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AQUARIST

AND PONDKEEPER

The Magazine for Fishkeepers



In this issue:
**West African
Killifish**
Colour feature



THE AQUARIST

AND PONDKEEPER

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APOLOGY

Due to industrial problems at our print works we regret that it is not possible to publish our "News from Aquarists' Societies" feature this month. We apologise for any inconvenience or disappointment this may cause.

The Editor accepts no responsibility for views expressed by contributors.



Golden gourami

What is Your Opinion?

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

MASTER JEREMY M. MOFFATT lives at 47 Chelsworth Drive, Pleenystead, London, SE18. He writes: ". . . I have been keeping coldwater fish for over six months now and my first fish, a goldfish, was a prize I won at a fairground for throwing darts into playing cards pinned on a wall. I saved up for a while, being only a schoolboy with little money, and bought a small plastic tank for my fish.

"Unfortunately those fish died a while afterwards; but I was hooked on fishkeeping and after a few months, with the help of my parents, I purchased a 24 in. x 12 in. x 12 in. aquarium and stocked it with fancy goldfish. At first I knew relatively little about fish except that you feed them twice a day—because it says so on the packet. Now I have read many books on the subject and have quite a large library myself.

"The reactions of my family have been quite mixed, although they all like the idea of an aquarium and the colourful fish I keep. Of everyone, my mother has taken most interest in the fish and I must thank her not only for putting up with all the mess and confusion but also for the financial help she has given. My sister, as usual, thinks she could do infinitely better, and anything which goes wrong is due to my mis-management of the tank. I am thinking of setting up a tropical fish tank but it will take a lot of hard saving before anything is settled. Be sure to keep up the great work because your *W.Y.O.* articles are a great source of information."

Photograph 1 shows a golden gourami and makes an appropriate introduction to the following letter written by Mr. P. D. Roe, of 26 South Road, High Etherley, Bishop Auckland, Co. Durham. ". . . In November 1979 I purchased a large pair of golden gouramies from a dealer in Darlington. After being conditioned for three weeks on *Tubifex* and white worms, in separate tanks, I moved them both into a well-planted 36 in. tank with water temperature of 80°F and pH of 7.0. I used a large Amazon sword plant in the middle of the tank and lowered the depth of the water to 6 in. This made the large, broad leaves of the Amazon sword spread out and thus provide the perfect building site for a bubble nest. In the past, when spawning Anabantids, I have used a square piece of polystyrene for the nest.

"The golden gouramies started spawning after 24 hours and hundreds of eggs were deposited in the nest. I removed the female after 12 hours and placed her back into a community tank. I left the male in the spawning tank until the fry became free-swimming; and then I removed him too. I would estimate that at that time I must have had about 1,000 fry. I did not have the space to grow on that number but I culled down the fry to leave about 100 as they grew. At first they were fed on *Liquifry* and, eventually, brine shrimps, and they grew rapidly. Out of the 100 fry I kept I got 40 pairs of golden gouramies. I have since tried to cross a golden male with a female opaline but with no success.

"I have been keeping fish for about 10 years now and have 15 tanks of various sizes in an outside fish house. I also keep a dozen koi in a small pond in the back garden and they are growing quite steadily. The biggest is 12 in. I have left them out over the winter as the pond is 4 ft. deep and they appear to be faring well; but they have not grown over the winter months. I suppose that's not surprising because I have not fed them either.

"My main interest in tropical fish is the barbs and I have bred rosy barbs, schuberti barbs, tiger barbs, cherry barbs, ruby barbs and ticto barbs very successfully using the same method. I use a 24 in. tank well planted with willow moss and other fine-leaved plants, at a temperature of 80°F and a pH of 7.0. I introduce the conditioned pairs in the early evening and then turn out the lights and leave them off all night. I usually find the fish actively spawning the next day. I remove the pair on the evening of that day and the fry hatch after about 24 hours and are usually found hanging on the glass. At this stage I introduce *Liquifry*, and green water from the pond to start off *infusoria*. After another two days the fry are free-swimming and are fed on brine shrimps straight away. The only hint I can give is to make sure that the breeding tank is spotlessly clean because dirty or old aquarium water is a killer to barb fry.

"Recently I went to two auctions of fish and equipment at Bellingham and Northallerton. These were run by aquatic societies and I found that as well as being able to get rid of my unwanted fish at quite decent prices I



Dwarf gourami

was able to pick up some bargains. I would be interested to hear other aquarists' opinions of any auctions they have visited.

"I have just recently established a 48 in. tank containing Rift Valley cichlids. Among the fish in it are *P. auratus*, *P. pindani*, *Tropheus trophops*, *Ideotropheus sprengeri* and *P. ornatus*. Unfortunately the pair of *P. auratus* I bought started to fight violently and the supposed female is now found to be a male. These fish have not bred yet but I am very hopeful for the future because I have been successful in breeding them before.

"To finish I should like to mention that a year ago I had a large brood of blue acara—nearly 1,000—and I spaced them out into rearing tanks; and even though I flooded the local shops and auctions with them I still have over 40 left. I'll end with this note in case any other aquarist decides to raise a brood of large cichlids. In fact, I must have spent more on heating and feeding them than I got for them when I sold them. Stick to the smaller, more common fish: they certainly sell better. I hope this letter will be of use to other aquarists."

Dwarf Gourami

Photograph 2 shows a male dwarf gourami and introduces another letter about breeding gouramies—in this case *Colisa lalia*, the dwarf gourami. Mr. B. D. Moore's address is 200 Centurion Way, Purfleet, Essex. He says: "These fish need a medium-sized tank; I used a 24 in. aquarium to breed them successfully. The water in my breeding tank has a pH of 6.9 and a temperature of 80°F. The water I used was old and matured. It should be no deeper than 8 in. Use plenty of fine-leaved plants—such as *Cabomba*—in the tank. Also, find an old feeding ring and pop it onto the surface of the water. My fish used it to build their bubble nest in. Buy a tube of egg-layers' Liquifry and use 3-5 drops daily for one week. This helps to produce *infusoria*, which are vital to fry.

"Select a nice, plump female and a rich, colourful male. Introduce them into the breeding tank a week after it has been set up. A day or so after being introduced, the male and female will be seen making advances towards each other. After this stage is reached the male begins

to build the bubble nest. Pieces of *Cabomba* were used in the construction of the nest—which was made inside the feeding ring. Once spawning has taken place the female should be removed because the male is liable to attack her. Spawning usually lasts about two hours. In my case about 150 eggs were laid; they were white in colour and hatched in 24 hours. The fry have a good yolk sac which provides nourishment for the first couple of days. Liquifry should also be used: four drops twice daily. Once the babies are free-swimming—in about seven days—the male should be removed. Food and feeding should be as follows: 0-10 days—Liquifry twice daily, 4-5 drops for medium tank, 6-9 for large tank; 10-20 days—half the amount of Liquifry supplemented with some very fine fish food, and brine shrimps; 20-35 days—fine fish food and plenty of brine shrimps—as much as they can eat; 35-60 days—medium-sized fish food, plenty of shrimps, chopped *Tubifex* worms and finely-sifted *Daphnia*; 2-4 months medium-sized fish food, brine shrimps and *Tubifex*; 4 months—your fish should be able to take most of the live and flaked foods by now.

"The fry develop an additional breathing organ in the first month of their lives. It is essential that you keep them well out of draughts. Air in the tank must be at the same temperature as the water—80°F or so. This is a very interesting fish to breed—especially the courtship and the construction of the bubble nest. I hope many other aquarists will attempt to breed this excellent fish."

Rocks

Mr. Martin Cain, who resides at 855 Woodpark Way S.W., Calgary, Alberta, Canada, states: "... There are many types of rocks one can use in decorating aquaria. The most common and easily identified types for use in freshwater aquaria are quartz, granite and the lime-free sandstones and slates. These rocks are generally chemically inert and will not alter the water hardness or pH.

"Identification can be greatly facilitated by the use of a field guidebook to rocks and minerals. These are widely available in most bookshops for a nominal sum. The aquarist can quickly learn to identify a number of rock types by conducting a few simple tests. The equipment needed includes a magnifying glass or hand-lens, a sharp steel object—a nail will do nicely—and a small squeeze bottle of dilute hydrochloric acid (HCl). Please ensure that the acid is safely stored away from younger family members.

"Quartz is a very common mineral, available in a number of colours, with a dirty white variety being the usual one seen. It has a glassy lustre and can only be scratched with some difficulty using a steel object. Granites come in many colours and textures but the most common variety is a rose-coloured, coarse, crystalline rock. With the magnifying glass the individual crystals of white quartz, pink feldspar and dark brown to black mica and amphibole can be seen. Again, granite is very hard and can only be scratched using considerable pressure.



Rock formation and stones on beach

"Sandstones are generally grey to brown and consist of very fine to very coarse sand grains, as the name implies. These grains may be consolidated with siliceous, calcareous, dolomitic or clay cement. We are looking for siliceous and not only are these fairly hard but they will not react with the dilute acid. Place a few drops on the surface of the rock and if it contains calcite or dolomite the acid will begin to bubble. The reaction is almost instantaneous with calcite and takes a few minutes to begin in the case of dolomite. Argillaceous sandstones are those containing a lot of clay material. These appear to have a dirty surface and quite often will disintegrate if soaked in a bucket of water overnight.

"Slates are quite distinctive in terms of colour and general appearance. Again, the dilute acid can be used to determine their calcite or dolomite content. Occasionally, slates containing small crystals of garnets or pyrite—fool's gold—will be seen. I would advise against their use in aquaria.

"In contrast to the above, I have found the addition of limestone, dolomite and marble very beneficial in aquaria containing either hardwater or marine species. These rocks release calcium and magnesium, thereby acting as a buffering agent in maintaining an alkaline pH value. Limestones and dolomites are only moderately hard; white marbles are slightly harder. All three react to the acid test.

"Rocks to be avoided are those with bright green or blue coloration as they may contain toxic copper minerals such as malachite or azurite. Also, I never use any rock with a metallic lustre for the same reason. Very soft rocks should not be used as they may contain toxic materials and will probably disintegrate in the aquarium. I usually soak any such rocks overnight in a pail of water, discarding any that show even partial disintegration.

"A final test designed to avoid the loss of any valued specimens can be implemented by placing the rock in an aquarium housing a few expendable fishes. The rock is considered safe if all the fish appear healthy after two to three weeks.

"Needless to say, any rocks added to aquaria should be thoroughly cleaned—a good brushing with a stiff-bristled wire brush, followed by rinsing in water, will usually do the trick.

