeding methods, if used intelligently, can be used to bring about an improvement in the quality of the young which are produced. Whichever method is followed, there will come a time when it becomes necessary to incorporate one or more of the other methods into the breeding programme in order to concentrate certain genetic characters, or to introduce new ones as an essential to the overall improvement. Outcrossing is

not recommended as a regular practice. Rather, it is valuable as an adjunct to the other methods when used for corrective purposes—provided that the outcross is to blood-related stock of good quality.

Inbreeding

Let us first consider Inbreeding. This entails the breeding of father to daughter, son to mother, half brother to half sister, and, the closest inbreeding of all, brother to sister. These matings produce stability and purity of the inherited material. More specifically, inbreeding concentrates both good and bad features, strengthening the dominants and bringing the recessives into the open where they can be seen and evaluated. It is the only means the breeder has to control, combine and balance similar genetic factors. Inbreeding does not result in degeneration, it does, however, concentrate those faults and weaknesses that are already present so that they can be recognised and eliminated.

Selection is always important, but never more so than when inbreeding. It is imperative to choose as near faultless partners as possible, and the culling of the young must be rigidly selective.

There is an oft voiced fear that inbreeding can lead to smaller, less vigorous fish. However, whilst this may happen during the first few generations, there is normally an improvement in the fifth and subsequent generations as the young regain their vigour and size—even surpassing the original specimens. Amongst many examples of this fact is that Dr. Leon F. Whitney, and the line of guppies which he produced. Despite their early lessening size, in the fifth generation the trend was reversed and thereafter improved with each succeeding generation to produce his very beautiful fishes. I might add that during the many years during which I have bred my strain of lionhead goldfish, I have not suffered any 'dwarfing' of my stock; however, I have relied upon a combination of the methods described in this article.

Backcrossing

Another form of inbreeding, more commonly known as Backcrossing, involves the use of an exceptionally good adult. This fish is bred with the best opposite sex available, and the best of the young is then bred to its exceptionally good parent. This practice is continued for as long as possible or necessary. For instance, if the programme is based upon a male that carries features that we wish to propagate in future generations. The male would be crossed with a good female, and the best daughter, grand-daughter, great grand-daughter and so on crossed back to the male for as long as he remained active and capable of fertilizing the eggs. This would be discontinued if any fault or weakness became apparent in the progeny.

Line-breeding

Line-breeding is breeding in a somewhat broader sense, which allows us to conserve and concentrate valuable characteristics but does not allow us to exercise so much control over specific features. Most fish breeders rely upon line-breeding, which is relatively safe, to create a 'strain' of their own particular fancy.

Specifically, line-breeding entails the selection of breeding partners which have one or more common ancestors, in other words they are blood-related to some extent. The ideal is to create two separate lines by, say, breeding a male to two different good quality females. The young are kept separate to avoid any mix-up. One line is then bred on the backcross system, the other is initially bred best brother to sister and thereafter a combination of inbreeding and backcrossing is used—always selecting only the best young fish. From these two lines it is then possible to select the best fish, as necessary, to line-breed. The alternative is to obtain or work with another breeder who has a stock of fish which originated from the same ancestors as yours.

Outcrossing

Occasionally it may be thought necessary to Outcross by breeding to a

fish which is not blood-related in any way, in other words the chosen fish shares no common ancestor with your own stock. This may be necessary to bring in a new and needed characteristic, which cannot be found in the existing stock.

The new fish should be strong in the required feature, and be from a strain which is well bred and equally strong in that particular feature as evidence that it is a dominant factor.

Outcross breeding should not be used as a regular pattern of breeding, as it will not allow an overall improvement in the stock. In fact, the result of outcrossing will, in general, result in a lowering of quality because it will tend to bring in unknown gene factors and disperse those favourable genetic combinations which have been built into your own strain. Care will be necessary, when selecting from the young, to choose only those progeny which have retained the features of your own strain whilst incorporating the new feature, rejecting the remainder. Look upon outcrossing as a corrective measure only, and nothing more than that.