"Regarding sources of lime-free gravel, most dealers can supply quartz gravels in a number of colours and grades. Personally I have never cared for the appearance of blue, green and red gravels, but to each his own. However, a very economical source of lime-free gravel is the 'chicken grit' used by poultry farmers. Here in Canada this material consists of a crushed granite and is available in several sizes or grades. Again, the local price is the equivalent of just over £1.00 for 50 lb. bag. This material is very dusty and requires thorough washing before use in aquaria. Also, I don't use it in aquaria containing catfish or loaches as the sharp, angular grains can be very abrasive to their barbels. The equivalent material sold in Britain may or may not be lime-free but your readers could quickly test a small sample with dilute hydrochloric acid."

BKKS

I note from the latest edition of the magazine of the British Koi-Keepers' Society that the Society will be 10 years old this year. No doubt others will join me in wishing the members every success for their celebrations—which will be held about 19th July.

Snow continues to lie around as I write this; and my newest roses remain unplanted.

Photograph 3 shows a section of natural rock formation and loose stones forming part of a seaside beach. A carefully study of such areas can give the aquarist some useful ideas about how to create a fairly natural looking combination of rocks and gravel in a home aquarium. In most cases, the rocks and gravel in an aquarium will look more natural in combination if they are the same—or of similar—colour. Light coloured gravel used with black rocks usually looks rather incongruous.

I suspect that the following letter has been in my unused collection for some considerable time; but I'm sure Mr. G. W. Spencer, who lives at 6 Lawson Avenue, Long Eaton, Nottingham, won't mind my using it—on the basis of better late than never. Please bear this in mind when reading the letter. Mr. Spencer says: "I have one of the new, digital thermometers which I think is very good as it does not get battered round the tank by the fish; nor does it get broken by being dropped. My last glass one lasted two days and cost only 20p less than this one.

Kribensis

"... The kribensis I have bred once; but after removing the other fish, which included two large *P. zebra* and two large black sharks, to another tank, the thermostat stuck in the on position during the night and caused the death of every fish I had apart from the kribis and their young—which had been left where they were. Four days later my wife said, 'What's that in the filter?' A closer look showed it to be a young kribensis about 35 mm. long

swimming in the $\frac{1}{2}$ in. air-lift tube of the filter. We got it out; but later, whilst in a small tank, it just disappeared. Has anyone else had a 'stat stick on with equally disastrous results; and has anyone found fry and small fish in unusual places?

"The batch of kribis is now 17 weeks old and the fish are in my second tank with some young *M. eiasporatus* and *livingstonei*. The tank is 48 in. \times 15 in. \times 12 in. and I renovated it after buying it in a bad state for £2.00. The tank was lying in a garden with cracked glass, and all the 'poly' coating peeling off. The crack was in the larger piece of glass and ran from top to bottom. I repaired it by getting a 15 in. square piece of $\frac{1}{2}$ in. plate and sticking it over the crack. I sealed the crack with sealer before sticking the pane on the inside. I have used this method of repairing before and it is cheaper and quicker than stripping a tank right down. I have also fixed mirror tiles, which gave a good effect. On the outside I have fitted plywood ends which also act as insulation. The front has a plywood panel with a large cut-out for viewing. This has been varnished and looks very smart. The plywood was fixed to the old 'poly' coating with Evo-Stick.

"The tank is sited in an opened up fireplace which always looked empty and bare; it is now the focal point of the room.

"I have had several types of pumps. A German pump that cost £7.00 some years ago has run night and day with only one short rest of a few weeks. It has plenty of power, running up to four U/G filters at one time with no trouble. I think it was well worth the trouble. . . . In my 48 in. tank I have one of the filters, with the large holes in the base, made by the Dorking firm, and it works very well, giving a very good water flow. I do not have much luck with plants—although I have plenty of thriving hornwort which has to be cut down every week, even with my cichlids—which don't seem to bother it. I use two 40 watt. bulbs over the 30 in. tank, with three 40 watt. bulbs over the 48 in. tank for 14 hours daily. I have plenty of rocks in my tanks with a lovely growth of algae which the fish—both young and old—are always nibbling at.

"My kribensis were kept by themselves for six months, but to no avail; but as you will know, they have at last spawned and raised young twice in the 30 in. tank with fish a lot larger than themselves. Their home is under a lump of red slate that they have dug all the gravel out from underneath despite plenty of rock and slate structures for them to spawn on. When the young were about five weeks old we had to remove the female as the male had just about killed her. I put her into an ice-cream container—they make excellent fish recovery homes—and she recovered. I don't know why this happened as both fish had looked after the fry very well. The kribis have plenty of spots on their tails and the male has a rainbow of colours in his dorsal fin. When in spawning mood the female turns almost black on her under-side—except for the red patch on her belly. The water is usually about 76°F and the pH 7.0; it is hard. I feed a variety of foods including chopped worms, liver, freeze-

dried *Tubifex* and brine shrimp tablets. With everyone on about the cost of fish tank electricity, may I suggest a simple way of checking this. If you have a small electric clock, this could be connected into the heater circuit so that it comes on with the heater; and by logging the time every night and morning over a week the total running time of the heater would be known.

Heater Tubes

"I hope to build a larger growing-on tank, in my shed, using chipboard, lining with polythene, and insulated to reduce heating costs. I estimate the running costs of an 18 in. \times 10 in. \times 10 in. tank as 1.5 units per day in December. . . . The other day I had an accident and broke the glass tube on my spare heater; and on trying to obtain a new glass tube yesterday I was told they cannot be sold now as they do not conform to the new regulations. I should like to raise a few points. How many aquarists are still using the 'old' type heaters and thermostats; and how many are willing just to throw them away when a tube goes?"

Photography

Mr. Kevin Appleton's home is at 46 Oak Lane, Old Catton, Norwich. He says: ". . . Although the majority of my photographic attempts are now recorded on transparencies, the enclosed colour and monochrome prints might prove of interest." (Although Mr. Appleton's cardboard folder did not contain any monochrome prints when it reached me, it did contain a very good colour print of an exotic marine fish.) Mr. Appleton continues: "My equipment comprises a Chinon S.L.R. camera onto which is fitted a \times 2 converter lens and then a wide-angle lens. An electronic flash is connected by an extension lead to allow it to be held away from the camera.

"All photographs are exposed on film rated at 100 A.S.A., the shutter speed is 1/60 sec. and the aperture f/11. The flash gun is held level with the lens, as close to and at 45° to the front of the glass. Tank lights are left on to aid focusing. I have found that different strength tank lights do not alter the final results and no amendment to the above-mentioned camera settings is needed. All subjects are photographed in their own tanks, which are designed to restrict the movements of the fish; and the natural background of rocks and plants is far more pleasing.

"Before photographing, all room lights are turned off and the curtains drawn, thereby avoiding my own reflection from appearing on the tank front. Pumps are also turned off as poor results are obtained if a flash of light hits a stream of bubbles. Both inner and outer surfaces of the front glass have to be cleaned because any marks or algae are exaggerated on the resulting photographs. Three drawbacks with photography as described are: (a) depth of field is very small, making focusing very difficult; (b) the converter lens reduces light coming through to the viewfinder, increasing focusing problems; and (c) a lot of patience is required to photograph fast-swimming fish in a large tank. I prefer to set my camera on a tripod and wait for the fish to swim into the view-finder.



Parent fish removing dirt particles from eggs

fact, the same fish. Thereafter the genus *Pterophyllum* included only three species:

- (1) *Pterophyllum altum*.
- (2) *Pterophyllum dumerilii*.
- (3) *Pterophyllum scalare*.

P. scalare lives in nature, in stagnant or slow flowing waters with lots of water plants. Very often it keeps near to growths of rushes or fallen trees, where the fish, because of the vertical black stripes, easily can hide. When sunlight shines into the water the black stripes of the *scalare* and the shadows from the water plants will make the fish nearly invisible. *P. scalare* likes to hide below the thick layer of water hyacinth (*Eichhornia crassipes*) which lies on the surface, or underneath the big leaves of the giant water-lily (*Victoria regia*) whose leaves can become that big that they can carry a child.

Pterophyllum scalare is very common in the rivers of Guayana and in the Amazon river and its tributaries. It has been collected in the rivers Rupunno and Essequibo in Guayana. In these rivers *Pterophyllum dumerilii* is also found. In the Amazon river both *P. scalare* and *P. dumerilii* are found and in the River Negro *P. scalare*. In the river Orinoco in Venezuela both *Pterophyllum altum* and *Pterophyllum scalare* are found.

P. scalare is found in the rivers in large shoals and at the very back of these there often are a number of *Cichlasoma festucum*, a cichlid which behaves and looks quite a bit like the *scalare*.

P. scalare attains a size of 15 cm. Vertical on the very compressed body it has four broad black stripes. The first

of these runs over the fish's eye with a camouflaging effect. The second of the black bands runs from the beginning of the dorsal fin and down to the anus. The third band runs from the highest point of the dorsal fin and down to the lowest point of the anal fin. The fourth band runs across the base of the tail. In between these clearly visible perpendicular black bands there is a hint of three bands more (one in between the others). The ventral fins are two long threads and the upper and lower fin rays of the caudal fin are prolonged. When the fish is feeling well the eyes are bright red.

If one wishes to keep *P. scalare* in an aquarium it has to be as large as possible and has to contain at least 100 litres of water. *P. scalare* grows to a height of 25 cm so it is no good keeping the fish in an aquarium which is not taller than 25 cm. Moreover, *P. scalare* is a cichlid which loves peace and quiet, so one has to provide it with a dense plantation. Suitable plants for the *scalare* tank are *Vallisneria spiralis*, and *Echinodorus brevipedunculatus* (the Amazon Sword plant). Of course one can use a variety of other plants, but the two above mentioned are excellent because they fulfil a number of the demands put to them by the *P. scalare*. A dense plantation of *Vallisneria spiralis* will suit the fish very well. The black bands and the shape of the body make it easy for the fish to swim through such a plantation and at the same time it will be nearly invisible. The Amazon sword plant is meant for another purpose—it has to be the spawning site. Of course, one can use other broad-leaved plants but there is something special about a pair of *P. scalare* and their eggs in the middle of a big sword plant.

If one has purchased at least 10 *scalare* it is very difficult not to get at least one breeding pair—if one has been feeding the fish with live food. When the fish have reached the age of ten months, they become sexually mature and pair out.

One day it will be apparent that two of the fish keep together all the time, for instance close to the last new leaf of the Swordplant. As soon as the other fish in the tank get too close to this area, the *scalare* pair will chase them away. If one wishes to breed the fish, (and who would not?) then one will have to move either the rest of the fish in the aquarium or move the pair to another tank which has been decorated in the same way.

A few days before the fish are ready to spawn, one can vaguely see the ovipositor of the female and the genital papil of the male. When these reproductive organs are clearly visible, it is only a question of hours before the fish will start spawning, and the fish should at this time be busy with the preparations. Both fish will be busy cleaning the leaf they have chosen for spawning. They use the mouth to remove the dirty particles from the leaf and this is often the newest leaf of the plant and therefore also the most clean. When the leaf has been rinsed the spawning will start. I have the following from my notebook:

22-1. From a shoal of six *P. scalare* two had paired out, and they were moved to a 130 litres tank with only one plant in it.

23-1. Spawning began in the beginning of the evening. The female swam slowly over the leaf so the breeding tube nearly touched it but no eggs were laid. The ovipositor was pink and 2 mm thick and 3mm long. The male was guarding the spawning site, and when the owner of the fish was showing too great an interest, the male rushed towards the front glass, to chase him away. After 5-10 minutes time the eggs started to come. One after the other the 2mm big yellowish eggs came out of the breeding tube and struck to the leaf. When the female had done her trip over the leaf she had laid a row of eggs which in number varied from 5 to 20. Thereafter it was the male's turn and he swam slowly over the eggs and fertilized them. His genital papil was smaller than the female's ovipositor, 1mm broad and 3mm long.

For the next hour this whole sequence was repeated and when the spawning was finished nearly the whole leaf was covered with eggs. In this case there were 500 eggs which was quite a number for a first spawning.

In most cases the adult fish eat the eggs as soon as they hatch, so I decided to move the eggs and hatch them artificially.

I rinsed a small glass aquarium (10 litres) and in the end I filled it with tap water of the same temperature as the water in the parents' aquarium. As soon as the pair had finished spawning I cut off the leaf with the eggs and placed it in the small tank. It does not matter that the leaf with the eggs is exposed to the air for a little while, when it is on its way to the small tank. The leaf has to hang perpendicularly in the tank. A gentle aeration is applied to the tank and for the

next seven days the aquarist has to be father and mother to the eggs.

24-1. In the afternoon 15 eggs had fungused and were loosened with a needle and thereafter they were moved away with a pipette. By night another 21 eggs had fungused and were removed.

25-1. It is possible to see two dark spots on the eggs. By midnight the eggs hatched and the fish larvae were hanging down from the leaf in a sticky substance secreted from a gland on top of their heads.

27-1. Eye pigmentation is being developed.

28-1. The eyes have been developed.

31-1. The fry nearly free swimming. One can see how they are more lively and pulling at the sticky thread which keeps them to the leaf.

1-2. The fry are free swimming and they are fed twice daily with *Artemia*.

It is easy to see if the fry are taking the food. If one looks at their tummies, one can clearly see that they become pink. One should not feed with micro worms for the first few days, because the babyfish still have a little of the sticky substance left on top of the head, and the micro worms might stick on to the fry. When the fry are a week old they can be fed with micro worms and this will save the aquarist a lot of money since he does not have to buy *Artemia*. If it possible for one to catch live food, one can feed with small *Cyclops* when the fry are a week old, and later with larger *Cyclops* and *Daphnia*. When the fry have reached the age of a month one can start feeding with mosquito larvae.

It is very important to feed with live food for the first two months, as the fry will not touch dry food at all. If one has been feeding in the right way the fry should in an age of two months measure 3.5cm.

P. scalare was for the first time bred in 1920, but not before the artificial breeding succeeded was it possible to buy them at a reasonable price. If one always takes the eggs away from the parents, they will continue to lay eggs. One should not let them lay eggs over a longer period of time as it might weaken the fish.

If one lets the parents keep the eggs and these are not eaten, then the parents will look after their offspring for more than two months. There are quite a number of aquarists who have bred *Pterophyllum scalare*, but how many have managed to let the parents do it?

W. Staack: *Cichliden I*

Robert J. Goldstein, Ph.D.: *Cichlids*.

TFH—looseleaf EXOTIC TROPICAL FISHES. P—498, 10—498, 11. Leonard P. Schultz (1949): *A further contribution to the ichthyology of Venezuela*.

Rosemary H. Lowe—McConnell, F.L.S. 1969: *The Cichlid fishes of Guayana, South America, with notes on their ecology and breeding behaviour*.

Julius Nachstedt & Hans W. Tuschke: *Opdrachten 2*.

Jørgen Hansen: *Making your own aquarium*. (Bell & Hyman 1979).

Some Notes on Siamese Fighting Fish

by Mrs. M. J. Moore

MY HUSBAND IS A Piscean and fish appear to be his kin. I find my home gradually being taken over by aquariums, but of all the fish he has bought, one species gets through to me, the Siamese fighting fish.

The first one I was to come across was a blood red male which we named Sebastian. We placed him in our main tank where he settled down very well with its inhabitants of a variety of fish ranging from Angels, Gouramis, Tetras etc. Perhaps I ought to add that our main tank is 4 feet long, well aerated, well planted and running at a temperature of 78°F in which exists a goldfish which appears to dominate the tank, dig up every corner and generally create a problem.

Sebastian was incredibly tame, I could hand-feed him and tickle him as one would a trout. It was merely necessary for me to place my hand in the water for him to swim into it and lie there if he wanted to be stroked. Some eleven months later he fell ill; it was apparent that he was under the weather by the fact that he no longer 'paced' the tank but would sit on the bottom, barely managing to come to the surface for air, let alone for food. I fed him by hand which he readily accepted and appeared grateful when I helped him to the surface so he could breathe air, but the inevitable happened, he passed away. I was now hooked, so to speak, on the Siamese Fighting fish.

My husband and I have had the fortune to travel and have seen the original home of the Siamese fighting fish. We have been in Malaya during a rainfall, which happens

often, and seen the garden of the hotel in which we were staying, flood to a depth of over 4 inches, covering the lip of the swimming pool in the gardens, despite the fact that the sea was no more than 150 yards away.

After my experiences with Sebastian, I read much documentation on the fighting fish and had to ask myself how could a floating nest of bubbles survive for the period of time necessary during breeding, in such an onslaught of rain. We bought two new fishes, naming them King Arthur and Sir Galahad.

Sir Galahad was placed in the domain of Sebastian. King Arthur was placed in our second tank which is only 2 foot six inches and at that time rather regarded by us as a secondary consideration. I am ashamed to say that Arthur was to be observed more than Sir Galahad. This may be because his behaviour was more interesting.

Arthur paced his tank and would only eat what was necessary for his survival. I drew on my experience of their natural environment and asked myself why this fish was behaving in such a manner. I thought that he wanted a mate. A third tank was bought.

The third tank was the same size as the tank that Arthur was now living in; i.e. 2 foot 6 inches long. We had realised that he would like shallow water and I had convinced my husband that he wanted to breed. I therefore persuaded him that the tank should be set up as follows: the water should be brackish, the temperature should be higher than that

which he came out of, there should be a place to contain the female according to text book description of how to breed Siamese fighting fish (we placed a small tank inside the big tank), refuge should be given for the female in the main tank.

What we actually constructed was a tank as specified with an underbed filter, a peat-based layer covered with gravel, well planted, aerated, a flower pot turned on its side and slate laid in layers for decorative purposes. A week was spent clearing the debris from the peat sediment. At the end of the week Arthur was transferred to his new domain. He appeared to like it. He was introduced in the morning of 26th January. We were expecting him to spend a week exploring his new found situation; however we awoke on the next morning to find a profusion of bubbles on the surface of Arthur's new Empire. The bubbles were divided and in all honesty we were not sure that they were not the result of a reaction from the peat or the gravel or the plants. Perhaps now I should describe what we saw. The larger of the bubble formations was to the fore of the tank, the second formation was in the right hand corner, resting on some leaves and held up by the inner tank and the glass of the outer tank. There was a minor formation without any semblance of status in the middle of the tank.

We debated the situation; were they or were they not bubble nests? We had not seen them before. We came to the conclusion that they could be, and turned off the aeration so as not to disturb them. In view of Arthur's impatience in the top tank and our conclusion that he had done in twelve hours what we were supposed to believe would take a week, we felt we ought to find him a mate. So on Sunday morning we went shopping. What we had to choose from was very limited. We were confronted with one tank of some twenty small, supposedly female fighting fish. I had an argument with my husband over which one should be selected. I won. We called her Guinevere and placed her in the inner tank as prescribed by the text books.

Arthur's reaction was immediate. His awareness, despite the barrier between the two fishes, was embarrassing. Guinevere, despite her disruption, wished to continue to eat. The decision was made, on the basis of Arthur's excitement, to risk Guinevere and place the two in the same tank. The agreed technique to do this was to raise the level of the water of the outer tank until it exceeded the rim of the inner tank. Barely half a millimetre of water was above the rim of the inner tank before Arthur got over to his Lady Love. We now had two fish in the inner tank. A very worrying few minutes ensued. The water level was still rising and hectic foraging occurred within this small tank. When the water level reached a quarter of an inch above the inner tank rim Guinevere managed to escape. When there was half an inch of water difference Arthur escaped. I must stress at this point that his original nests were still more or less intact. We now had a situation which we did not know how to handle. (Arthur and Guinevere obviously did!) We had, as far as we were concerned, what appeared to be two fishes at each others throats, but Guinevere, with surprising dexterity,

within thirty minutes had located every nook and cranny that she could hide in; she had even worked out where her colour would camouflage her and sat there and did not move. Arthur hunted for her. Sometimes she would let herself be found, but mostly after such an exposure she would then re-conceal herself. There were occasions when she would deliberately expose herself. What I have described happened within four hours of her introduction to the tank. I discussed with my husband whether or not Guinevere should be removed; she appeared to have been bullied. However, in view of the difficulties of catching her and her obvious slyness, we decided to leave things be overnight.

On Monday morning there were two more bubble nests. Arthur was still furiously chasing Guinevere who sometimes came out but mostly ran away. The overall scene was rather worrying.

On Tuesday Arthur was still increasing his nests. Guinevere was still behaving in her usual way, but we felt there was a slight difference in as much as she was indicating that she preferred the left hand side of the tank to the right hand side.

On Wednesday a new bubble nest had been made on the left hand side of the tank. However, the nest on the extreme right hand side was still growing.

On Thursday we saw fry, almost free-swimming under the right hand nest. Nothing could be observed from any of the other nests, in fact these were beginning to break down. Arthur's attitude to Guinevere was very aggressive and we found that she had a tear in her back. We removed her to our second tank, situated above the breeding tank.

On Friday morning Arthur was still diligently attending his nest and he spent the whole day alone with the fry. His dedication was obvious. My reference to text books indicated that he should be removed but this seemed so unfair that we did not do it.

On Saturday morning, as the selected nest had now almost completely dispersed, Arthur was placed in a community tank different to the one Guinevere was in. His behaviour was now very shy in the presence of other fish. No longer did he appear to act like a King but more like a poor pathetic stray that had been pushed into a world where everyone else was his master. Guinevere was also acting sullenly in her separate tank.