To sum up, Inbreeding simplifies the breeding formula and strengthens desirable dominants. It brings undesirable recessive factors to the surface where they can be recognised and corrected, possibly by Outcross breeding. When we have thus established a definite improvement by rigid selection for the required characteristics we can Line-breed to create and establish a strain of fish which, in various degrees, incorporates those improvements which have been built into it.

Creating a strain of fish will not be achieved "overnight" and much careful selection will be necessary before any improvement becomes evident. There will be many apparent set-backs but, with dedication and perseverance, the results will eventually bring their own reward as your stock climbs above the "average norm", both in quality and value. Surely a planned breeding programme is worthwhile—so why not try it and work towards YOUR ideal fish?

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



Tongham A.S. held a table show on 6th January. Results: Class 1: 1 and 2, M. Long; A.O.V.: 1, A. Outley; 2 and 3, M. Bird; 4, J. Outley. 20th January Class 2: 1 M. Bird; 2, R. Cooke; 3, J. Outley. Class 4: 1, 2 and 4, A. Outley; 3, J. Outley. A.O.V.: 1, M. Bird; 2 and 3, R. Cooke; 4, J. Outley. The judges were Mr. R. Payne. They meet every first and third Thursday at the Victoria Hall, Ash, Aldershot, and new members are very welcome. Tel: J. Outley (Aldershot 31062).

Tongham Aquarists now meet at the Victoria Hall, Ash, near Aldershot on the first and third Thursdays of each month. Further details from the Secretary, Mr. J. Outley, 71 St. Michael's Road, Aldershot, Hants.

Corringham and District A.S. held its a.g.m. on 24th January, and the following officers were elected: Chairman, Mr. John Harrison; Secretary, Mrs. Jacky Harrison; Treasurer, Mr. Mike Liggins. The club meets on the 2nd and 4th Monday of each month. Further details can be obtained from Mrs. J. Harrison, 18 Tasman Close, Corringham, Essex. (Tel: 0375 671746).

Wycombe Marsh A.S. meet at 8.30 p.m. at the Young Adult Center, Wycombe College, Queen Victoria Road, High Wycombe, Bucks., on the 1st and 3rd Thursdays of the month. At the a.g.m. the following officers were elected: secretary, Jeff Woodbridge (Tel: High Wycombe 882875); chairman, John Johnson; treasurer and publicity officer, Stephen Friend. Events planned are as follows: 17th March Tape-slide on "Aquarium Plants." 7th April, Bring and Buy Sale.

Reigate and Redhill A.S. held their a.g.m. on 3rd January. New Committee: chairman, Al Gardner (Redhill 66045); secretary Dick Leah (Redhill 65152); treasurer, Derek Payne (Upper Wokingham 5308); show secretary, Eddie Baguley (Redhill 67929). The committee would be pleased to hear from other clubs with the prospect of arranging joint ventures throughout the coming year. The club meets regularly at 8 p.m. on alternate Mondays, Woodhatch Public Library, Woodhatch, Surrey. Members of other clubs and anybody interested in aquatic life will be most welcome.

At the a.g.m. of the **Catfish Association of Great Britain**, the following officers were elected: Chairman, Roy Goodson; Secretary, John Carpenter; Treasurer, Pat Lambourn; Public Relations, Tom Glass; Show Secretary, Malcolm Field. The address of the Secretary is John Carpenter, Secretary, C.A.G.B., 8 Brocklands, Yantley, Camberley, Surrey. This year's open show will be held on 24 April, and will take place at Annerham Community Centre, Chiltern Avenue, Annerham on the Hill, Buckinghamshire. All details about show schedules can be obtained from our new Show Secretary, Malcolm Field, 118 Box Moore Road, Chesham, Buckinghamshire NP5 1SS. (Tel: 694-76467). In order to keep their overheads down to a minimum, they would gratefully appreciate it if all postal queries were accompanied by a s.a.e.