On Sunday, rightly or wrongly, and with their young now free swimming in the breeding tank, we re-united Arthur and Guinevere in a community tank. It took some minutes before the two fishes were aware of each other's presence, but once aware their attitude towards each other was totally different to that observed in the breeding tank. Initially Guinevere would not leave Arthur alone, she followed him almost as if she had lost a loved one. Arthur suddenly perked up. Once more he could face down the other fish in the community tank, his colours returned and he displayed himself without attacking Guinevere.

THOUGH THE MINISTRY OF AGR. & FISHERIES' annual research Report proposes "more emphasis on eels and less on grass carp," conservationists are becoming more concerned about the increasing dangers from the rash release of alien fish into our waterways. The latest is an anonymous claim of the introduction last year and in 1978, by "anglers," of 38 predatory, migratory, large fast-growing zander or continental pike-perch, into a weedy stretch of the Leeds and Liverpool Canal between Aintree and Maghull near Liverpool, their furthest north. At the time of writing the Water Authority has failed to find any by electrically fishing 11 miles.

Known from the unrelated pike by its two dorsal fins, the zander has been found in muddy canal systems near Rugby as well as the Warwickshire Avon, with its stronghold in the Bedfordshire-Hertfordshire-Great Ouse area. The Water Authority will try to eliminate any Liverpool specimens should be report be proven before it is too late, by electrically fishing the area. More would have gone in it is claimed had they not died in transit. Zander thrive most where few pike can compete, but both pike and perch are in this stretch of the Liverpool Canal. The zander is a large continental relative of the perch, no relation of pike though the press reported it as a pike x perch hybrid! It feeds mainly on fry. By the first week of February, none had been caught in 2 years since introduction, and unless electrical fishing reveals evidence it may be only a hoax.

Fish Cultivation

Ministry biologists also think that the emphasis on fish-cultivation in this country should shift from marine flatfish to salmonids as Britain is highly suited to the latter, especially studying their genetics and diseases to produce vaccines for bacteria and viruses, as well as studying fish nutrition due to the high cost of food in fish-farming. Britain is unsuitable for large-scale development of recent success in breeding prawns, and their future culture will depend mostly on the use of waste heat or re-circulated hot water. Factors influencing salmon and trout populations are being studied in the River Sush, the eels in Lough Neagh and the effects of drainage on fish and invertebrates in the River Camoweb—£728,000 on fresh-water fish research this past year.

Frog species

Every year, two or three new species of frog seem to be discovered, especially in South America. One of the most difficult areas to classify frogs is mountainous New Guinea, geologically relatively young and only separated from North Australia some 8,000 years ago, but with such humid, tropical climatic differences as to have only limited resemblance in its fauna. Over 200 species of frog rival those in South American forests. A University of Papua researcher finds such recent divergence in their evolution that usual descriptions and even chromosome counts are little help in classification. Thus recourse has to be made to taping the mating calls for distinction.



From

a

Naturalist's

Notebook

by Eric Hardy

Piranhas

Piranhas, now a frequent sight at fish-shows, receive blood-curdling write-ups by some nature-scribes, as if these South Americans were just waiting to eat aquarists alive. Thus my interest in reading the recent travels up the rapidly-exploited and denuded Amazon basin, of fellow-member of the American Audubon Society, Anne LaBastille. In the white water-lagoon at Campinhas, she and companions swam often in clear tributaries with piranhas and no one was bitten. The fish with super-sharp teeth were only 7 to 17 ins. long. They normally attack only bleeding, ill or floundering prey, or bite in self-defence, as when they caught some easily by jiggling. These made delicious eating.

Hundreds of walking catfish occupied this lagoon, along with black piranha, wolf characin and colourfully brown and yellow tucunare, as the dry season restricted their normal haunts in side pools. A world record list of more than 2,000 fish species have been recorded in the Amazon basin, more than inhabit the whole of the Atlantic Ocean. Many depend upon annual flood waters taking them over the forest plain to fatten on fallen fruits and seeds. Legal protection suffers lack of full enforcement in conserving its large *Podocnemis* river-turtles: *expansa* up to 150 lb, *tartaruga* and *amazoniana*. Its black caimans exploited for leather around Manaus now

average much smaller than the 20 ft. specimens of early explorers. The Amazonian Manatee, *Trichechus inunguis*, is almost extinct, though the research institute in Manaus has a plan to improve its conservation management. The diurnal 7 ft. long giant otter is endangered for its luxurious pelt.

50,000 square miles of this unique Amazon rain-forest are being burned annually for ecologically disastrous and failing attempts at cultivation.

When native flag-iris flaunts its first yellow falls by the garden pool in May, purple *germanica* joins it. Raindrops glisten in golden kingcups where the shallow margin is covered with predatory water-scorpion and pondskater bugs, and water-boatmen hunt young fishes below. Recently-spawned native fish may be seen cleaning themselves of slime by rubbing against stones and plants. Many Amazonian cichlids graze on parental mucous when alternative food is lacking and this may occur here where food for small fish is scarce. This habit is widespread among young cichlids, and *discus* have been observed doing this when other food is abundant.

Water gardens

Water-gardens now begin to look their best when May opens the green pages of our northern spring. Glittering male hawk dragonflies flash over the water as they patrol some sunny corner, holding territory against all other males until a female arrives, and mates, then your daily visitor disappears. Each night he left to roost amicably with other males in some reedy jungle. Most other aquatic insects fly at night and I was once brought a yellow-bordered *Dytiscus* beetle from the top of Black-pool's illuminated tower. My first walk out of my tent in the North African desert in the last war encountered the same water-beetle, like meeting an old friend.

Speckled drifts of primulas are accompanied by "Foam of May," *Spiraea arguta*. Wrongly named "pink purslane" in books, alien split-petalled *Montia* (formerly *Clytonia*) *sibirica* is now a spreading weed, not recommended for any wet site. Double marsh-marigolds explode their gold, but do not produce seed like the native single form. A 6 ins. form *minor* (= *radicans*) has small, single flowers. Large and small double forms include *monstro-plena* and *nana plena* even *semi-plena* of nurserymen. There is a white form *alba*, distinct from the white North American *Caltha leptosepala* and *rotundifolia*. Another species *C. hortulana budda* has thin, fluted petals like a cactus dahlia. Masses of small flowers cover prostrate *sibirica*. The giant among kingcups from Asia Minor is *polypetala*, with leaves up to a foot across and stout, hollow, 2 ft. leafy stems topped by 3 ins., yellow flower-cups called Pontic kingcups, because of their cultivation in the Vatican garden. All these propagate by root-division between July and March, planted 18 ins. apart in heavy, wet loam, or by seed.

Forget not 40 different forget-me-nots, *Myosotis*, of which trailing *pahustris* (= *scorpioides*) has now brought the blue of the sky to trace its beautiful pattern where its rhizomes creep along the waterside. Its long-flowering

variety *semperflorens* lasts into July. This spreads out over water from mud banks. I have seen it flourishing so well in damp woods as to be mistaken for larger rarer, brighter wood-forget-me-not *zydeutica* of shaded stream-sides. The latter has a white form. Larger blue forms of *semperflorens* are cultivated as Nixenauge, The Czar and Fairy Maid.

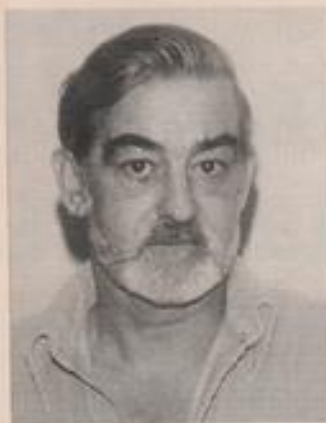
Hottonia the water-violet (which isn't a violet, but related to primroses) pops its lilac-pink flowers above deep dykes, where it is followed in July by yellow bladderwort. Fragrant, fuzzy pink and white bogbean, which opens its pink buds in lacy explosions from March, is now at its best. It stands alone in its genus. Its spreading rootstock soon produces masses of spring flowers, in Epping Forest for instance; but they soon fade upon picking. I have seen it at Llyn y Cwm, a 2,000 ft. tarn above Snowdonia's Devil's Kitchen, towards the Glyders. Where it is established, cut back drastically its rampant growths after flowering, or propagate by latering them like carnations. It is too bitter for those nibbling little foes of water-plants, water-voles, now active among succulent watercress and starchy roots of reedmace rushes, ribbon-weed, iris corms, etc. Catch them in box-traps baited with nuts, oats or canary-seed.

Fringed water-lily

Related to the fringed bogbean in the gentian family is the so-called fringed yellow water-lily of late summer, *Nymphaoides peltata*, named from the likeness of its 2-ins. leaves which shade fish in 6-18 ins. of water too small for true water-lilies. This subtropical colonist of the dirtiest rubbish-pools reproduces freely. Its Bennett's variety has clear green leaves. More tender white relatives *indica* and *trachysperma* need greenhouse protection in winter. Even *peltata*, like the water-fern *Asolla*, usually fails to survive a severe winter outdoors in Britain.

An uncommon spiral form of native giant horsetail, white stemmed with green branches ending with a spore-bearing spike, now fills minty ditches with its noble growth, so different from the despised horsetail weed, too often misnamed "marestail" on allotment gardens. Marestail is an entirely different green seeding aquatic, withstanding great changes in water-level alternating submergence with exposure to sunlight, like pink amphibious bistort. This, too, needs strict disciplining before it takes over the bed of a pool.

"Hermaphrodite" *Nymphaea* water-lilies start flowering in a "female" stage, their anthers directed straight upwards. Insects, like wild bees, landing on the tips tumble into the bowl-shaped stigma, which contains a fine sugar-solution where they drown. Later, the stamens form a closed cone over the stigma which is no longer accessible. No nectar is available in this "male" stage, each ripening stamen turning outwards, a landing space upon which insects crawl. So an insect visitor acquiring pollen in the "male" stage will fertilise a flower in the "female" stage, then probably drown in the liquid trap. Giant Victoria lilies in the Amazon let their tiny visiting beetles escape again.



Coldwater Jottings

by Frank W. Orme

DURING LAST MARCH I happened to switch on the television set, it was the tail-end of the B.B.C. Nationwide programme, and I was very interested in a report about an experiment at a Scottish fishery in obtaining increased growth in trout. The experiment involved making young trout swim, continuously, against a strong water current for a period of six months. At the end of that time it was found that the experimental fish had grown to around three times the size of similar age fishes, which had been reared under normal conditions.

This made me wonder whether other species of coldwater fishes would respond, in growth, if also subjected to this treatment? This question was later discussed with a zoologist who believed that there would be a similar result. He made the point that, due to the non-stop exercise, the fishes developed their muscular tissue (which is the meat of the animal) to a much greater extent than those which were raised in less taxing conditions; this, in turn, increased the fish's body-mass and size. Of course, this treatment could not be applied to the deeper bodied, twintail varieties of fancy goldfish; such treatment would have the effect of slimming the fish. However, it could be used to produce larger than average slim, singletail goldfish types and, perhaps, koi or other types of coldwater fish. So, for those readers who can provide tanks through which a steady water current can be run, perhaps here is an opportunity to carry out a similar experiment and report the result, at a later date, in this magazine. It seems, to me, that such a tank would need to be long, shallow, and narrow—in order to ensure that the water current affected all of the water, for any area that was not subject to the through current would allow the fish to escape from its movement, and so avoid the enforced exercise. The current would also need to be adjusted so that it was just strong enough to cause the fish to swim against it, in order to maintain its position within the tank—but cause it to be swept backwards with the current, if it ceased swimming against the flow of the water.

Holidays

Many newcomers to the hobby of keeping coldwater fish—especially fancy goldfish—tend to regard the holiday season with some apprehension. In the mistaken belief that some harm will befall their pets, if left unattended, they either forego a vacation or arrange for somebody to attend to the feeding arrangements whilst they are on holiday elsewhere. It is not necessary to enlist any outsiders help, nor is it necessary to miss out on holidays. Fears that the fishes cannot be left unattended for 7-14 days are without foundation, in fact they may come to more harm at the hands of the well-meaning friend or relative.

Each year I lock the fish-house, making it secure against any outside interference—whether well intentioned or having an illegal interest, whilst my wife and I depart to spend up to fourteen days in pastures new. During this period, I must confess, I seldom give any thought to the fishes—young and old—which have been deserted, so that a well-earned rest can be enjoyed away from home. Whilst I am away enjoying myself, the fishes are, no doubt, benefiting from my short absence and lack of daily attentions. Certainly, they never seem any less happy when I return, and I cannot recall ever having returned to discover any dead fish. Well cared for fish are well able to survive, without hardship, their owner's non-attention for up to 14 days, and, failing any unforeseen problem, will not come to any harm. On the other hand, if left in the care of an inexperienced person the fish may be given too much food—much will be left uneaten, and this will lead to pollution of the water, and death of the inhabitants. This is not a happy picture to greet the homecoming—but it happens all too often.

Adequate Feeding

Ensure that the fishes are adequately fed prior to departing for the vacation but do not overfeed them. Make sure that they are in good health. Keep the tanks clean

but the green growth of algae should not be removed from the sides and back—this will provide a browsing area for the fishes. In other words, make certain that the fishes and their tank are in first-class condition for it is courting trouble to leave sickly fish in a dirty or slightly polluted tank—although, perhaps, things might correct themselves during the absence of such a neglectful fishkeeper. If hot weather is expected, either provide some protective shading or move the fishes to a place which is likely to remain reasonably cool.

Similar care should be given to small, ornamental pools—especially if they happen to be rather shallow as some pre-formed pools tend to be. A small, shallow pool containing marginal plants can suffer greatly during hot weather from evaporation which quickly lowers the water level. Moisture will be dispersed into the atmosphere by the plant leaves as well as from the water surface. If the pool is exceptionally shallow, and a hot spell of weather is anticipated, it might be a wise precaution to remove the fishes

to somewhat safer quarters. Another safety measure, if not already taken, would be to stretch a net over the pool. This should be fitted in such a way that it prevents attacks from birds or 'fishing' cats—and, despite what some may say, some cats are very adroit at flipping a fish out of the water, I have seen it done.

It all boils down to making commonsense preparations, to ensure the well being of the stock. Attend to the obvious essentials and try to allow for the unforeseen, such as a tropical type summer (remember, we had one not so many years ago), and all should be well. There is seldom any reason to be deprived of a holiday because of any interest in keeping coldwater fishes. After relaxing in fresh surroundings, the return home is accompanied by a renewed interest in the hobby; friendships are still intact—for the fish have not been put at risk by the well meaning attention of a friend and they will be alert and swimming actively in crystal-clear water. What more could be wanted?

The Reedmaces

by Philip Swindells

OFTEN MISTAKENLY referred to as bulrushes, the various species of typha are tall, handsome stream and poolside plants with bold upright foliage and handsome brown poker-like heads. The true bulrush is in fact *Scirpus lacustris*, a rather uninspiring native with dark green needle-like foliage and tiny tufts of brownish flowers. If one wants to use a collective common name for typha, then it should be reedmace.

The typhas are a widespread genus consisting of nine species, a number of which are of interest to the pool owner. Particularly the two native kinds *Typha latifolia* and *T. angustifolia*.

Although very handsome, these likeable rogues should be treated with caution if they are to be introduced to the ordinary garden pool. For not only are they vigorous and inclined to swamp their neighbours, but they also have extremely sharp pointed creeping rootstocks which are quite capable of puncturing a pool liner.

If grown well and kept restrained, they are useful marginal subjects, conveying a natural waterside effect and at the same time providing much needed height. As their specific names suggest, *T. angustifolia* has narrow foliage, while the leaves of *T. latifolia* are broad. In addition the male and female parts of the spadix of *T. angustifolia* are distant and in *T. latifolia* contiguous.

While it is possible to grow these two native species successfully in the ordinary garden pool, I think I would be more inclined to turn to *T. laxmannii* (Syn. *T. stenophylla*) for a dependable well behaved reedmace. With slightly smaller, but well proportioned flower spikes, this modest fellow seldom grows much more than three feet high and produces attractive willowy leaves.

Finally, for anyone with a large expanse of natural water may I recommend *T. truxillensis*. A native of the southern United States and therefore doubtfully hardy in some eastern and northern areas, this giant of a plant has immense brown pokers and narrow upright foliage.



Typha latifolia



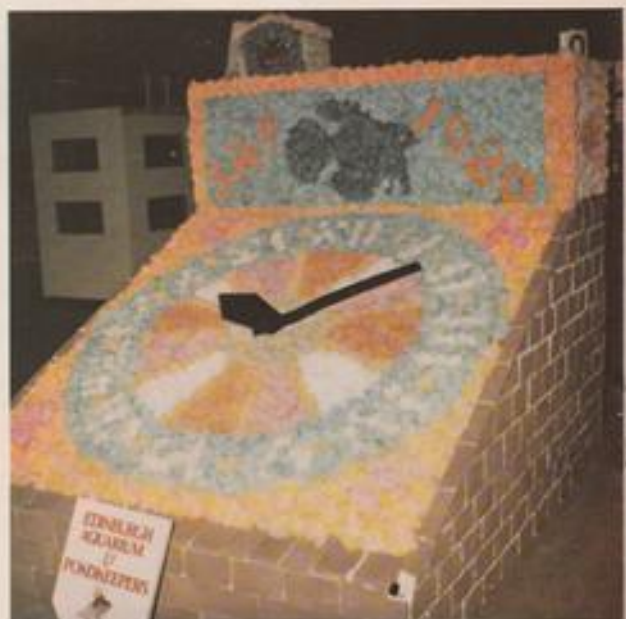
Mr. H. Rekie, President of the F.S.A.S., presenting the 'Aquarist' trophy for Highest Pointed Tableau to a representative of Dunfermline and District A.S.

Scottish Aquarists Festival '80

THE EIGHTH S.A.F. once again owed much to the support received from all those societies who entered tableaux and of course the traders who try each year to surpass their previous displays of fish, plants, foods and all the latest aquarium accessories. We in Scotland like to make the Festival a social occasion for meeting all our friends who visit us from as far away as Basingstoke in the south to Aberdeen in the north. On the Friday night following the judging we hold a supper dance, the food comprising a piece of chicken and tatties done in their jackets, suitably washed down with a drink of your choice.

Our grateful thanks to the panel of judges who did an excellent job as usual. The Tetra Min Trophy for Best Tableau was presented to Edinburgh Pondkeepers for their beautiful Floral Clock. This also won the Duncan Fotheringham Trophy for Best Aquarium Plant, J. Thomson (who cooks the tatties) being the proud owner. Muirhouse A.S. with a Loch set in a scenic background

The Floral Clock which won first prize in the Tableau Section for Edinburgh Pondkeepers



was placed second whilst third in order of merit was a Log Cabin from East Kilbride.

Dalkeith A.S. came fourth with a Radio and here also was the Best Coldwater entry from S. O'Sullivan who won the Edinburgh Pondkeepers' Trophy with a *Notropis lutrensis*. The Rift Valley Trophy went to N. Mitchell for a *M. johani*.

The Aquarist Trophy for Highest pointed tableau was won by Dunfermline and Dist. A.S., which included the Stan Taylor Trophy for Best Barb collected by I. Hendry for a *B. tetrazona*, the Belle Vue Trophy for Best Fighter by D. Dobbie and The Hutchings Trophy for Best pair of Guppies which was won by C. Hendry. The N.E.L. Trophy for Best Furnished Aquarium (society entry) went to Aberdeen A.S. and the F.N.A.S. Trophy for Best Furnished Aquarium (individual) to B. Maxwell of Dumfries A.S. with a native marine entry. A very interesting tank with its varied marine life.

Mervyn Strange of Basingstoke A.S. picked up most of the Livebearer Trophies including the George Henderson Trophy with a *P. ameles*, The Aquarama Trophy for a pair of *N. umbratilis* and the Lanarkshire Trophy for Best Breeders with a team of *P. compressa*. Another contestant to sweep the board was P. Move who won The Mark Aitken Trophy for Best Catfish 'A' with a *Corydoras barmagousis*, The Hartlepool Trophy for Best Loach with a *G. taeniata* and the Aberdeen Trophy for Best A.O.S. Egglayer with a *C. kingslyae*.

Other awards were as follows: Aquarian Trophy for Sharks (*Labeo bicolor*) W. Harmsworth, Basingstoke A.S., Woodcock Trophy for Characins (*A. alburnus*) R. & S. McIntosh, Livingstone A.S., Friendship Cup for Danios and Tropical Minnows (*D. rerio*) L. Naismith, Lanarkshire A.S., Muirhouse Trophy for Gouramis (*B. signata*) P. & S. Robson, Bridlington & D.A.S., Fotheringham Trophy for Cichlids (*P. altum*) D. Frency, Scottish A.S., Alloa Trophy for Team of Egglayers (*N. marginata*) A. Vaissieue, Ayrshire A.S., Bob Ferguson Trophy for Rasboras (*R. pauciperforata*) A. Donaldson, Ayrshire A.S., Earl of Motherwell Trophy for Guppies A. Andrews, Clyde A.S., B.K.A. Trophy for Egglaying Toothcarps (*A. amieti*) K. Mayes, Fife A.S., M. & M. Trophy for Egglayers Pairs (*Corydoras blochi*) T. Cruickshanks, Catfish Association. Ayrshire Jubilee Trophy for Catfish 'B' went to D. Cruickshanks of the Catfish Association who also won the Bobby Wood Trophy for Best Fish in Show with *Loricaria* Sp.

The awards were presented by H. Rekie, President of the F.S.A.S.