THE Aylesbury & District Fishkeeper Society held their a.g.m. at their new meeting place in the British Rail Staff Association Club. They will be meeting there every other Monday at 8 p.m. and new members are always welcome. Further information can be obtained from the Secretary, Mrs. Mallon, on Aylesbury 431196.

THE Secretary of Kingston and District A.S. is now Mr. D. Mackay, 12 Victoria Road, Twickenham, Middlesex.

MIDLANDS AND WALES



Port Talbot and District A.S. held its a.g.m. recently and the following officers were elected: chairman, R. Perkins; secretary, D. Nichols; 2 Dolphin Place, Sandfields Estate, Port Talbot; treasurer, A. Calister; show secretary, J. Egan.

F.I.A.S. Area Group. A Mid-Shires area group has recently been formed in the Midlands. The aim is to assist societies and to organise various inter-society activities. Any society interested in further details should contact Howard Bley, 54 Lumberbush Lane, Boothville, Northampton (Tel: Northampton 44158).

THE North Bucks A.S. now meet at 8 p.m. on the first Tuesday of every month at the small meeting place, Stacy Dashes, Milton Keynes, Bucks. At the recent a.g.m. the following officers were elected: Chairman, J. Masood; Treasurer, Mrs. L. Honey; Show Secretary, J. Irvine; Secretary, M. S. Wolfe, 44 Farthing Grove, Netherfield, Milton Keynes, Bucks. MK9 4JH. Visitors and new members are always welcome.

THE Pottersley & District A.S. has now been dissolved.

THE Cannock & District A.S. has had a wonderful fishkeeping year, and would like to thank all of the speakers, M.A.A.S. judges and enthusiasts, who made it so. The awards for 1982, will be presented at a special evening on the 26th February by Mick Darbey, who has made several appearances on television concerned with the hobby. Award winners are: Miniature Aquaria Senior, A. and R. Potts; Miniature Aquaria Junior, Miss R. Hall; Home Aquaria Senior, H. Evans; Home Aquaria Junior, Miss S. Hewkes; Champion of Champions, Mr. and Mrs. Hall; Aggregate Senior, A. and R. Potts; Aggregate Junior, Miss R. Hall; Breeders Class, Mr. and Mrs. Hall; Fish Rearing, Mr. and Mrs. Hall; Fish over 6 in., M. Kirkham; Fishing Contest, J. Shorthouse; Pairs Class, M. Kirkham; Plants, R. Evans; A.O.V. Catfish, M. Kirkham; Novice Aquaria, R. Potts. The society meets first and third Tuesday every month at the "Edward Street Working Men's Club," 101 Edward Street, Broctonhill, Cannock at 8.30 p.m. Several activities have been arranged for the coming year, and more information will be gladly given from: Robert Potts, Secretary, 25 Oaks Drive, Cannock, Staffordshire WS11 1EU. Visitors and new members are always very welcome to attend.

NORTH



At the a.g.m. of **West Yorkshire Marine Aquarist Group** on 19th January, in the Dewsbury Club and Institute, the following officers were elected: Chairman, Noel Ogilby; Secretary, Steve Pearson; Ance Humpshires; New Products, Tom England; Publications, Bill Macbeth. The evening was brought to a close with a lecture "Swimming up water chemistry," by Steve Pearson, Noel Ogilby and John Grainger. The group meets on the third Wednesday of each month and new members or visitors are always welcome.

Wyke Show Society held their a.g.m. at the "Rose Hotel," Beverley Road, Hull. The following committee were elected: Chairman, A. Frisby, 13 Brammar Avenue, Eskdale Lane, Hull HU6 7UE; Show Secretary and Secretary, I. Giddings, 47 Bohemian Close, Bransholme, Hull; Treasurer, G. Frisby; Committee members, D. Frisby and C. Taylor.