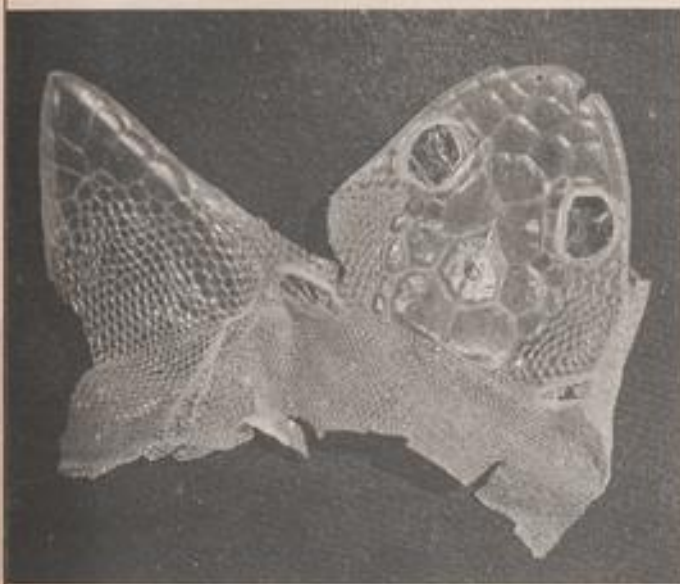
Our grateful thanks to Buckley Press Ltd. and the staff of this magazine for all their invaluable assistance.
Steve Laismith
(Show manager S.A.F.)



A realistic Log Cabin constructed by East Kilbride A.S.

This much admired Model Radio was contributed by Dalkeith A.S.





Sloughed skin from the head of *X. henshawi*

The Night Lizards

by

Chris Mattison

TO BEGIN WITH, the aspiring reptile keeper, like the aspiring fish-keeper, understandably often bases his choice of species on the brilliance of colour and markings alone. Later on, other qualities are considered equally, such as an interesting behaviour pattern or life-cycle, or the ease with which that species may be kept under the available conditions. Price and availability also come into the reckoning, at least for most of us. For collectors looking for something different, but of somewhat less than spectacular appearance, the Night Lizards are worth considering. They constitute a very small family, a mere twelve species, all occurring in North and Central America, about which very little is known of their natural history.

Their closest relatives are probably the geckos, with whom they share the characteristics of lidless eyes, and soft, granular skin, (although the scales on the belly are large and rectangular). Unlike the geckos, when the Night Lizards slough, the discarded skin also includes the eye covering—this is the general rule, of course, with snakes but not, I think, with any other lizards. Night lizards give birth to living young, one to three per 'litter,' but there seems to be no reports of breeding having taken place in captivity, so here is a golden opportunity for an amateur herpetologist to add to our knowledge of a little-studied species by noting mating activity, gestation period and so on.

Two species are occasionally available; these are *Xantusia vigilis*, the Desert Night Lizard, which comes from the desert regions of California, Utah, Nevada, and Baja

California, and *Xantusia henshawi*, the Granite Night Lizard, restricted to a smaller area, in California and Baja California. Both are small, especially the former, which grows to only about two and a half inches in total length. Its body is cylindrical in shape and its grey skin is speckled all over with black. *X. henshawi* is slightly larger, to about four inches total length, and its body is slightly flattened, no doubt an adaptation to its usual habitat of rock crevices. Its markings are bolder than those of *X. vigilis*, consisting of dark brown angular blotches on a yellow background.

In my experience it is difficult, if not impossible, to distinguish the sexes of either of these two species, although as mine have never bred, it is possible that I have had groups consisting of only one sex. It is said that in *X. vigilis* the male has larger femoral pores than the female, whereas in *X. henshawi* there is a pale oval patch on the underside of the thigh in front of the femoral pore row.

Accommodation for Night Lizards is easily arranged. Since they are desert dwelling species, a substrate of sand is appropriate, along with a pile of rocks in which to hide. A potted cactus or succulent provides authenticity, and a small shallow water dish completes the set-up. If an aquarium is used as a cage, there is no need to cover it, as although agile, these lizards will not climb the glass sides but a cover may be desirable to prevent the escape of food items, which consist of small crickets, grasshoppers, spiders etc. A light bulb, preferably with reflector, is necessary to raise the temperature to around 80-90°F

during the day in part of the cage. Although nocturnal by nature, they will soon begin to emerge from their rocky hideaways during the early evening in order to look for food.

Suitable companions would be other small lizard species from similar habitats, such as the Banded gecko, *Coleonyx brevis*, which is also nocturnal, or the smaller species of Spiny lizards, *Sceloporus*, several of which are found in the same general area. Snakes should be avoided, because even if they did not eat the Night Lizards, the latter would feel insecure when kept in such close proximity to their natural enemy. Because of the dry environment, amphibians are obviously ruled out as cage-mates. On the other hand, as these species have been relatively inexpensive when available, a good plan would probably be to install a small group; observations regarding their behaviour and breeding habits being much more likely under these circumstances.



The Desert Night Lizard, *Xantusia vigilis*



Xantusia henshawi

The Junior Aquarist

Macrogathus aculeatus

by David Hedge, age 14

Macrogathus aculeatus is from the family Mastacembelidae (Spiny Eels).

These fish are from fresh and brackish waters in the tropical regions of Africa and Asia. The body is elongated and eel-like. The small mouth is situated under the long snout, which is probably used to find and taste food. They are not very colourful, being of a dull brown hue, but they can have some very attractive markings on their sides and fins. Their scales are very small and numerous. They can grow up to a length of one foot in the home aquarium.

These fish come from quiet and weedy waters, with a bottom of mud or sand, where during the day they bury themselves in this mud leaving only the eyes and snout showing. They will also bury themselves in gravel in the home aquarium. At twilight they become more active when they start to hunt for food.

In the aquarium they are easy to keep as long as they have plenty of hiding places. The water temperature should be 73-82°F (23-28°C), and the composition of the water does not matter too much as the fish can adapt easily to most types of water. Even so, frequent renewals of water help to keep them in good health.

Spiny Eels generally are a peaceful species and are suitable in the community aquarium, but they are capable of eating newborn livebearers.

They are partial to live *tubifex*, bloodworms and insect larvae. A friend of mine has a Spiny Eel in a community aquarium which eats freeze-dried *tubifex* from the surface, but this is very unusual.

The usual price for a half-grown specimen is approximately £1.



A. gabunense gabunense (male)

Three Species of West African Killifish

Written and illustrated by Allan Brown

Aphyosemion gabunense gabunense, *A. gabunense boehmei*, and *A. gabunense marginatum*, are three West African Killifish from the tropical rainforests of Gabon just south of the Equator. This species has been named "gabunense" after the country in which it was discovered.

A. gabunense gabunense was first collected, by W. Herzog in January 1973, in a small swampy brook near to Lambaréne. The water conditions in the brook were D.H. 0.28 and P.H. 6.1. Males of the species grow to a total length of 50mm (2 in.) including the long caudal filaments. Females are smaller at 40mm (1.6 in.)

A. gabunense boehmei was first discovered in January 1976 by Bochtler and Gaspers, in a stream near Bigouéni. The water conditions were D.H. 1.25 and the water temperature was 22.6°C. This fish has been named after Otto Böhm, an Austrian Killifish fancier. Males grow to a total length, including the caudal filaments, of 45mm (1.8 in.) and the females are slightly shorter at 35mm (1.4 in.)

A. gabunense marginatum was discovered in August 1976 by Huber and Radda, in a waterhole in the bed of a dried out brook 9 Km. S.W. of Bifoun. The water conditions were D.H. 2 and the water temperature was 24.8°C. Males grow to a total length of 48mm (1.9 in.) and do not develop such long caudal extensions as their congeners. The females are smaller at 38mm (1.5 in.)

The three different *A. gabunense* fish are very similar in their habits and require similar aquarium conditions. These conditions must be provided by aquarists who wish

to keep and breed them.

An ideal size of tank for a pair or trio would be 30 × 20 × 20 cm. (12 in. × 8 in. × 8 in.). As these fish are very peaceful, both sexes may be kept together without any damage to the females. In a larger tank it is possible to keep several males and females together. Whilst the males will spar with one another, only minor damage will occur, usually to the extensions to the caudal fin in the *A. gabunense gabunense* and *A. gabunense boehmei*. Each of the three types of gabunense are best kept in a tank of their own as they are easily disturbed or damaged by the types of tank companions normally found in community tanks.

The water conditions suitable for keeping and breeding these fish are a hardness of less than 10° DH, a PH. of 6.5 to 7, and a temperature of 21°-23°C. Whilst these conditions have proved successful it may be that other conditions may also be suitable.

A tank with subdued lighting is preferred, with floating plants of Indian Fern or Salvinia. The base of the tank will be covered with a thin layer of boiled garden moss-peat and on top of the peat will be either Java Fern or peat fibre. In these conditions the fish will readily show themselves and not hide in the plants as they tend to do if the light is too bright.

The mature fish should be fed a variety of live-foods:—*tubifex*, whiteworms, *daphnia*, or fruit flies. Provided they are kept in good condition they will spawn continuously for months, producing about 20-30 eggs each week from a

A. gabunense
boehmi (male)



trio. Newly hatched fry can be removed from the surface of the tank by scooping them up in a small dish such as a margarine tub.

An alternative method for breeding *A. gabunense* is in a bare tank with one or two mops of nylon wool attached to floating corks. The fish will spawn and deposit their 1 mm. diameter eggs into the nylon strands. By removing the mops from the tanks one may easily collect the eggs and transfer them to a small tray to hatch. The eggs are not damaged by gentle handling as they are quite firm and may be picked between finger and thumb from the nylon strands.

After 14-21 days the eggs hatch and if they are in a plastic tray it will be necessary to check them daily during this period to remove any which fungus so that the fungus will not spread to other eggs. Setting the fish up to spawn in a bare tank is possibly the most productive method of breeding, but the fish do not show their brilliant colours or behave naturally in such surroundings.

As you may imagine, the fry from eggs of only 1 mm. diameter are very small when newly hatched and for the first week they will need to be fed on *infusoria* (e.g. *Paramecium*, Rotifers, etc.). Their tank water should not exceed a depth of 1.2 cm. ($\frac{1}{2}$ in.) and a small amount of Java Moss should be introduced to provide some cover for the fry. As the fry grow they will benefit from increasingly larger foods such as micro worms, brine shrimp, Grindal worms, and chopped *Tubifex*.