THE names and addresses of Doncaster & District A.S. committee for 1983: Chairman, H. Ackroyd, 17 Ronald Road, Bally, Doncaster; Secretary, D. A. King, 73 Aintree Avenue, Cantley, Doncaster; Treasurer, S. D. Copley, 17 Newbolt Road, Bally, Doncaster; Show Secretary, N. Brumby, 26 Merley Road, Wheatley, Doncaster (Tel: 22837).

CHANGES of Committee in the Bradford & District A.S.: Chairman, Ray Spencefield, 18 "Hope View," Windhill, Shipley (Bradford 595097); Treasurer, Allan Daugherty, 60 Moore Avenue, Bradford 5, (Bradford 571523); Secretary, Miss Sheila Gauls, 90 Hillcrest Drive, Queensbury, Bradford, (Bradford 882306); Show Secretary, Mrs. Sandra Evansfield, 16 "Hope View," Windhill, Shipley, (Bradford 595097).

RESULTS of Northern Coldwater Fish and Pondkeepers Society open show held on 16th January: Best in Show: Mr. and Mrs. Roe (Bishop Auckland). Special Award: D. Herbet (Redcar). Koi (above 7 in.): 1, K. Goddome (Airedale Plain); 2, J. Brady (Bibb); 3, K. Harrison (NCFPS); 4, Mr. and Mrs. Roe. Koi (up to 7 in.): 1, G. Robertson (NCFPS); 2, K. Harrison; 3 and 4, D. Young (NCFPS). Singletails (Metallic): 1 and 2, Mr. and Mrs. Roe; 3, J. Loman (Throckley); 4, S. Rhodes (NCFPS). Singletails (Non-metallic): 1, N. and W. Daly (NCFPS); 2, Mr. and Mrs. Roe; 3, J. Middlemass (Stanley). Twintails (Metallic): 1, D. Herbet (Redcar); 2, Mr. and Mrs. Roe; 3, K. Goddome. Twintails (Non-metallic): 1, N. and W. Daly; Twintails (Cello): 1, R. Scott (Ind.); 2, K. Barron (Gateshead); 3, N. and W. Daly; 4, Mr. and Mrs. Roe. A.O.S. Twintail: 1 and 4, K. Dodd (B. Airedale); 2, C. Herbet; 3, N. and W. Daly. A.O.S. Coldwater (up to 5 in.): 1, D. Herbet; 2, 3 and 4, B. Barron (Gateshead). A.O.S. Coldwater (above 5 in.): 1 and 4, J. English (NCFPS); 2, K. Harrison; 3, D. Hall (NCFPS). Breeders (Singletails): 1 and 2, Mr. and Mrs. Roe. Breeders (A.O.S.): 1 and 2, J. Hoarer (Gateshead). Any Species Amphibian: 1, D. Hall (NCFPS); 2, J. Young (NCFPS); 3, K. Barron (Ind.).

SCOTLAND



Paisley and District Aquarist Society held a meeting on 11th January. Guest speaker was Mr. S. Nisbet, who gave a very interesting talk on Breeding Egg Layers. The table show was 'Paisley Fish'. Results: Senior League: 1, Ian McIntyre; 2, Stuart Hamilton; 3 and 4, Ian Lindsay. Juvenile League: 1 and 3, Richard Brooking; 2, Alan Patterson; 6, Dylan Lafferty. Meetings are held on the first Tuesday of every month at the Paisley Mosses & Art Galleries, High Street, Paisley at 7.15 p.m. to 9.15 p.m. Everyone welcome, further information can be obtained from the Club Secretary: Mrs. E. Lindsay, 71 Wright Street, Renfrew, Renfrewshire PA4 8AS. (Tel: 041-889 5772).

Dates for the diary

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

MARCH

6th March: The Norwich Section of the **BRITISH KOI KEEPERS' SOCIETY** monthly meeting in Norwich, with a film show on Koi, for further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.