Growth of the fry is very slow and they can reach 1.2 cm. ($\frac{1}{2}$ in.) in one month, 1.8 cm. ($\frac{3}{4}$ in.) in two months, and 2.5 cm. (1 in.), after three months. At three months it

should be possible to notice some colour in the dorsal and anal fins of some of the fish and this is a sign that the males' colouring is beginning to show. It increases as the fish grow and the full colours may take 4 $\frac{1}{2}$ to 5 months to develop. The females of all the *A. gabunense* have very little colour. At the 4 $\frac{1}{2}$ to 5 month stage the males begin to grow caudal filaments at the upper and lower extremities of the caudal fin. It will be about four more months before these extensions, or filaments, reach their full size of about 6mm. ($\frac{1}{4}$ in.). During this time they can easily be damaged when the males spar.

To help the young fish to grow, and also to keep the mature fish in good condition, it is beneficial to change 10% of the water each week for water of similar conditions. Tanks polluted with uneaten food provide ideal conditions for diseases to develop, especially "velvet" (oodinium), and by the time the aquarist notices this disease in the very small fry it is usually too late to cure them.

A. gabunense are slow growing and this may deter some aquarists from keeping and breeding them, but they will survive for 2 $\frac{1}{2}$ -3 years in an aquarium provided that the temperature is kept at 21-22°C.

It is vital that the separate identities of the three types of *A. gabunense* should be preserved. For this reason one should only acquire and distribute *A. gabunense* if they are accurately named as *A. gabunense gabunense*, or *A. gabunense boehmi* or *A. gabunense marginatum*. As with most *Aphyosemion* species, differently named females are so similar that they should never be mixed in the same tank because it is virtually impossible to distinguish which is which.

A. gabunense
marginatum (male)



Book Review

Frogs is one of the *Life-cycle books* by *Althea* and published by Longmans Ltd. of Longman House, Burnt Mill, Harlow, Essex at £1.75.

It is a picture book for the very young, its text being limited to a few words per page. For example, a colour drawing of a pair of frogs in amplexus and in the act of spawning is accompanied by the notice: "The male frog helps his mate to lay her eggs in a pond."

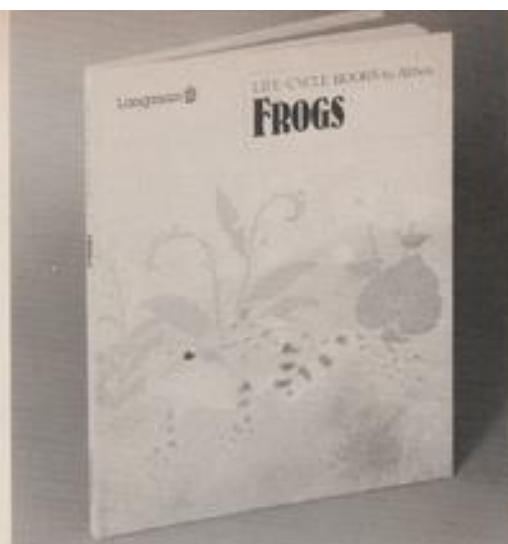
Colourfully and accurately illustrated (save for an obvious common frog (*Rana temporaria*) inflating air sacs like those of the edible frog (*R. esculenta*)) this little book is ideal for inculcating the young with the beginnings of a love for and understanding of the other life-forms with which we share our world.

The Complete Home Aquarium by *Hans J. Mayland*, published by Ward Lock, 116, Baker Street, London W1M 2BB.

This is a paper-back edition of the original publication of 1976 (reviewed in *The Aquarist* of December, 1976) and is priced at £3.95.

Diseases of Marine Animals Vol. 1, General Aspects, Protozoa to Gastropoda, edited by *Otto Kinne* and published by John Wiley & Sons Ltd., Baffins Lane, Chichester, Sussex @ £25.00.

To be followed by three more volumes on, respectively: Bivalves to Arthropoda, Echinodermata to Vertebrata, and Pisces. Applied Aspects, this work, to quote the publishers: "... reviews comprehensively and critically all essential information available to date on the biotic diseases, proliferative disorders and structural abnormalities of marine animals. Produced after a decade of careful literature research, it brings together, for the first time, a host of data scattered over a wide array of scientific journals and books. Largely based on original-source information, *Diseases of Marine Animals* corrects numerous misquotations which have, over the years, found their way into scientific literature. . . . The treatise is intended for all those professionally interested in the marine environment: its comprehension, utilisation, management or protection. It addresses especially researchers, teachers and students in the fields of pathology, parasitology, ecology, fisheries biology and aquaculture."





Press Release — *Highlands Fish Section now open!*

A FULLY re-designed fish section has been opened by Highlands Water Garden Nurseries Ltd. at their Chorleywood centre. The new installation incorporates 24 display tanks accommodating a wide variety of species of coldwater pondfish, including Shubunkins, golden Orfe, Koi, Green Tench, Calicoes, Cambridge Bloes and many more.

Highlands' manager, Mr. Charles Maplethorpe, confidently expects the new facilities to be a big draw for water gardening enthusiasts. "The new section is fully enclosed and the fish can be clearly seen, so our customers can browse in comfort" he says.

The new installation also has its advantages from the fishes' point of view. The water is constantly recirculated through the tanks by a Lotus Barracuda pump at a rate of 60 gallons per hour and before returning to the pump is passed through a special bacteria gravel filter system, so that a healthy and clean environment is maintained within the tanks.

All fish sold at the centre are from Mount Parnell Fisheries in the USA, one of the world's leading fish farms. Says Mr. Maplethorpe "The climate at Mount Parnell, which is in Pennsylvania, matches almost exactly

the climate here in Chorleywood so that when the fish arrive they have very little difficulty in settling into their new home."

Another major feature of Highlands new fish section is the wind-break constructed from "Tildenet" shade netting, by Kerrypack Ltd., of Bristol. Highlands are the first water garden centre in the country to install the netting, which serves both to keep the wind and excessive sunlight out of the fish house and to keep it well ventilated.

The fish sold at the centre are placed in polythene bags with plenty of oxygen, which in turn are put into cartons, both for added protection and for easy carriage; fish are also available from the centre by mail order. The new fish section was opened on 22nd March and the centre is open seven days a week, from 9 a.m. to 7 p.m. weekdays, 9 a.m. to 5 p.m. on Saturdays and 10 a.m. to 5 p.m. on Sundays.

Issued: 1st April, 1980.

For: Highlands Water Garden Nurseries Ltd., Solesbridge Lane, Chorleywood, Herts.

Further Information: Stuart Constable, Span PR Services.



The Cobalt Zebra

by

K. M. Foskett

Pseudotropheus zebra (Cobalt morph) is a fish which was introduced to the hobbyist in 1964. Known under the common names of Cobalt zebra or Nyasa blue Cichlid it is a native to Lake Nyasa in Africa.

The colour of this fish is very striking being various shades of blue with six to eight bluish black vertical bars and blue fins, the anal fin containing round orange spots. The blue background can only be likened in its vividness to the Electric Blue Damsel fish for anyone who is familiar with marine fish.

Looking after this fish can present difficulties on account of its aggressiveness, both towards its own kind and other tank mates. A large tank is required with a series of rocky caves; undergravel filters are of little use as this fish is an avid digger, an outside power filter being the most useful form of filtration.

Water conditions are less of a concern as anything over a pH of 7.4 and a hardness of 20° DH are ideal. Living as I do in Berkshire these conditions are easily met, but someone from a softwater area will find they have to add



copious amounts of Rift Valley Salts. Temperatures in the region of 75°-78°F will bring out the best colour and promote a good rate of growth. Whilst on the subject of growth, I have found an ideal diet to be Pond Pellets together with Lance fish, Algae, Cockles and adult Krill from the Gamma range of deep frozen sterilized foods.

The Adult Krill is particularly useful in promoting good coloration. As can be seen from the photograph, (above) the mouth is equipped with rows of small teeth which are used for rasping algae from rocks and crushing small shrimps etc.

Many books of reference give the size of the Cobalt zebra as 4 in. but I have a specimen on my shop premises which is far in excess of this. If you are lucky enough to obtain a pair and have them spawn you can expect them to lay thirty to forty eggs which should hatch in about three to four weeks. Should you be interested in just keeping a single specimen then suitable inmates would be the more aggressive and larger fish from the 'Lakes' plus perhaps large Oscars, Pike Cichlids etc.

Lake Nyasa, from where this fish emanates, is an enormous stretch of water some 11,000 sq. miles in area with a length of 350 miles, 50 miles in width and a maximum depth of 2,600 ft. It is the ninth largest lake in the world. As the Cobalt Zebra lives fairly deep it does tend to be difficult to locate and catch, therefore, it commands a fairly high price in the shops. It is, however, a worthwhile fish to keep and will reward its owner with a very colourful display, individual characteristics and long life.

What is Your Opinion - continued from page 24

English angels 2/6, 3/6, 5/- and 10/- Queensborough another regular advertiser, included the following in their lists in the October, 1953, issue: external thermostats 28/6 to 36/- each; internal thermostats 10/- to 28/6 each; aerators (air pumps) from 19/9 to 63/-; heaters from small at 10/3 to large at 16/11; hair grass cost 1/- and *Elodea densa* 4/6 a dozen. (Younger readers may not remember that one shilling (1/-) used to be worth 12d; and that there were 240 pennies in a pound. One dozen Malayan sand snails for 7½p doesn't seem too expensive; but neons at 50p seems relatively expensive. In those days the magazine itself cost 1/6 (7½p). In general, the aquarist doesn't seem to have been affected too badly by 27 years of inflation.

My thanks to the growing number of people who have invited me to visit them—in London and in Northern Ireland—to produce an article for the new series, *Meet the Aquarist*. Unfortunately the requests from readers who live in London reached me too late on this occasion because I returned from my London trip last week to find the letters waiting for me.

I hope to be in London again towards the end of the summer so I may get an opportunity to visit you and bring along my camera then; however, the air fare by Shuttle between Belfast and London is now £43 in each direction so I shall have to save all my spare pennies in an attempt to raise £86 between now and then—and of course the cost of accommodation will be an additional, financial problem. I'll attempt to visit readers in Northern Ireland as time and petrol costs permit—although my full-time job is keeping me rather busy at present as examinations loom large on the horizon; and you'll appreciate the fact that the needs of my full-time profession must always come first. It will be useful if you include your telephone number on invitations for me to visit you for a *Meet the Aquarist* interview.

Several days ago I decided to try to find out why the plants in my largest aquarium were failing to grow. I tested the water—something that I do very seldom—and discovered that the pH had dropped to 6.1. Tests on the water in my other five tanks gave pH readings of: 6.2, 6.3, 6.4, 6.4 and 7.3. The local tap water has a pH of 7.4. I'll attempt to raise the pH, *very gradually*, in those tanks with the lowest readings. I must admit that I would have estimated the pH in most of my tanks as being around the 6.8-7.2 range. It shows how wrong one can be—even after thirty plus years as an aquarist.

For next month please let me have your opinions on any of the following: (a) home-made fish foods; (b) breeding killifish; (c) keeping reptiles and amphibians; (d) cultivating *Hygrophila* species; (e) spawnings in ponds; (f) native marines; (g) accuracy of thermometers; and (h) cleaning algae from aquarium glass.