6th March: **BRITISH KOI KEEPERS' SOCIETY** annual general meeting, at the Post House, Leicester, commencing at 1 p.m. After the interval the Guest Speaker will be Dr. P. Miller, the Zoologist, talking about stress in *Cyprinus Carpio*, with particular reference to Koi. His talk will be illustrated with slides and diagrams. For further information, write to the Membership Secretary, 3, Horncliffe Road, Merton, Manchester.

6th March: **HARINGEY A.S.** 1st open show at Fox Hall, 59, Park Road, Haringey, London. Further details and schedule from A. Dempsey, 31, Oakfield Road, London N4 4NP.

19th-20th March: **SCOTTISH AQUARISTS FESTIVAL**, Motherwell Civic Centre, Nr. Glasgow. Details from Mr. W. Bennett, 15 Goulter Avenue, Coltness, Waltham, Lanarkshire ML2 8SZ.

20th March: **SKEGNESS & DISTRICT A.S.** 6th open show at the Imperial Cafe, North Parade (opposite pier), Skegness. Bunting 12-2 p.m. Judging 2.15 p.m.

20th March: **RUNCORN A.S.** open show at St. Edward's Church Hall, Ivy Street, Runcorn, bunting 12-2 p.m. Further details, schedules, etc. from Mrs. K. Morkin, 23, Adela Road, Runcorn WA7 4TU. (Tel: 76099).

23rd March: **GARFORTH & SWILLINGTON A.S.** Spring mud open show, at Scholes Village Hall, Main Street, Scholes, Leeds 14. Bunting 7.0 to 8.0 p.m. Enquiries and schedules, contact A. J. Martin, 16 Meriden Avenue, Garforth, Leeds LS25 1HX (Show Secretary).

27th March: **CENTRAL MEDLANDS CICHLIDS GROUP** Second exhibition and auction at the Peace Memorial Hall, Pinfold Lane, Penkridge, Staffs. Items for auction may be handed in from 10 a.m. onwards. Auction commences at 1 p.m. Further details from Mrs. Maureen Hall, 71 Saxon Road, Penkridge, Staffs. Tel: Penkridge (078 571) 3944.

27th March: First open show at the Orange Farm Hobbes Centre, Southcote, South Humberdale. Judging will be to V.A.A.S. standards.

APRIL

3rd April: **MALVERN & DISTRICT A.S.** 10th open show at Christ Church Hall, St. Barnards Green, Malvern. 1st place trophies as well as perpetual trophies. Enquiries to: Show Secretary, S. K. Yallop, 3 Monkshill, Yorkhill, Ludbury, Herefordshire, HR8 2TX. (Tel: Trunsept 562).

3rd April: The Norwich Section of the **BRITISH KOI KEEPERS' SOCIETY** monthly meeting in Bradwell at the home of T. D. Burtbee. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.

3rd April: **ROTHWELL A.S.** 3rd annual open show at the Blackburn Hall, Marsh Street, Rothwell, Nr. Leeds. Details and schedules from the Show Secretary, Mr. G. Deighton, 46, Sandy Bank Avenue, Rothwell, Leeds LS24 0ER. (Tel: Leeds 624555).

7th April: **KINGSTON & DISTRICT** Bring and Buy section at Raynes Park Methodist Church Hall, Worples 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. R. Cooper, 14 Rochester Road, Taunton TA2 3LD.

10th April: **BISHOP AUCKLAND A.S.** open show at the Bishop Barrington Upper School, Woodhouse Lane, Bishop Auckland. Bunting 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: **POCKLINGTON A.S.** open show at the Livestock Centre, Marton, York.

17th April: **KIRKCALDY A.S.** annual open show at Baberston High School, Baberston Gardens, Kirkcaldy. Schedules from A. Little, 36 Ivanhoe Drive, Glenrothes, Fife.

17th April: **POCKLINGTON A.S.** 2nd open show. Contact Show Secretary, R. She, 55, George Street, Pocklington, York YO4 3DQ.

24th April: **YEOVIL A.S.** open show, Parish Hall, Martock, Somerset. Schedules (S.A.S. please) from T. C. Perry, 316 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, 16 Kingsley Road, Bristol BS6 6AF, on receipt of a stamped addressed envelope.

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

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.

1st May: **WHITBY & DISTRICT A.S.** open show. Show Secretary, G. Taylor, 25 Runswick Avenue, Whitby, North Yorkshire YO21 3UB. Tel: Whitby 504495.

7th May: **NORTH AVON A.S.** open show at The Haslem Park Centre, High Street, Haslem, Bristol. Schedules from Show Secretary, Mrs. K. M. Gadd, 17 Braydon Avenue, Little Stoke, Bristol BS12 6EH. This is a change of date.

8th May: **I. & E. A.S.** open day at Monk Dyke High School. Bunting 11.00 to 13.00, Judging 13.15. If any clubs have plaques or cups belonging to the South & District A.S. would they please return them to Secretary, J. Johnson, 17 Florence Wright Avenue, Louth, Lincs. LN1 1BEJ.

8th May: **BOURNEMOUTH A.S.** annual open show at Kinross Community Centre, Fellams Park, Kinross, Bournemouth. Show schedules available from 1st April from Show Secretary, Jack Jeffery, 13a Woodland Avenue, Bournemouth BH1 2DZ, Dorset. (S.A.S. would be appreciated).

14th May: **SOUTHEND, LEIGH & D.A.S.** open show at St. Clements Hall, Leighton Soa, Essex. Show Secretary: D. M. Cheswright, 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, Bishopcleeve, Bristol. Further details from Show Secretary, Mrs. K. M. Gadd, 17, Beaydon Avenue, Little Stoke, Bristol.

15th May: **CORBRY & DISTRICT A.S.** open show at the Festival Hall, Corby Civic Centre. Schedules from Alan Henderson, The Nook, Corby, Northants. Tel: Corby (05353) 68289.

15th May: **BEDFORD & DISTRICT A.S.** 2nd open show at the Bunton Centre, Mile Road, Bedford. Further details from Mick Dashwood, 27B, St. Michaels Road, Bedford.

22nd May: **ABERDARE A.S.** first open fish show at Aberaman Y.M.C.A., Aberaman, Aberdare. Further details to follow.

22nd May: **ACCRINGTON & DISTRICT A.S.** open show at New Jerusalem Church Hall, Hargreaves Street, of Manchester Road, Accrington. Details from S. Walsh, 133, Lammock Road, Blackburn, Lancs.

22nd May: **BRIGHTON & SOUTHEN A.S.** open show. Details of venue at a later date. Information may be obtained from Show Secretary, Chas Raggio, 90 Bevindean Crescent, Brighton.

28th May: **DROITWICH A.S.** first open show at the Suburbs Village Hall, Copcut Lane, Nr. Droitwich, Worcs. Bunting 10.30 a.m. to 2.00 p.m. Schedules from Show Secretary, 47 Oakleigh Rd., Droitwich, Worcs. WR9 6RL.

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, Wilts. (Tel: 0793 32920).

8th June 1983: **SUDBURY A.S.** 11th open show at Neasen High School, Quainton Street, Neasen, NW10. Further details from Barry Witteridge (tel: 01-894 0818).

8th June: The Norwich Section of the **BRITISH KOI KEEPERS' SOCIETY** monthly meeting in Norwich at the home of B. E. Beane. For further details contact the Secretary, Mrs. O. Crosby on Norwich 412095.

11th June: **NALSEA & DISTRICT A.S.** open show at the Clevedon Community Centre. Details from Show Secretary, Mr. M. J. Ellick, 3, Burrington Close, Nalsea, Bristol. (Tel: Nalsea 854158).

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, Herford Road, Davonham, Northwich, Cheshire. (Tel: Northwich 6424).

18th June: **BASINGSTOKE & DISTRICT A.S.** 25th open show at the Cathedral Hall, Basingstoke. Schedules from Show Secretary, M. Strange, 10 Loddon Court, Newlie Close, Basingstoke. (Tel: Bas. 87039).