I still have not heard anything from the firm from which I ordered a couple of spatterdocks. I wonder if both of my letters got lost.

I hope you are having an enjoyable summer. Good-bye until next month—and do drop me a line.

Bleeding Heart Tetra

or
Blood, Sweat and Tears

by
W. Crusio

IN THE BEGINNING this fish was called *Hyphessobrycon rubrostigma*, later that became *H. erythrostigma*, and now we also have *H. socolofi*. The following story then is full of mistakes and misunderstandings, but I hope that it will be more clear to you at the end of this article.

Something about Nomenclature

When we look at all the events chronologically, then our story starts in the beginning of the 1940s, when World War II was at its height (or better perhaps: was at its lowest point). While Europe was bombed and most aquarists there had something different on their minds, Fowler in America received a fish, that in his opinion represented an undescribed species. In 1943 then followed the scientific description as *Hemigrammus erythrostigma*. Unfortunately, this description was not made in the appropriate (scientific) magazine, but in a more or less obscure aquarium magazine: *The Fish Culturist*.

Nowadays, too, this is a bad habit of several authors. For many reasons aquarium magazines are not suited for scientific publications. The following story illustrates this, for what happened? Fowler's publication was completely overlooked by succeeding authors. So when in the fifties these fish came to Europe, Hoedeman thought he had a new, undescribed species. This mistake, however, was not completely due to Fowler, because his description was mentioned in his 1948 published standard-work on Brazilian fish. But this publication was also overlooked by Hoedeman, and so in 1956 he described

Fig. 1. Anal fin of *Hyphessobrycon socolofi*, male.

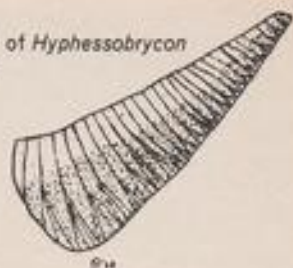


Fig. 2. Anal fin of *Hyphessobrycon erythrostigma*, male.

this species as *Hyphessobrycon rubrostigma*. This description was also publicized in a hobbyist magazine, namely the *Aquarien und Terrarien Zeitschrift*, better known as the DATZ. This magazine regularly published (and publishes!) original descriptions of fish species (by a.o. Hermann Meinken and Dieter Vogt). With this name the fish started its victorious march into the aquaria of European and American aquarists. It wasn't until 1970 that one discovered that only one species was involved, which should belong in the genus *Hyphessobrycon*. Géry studied the only (feminine) specimen that Fowler had used for his description and reached the above mentioned conclusion. By the way: the differences between the genera *Hyphessobrycon*, *Hemigrammus* and *Megalomphodus* are not well described, so perhaps some name-changes will take place here in the future. Géry reported about his conclusion in a letter to Sterba, who mentioned this in his 1970 published book. The correct scientific name for the Bleeding Heart Tetra now is: *Hyphessobrycon erythrostigma* (Fowler, 1943) Géry, 1970.

It seemed that with this publication there had come an end to all confusion. The proper name for the Bleeding Heart Tetra was established. However, in 1977 Weitzman published an article (this time in a scientific magazine) in which another new species was described: *Hyphessobrycon socolofi*. Some beautiful black and white pictures illustrated his study. And what could one see in his pictures? . . . right! The Bleeding Heart Tetra. Happily enough, Weitzman did know of the previous publications, so he

did not propose a third name for one and the same species. Indeed, a new species was described, albeit narrowly allied to our "old" Bleeding Heart Tetra. Then I could also see that this "new" species was present in our tanks already but was always confused with *H. erythrostigma*. A beautiful colour picture by van den Nieuwenhuizen in the DATZ (with an article by Raschka) proved this because it didn't show *H. erythrostigma* as stated, but the new *H. socolofi*.

The two species differentiate on several points (see table 1). When one knows where to look, males of both species can be easily distinguished. It is best to look at the anal fin (figures 1 and 2). With *H. erythrostigma* the front side of this fin is lengthened, ending in a point. This enlarged portion is totally absent with *H. socolofi*. Also, the white colour in this fin helps us to determine the species. Alongside the base of the fin is a white zone. The width of this zone is with *H. socolofi* always less than 50% of the length of the fin-rays. With *H. erythrostigma* this width is 75-90% of the length of the fin-rays at the front side of the anal fin. (compare fig. 1 and 2).

As can be concluded from table 1, most points of difference between both species lie within the male animals and are different in females. This is shown most clearly with the fins. The sex-difference in *H. erythrostigma* lies in the difference of length of the anal fin, as is the species difference with *H. socolofi*. Hence, the difference between females of both species is only slight, so it is difficult to differentiate between females of both species. On the whole, the edge of the anal fin in female *H. socolofi* is convex, while it is concave with female *H. erythrostigma*. However, this is not always easily visible, especially not when the animals are somewhat damaged.

When Weitzman investigated the type-specimen of *H. erythrostigma* (a heavily damaged female), he thus had great difficulties in determining which of his two species should be the real *H. erythrostigma*. In the end he decided, on some more or less dubious grounds, that the bleeding heart tetra we have had in our tanks for many years, should be the real *H. erythrostigma*. The other species then was described as *H. socolofi*.

Care and Breeding

Here, too, we find some disagreements in the aquarist's literature. For instance, in the Tropical Fish Hobbyist of Jan. 1978, page 42, it is stated, that the Russian aquarist Koslow has bred *H. erythrostigma*. "A Russian First" it is announced. But already in 1959 van den Nieuwenhuizen wrote about breeding these animals! So, not exactly a "Russian First"!

Nevertheless, well documented breeding-reports on this species are rather scarcely found. Van den Nieuwenhuizen did write on how to breed this tetra, but he didn't tell us how often he bred these fish and with what results. The only breeding report I found was written by Reed and published 1965 in . . . Tropical Fish Hobbyist!!

Also good articles on how to care for this fish in an aquarium are not often found. However, this isn't as bad as it looks, because these fish are not so difficult to maintain. They prefer soft, slightly acidic water and are preferably fed with live fish food especially insects and their larvae (fruit-flies and their larvae, mosquito larvae—especially white or black, the red ones somewhat less) are popular. When we want to breed these animals we surely have to feed them heavily with insects and refrain as much as possible from feeding dried and dead foods.

Breeding is difficult. Van den Nieuwenhuizen reports that it is necessary to take a tank of at least 50 x 35 x 35 cm, but personally I would even prefer a larger tank. The biggest problem then is the choice of the right partners. Males of this species are very stubborn: they decide which female they want and which not. Perhaps then it is best to start with a little swarm of these fish in the community tank where they can be closely observed. From this swarm we can then take a breeding-pair of which we can see that it "clicks" between them.

The actual spawning occurs early in the morning between fine-leaved plants, after some heavy driving. Nevertheless, it is necessary to choose as bottom-cover some material between which the eggs disappear out of sight (and mouths) of the parents, because with all this heavy labour a fresh egg tastes good!

If we then ensure a temperature of about 26°C, together with some very soft, peat-filtered water, our chance for success is the greater. After about 30 hours we can see the first fry appearing. These are hanging onto plants and walls, waiting for the moment that they are ready to take their first swim (after about 90 hours). To raise them to maturity, one needs fine, small, living food, like *Infusoria* and *Cyclops-naupliae*. It is unknown to me if they also eat *Artemia*. The number of young fish isn't very large. This is merely caused by the occurrence of growth-failures accompanied with losses after about one month, although at first their growth may have been satisfactory.

Due to all these difficulties, most bleeding heart tetra's are still imported and caught in the wild. In this age of nature conservation and management, not so good! So here lies a task for the more advanced and serious breeder, to dive in to this case and find out how these animals can be bred more easily. By the way: so far nothing has been reported on the spawning of *H. socolofi*, so here is a "first" waiting for someone.

Geographical distribution and habitat

Not much is known of the natural distribution of these two species. Weitzman mentions Barcelos at the Rio Negro in the Brazilian state Amazonas as a source of *H. socolofi*. Undoubtedly the future will show us that this fish is more widely distributed than in this area alone. For *H. erythrostigma* he reports that it is found in the Igarapé Preto, a branch of the Rio Solimoes in the Brazilian border-area with Peru and Colombia. It appears that this fish is also found in the two last named countries.

Consequently, not much is known about the natural habitat of both species. Dittmar mentions the water having a temperature of about 22 to 29°C. Further he presented an analysis of the water, which is shown in table 2.

Concluding remarks

The only thing left for me to tell you, is how these fish are coloured. However, this is quite difficult and as most people know these fish I will refrain from it. Moreover, most of the articles cited below are accompanied by good colour-pictures. They show us that the colours of *H. socolofi* are mostly somewhat brighter than in *H. erythrostigma*. The former is also somewhat more bluish in appearance.

As common names for these species I could then suggest the name "shortfin bleeding heart" for *H. socolofi*, which leaves *H. erythrostigma* the name of "longfin bleeding heart."

Some morphological characteristics of *Hyphessobrycon erythrostigma* (Fowler) and *H. socolofi* Weitzman. (Measurements in percents standardlength -SL-, unless otherwise indicated). (After Weitzman, 1977).

| | <i>H. erythrostigma</i> | <i>H. socolofi</i> |
|--|-------------------------|---------------------|
| snoutlength | 7.8-8.5 | 6.9-7.9 |
| Length of anterior dorsal fin-rays with male animals | 38.3-50.5 | 30.4-34.4 |
| Length of anterior anal fin-rays with males | 27.4-35.7 | 18.1-22.1 |
| pelvic-fin length with males | 23.0-28.5 | 18.6-20.8 |
| bony hooks on dorsal and anal fin of the males | nearly absent | numerous |
| number of vertebrae | 33 | 32 (very seldom 33) |
| SL in mm | 40-60 | 30-40 |

(Standardlength is the length of the body, as measured from the tip of the nose up to the point where the caudal-fin rays are implanted).

Analysis of a water-sample of a finding-locality of *H. erythrostigma*. (After Dittmar, 1967). Quantities in mg/l, unless otherwise indicated.

pH 4.5-6.5

| | |
|---------------------------|------------------|
| Total hardness | 0.2-0.9°DH |
| Humus-acids | 0.02-0.06 mval/l |
| KmnO ₄ -debt | 7-25 |
| free CO ₂ | 2-8 |
| NH ₃ | 0.05-0.15 |
| NO ₃ | 0.0-0.5 |
| Cl | 1-5 |
| SO ₄ | 0-0.05 |
| SiO ₂ (solved) | 1-5.3 |
| Fe (total) | 0.05-0.2 |

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BELLE VUE MANCHESTER

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SATURDAY and SUNDAY 8th 9th NOVEMBER 1980

THE POND SAGA

Part 4

by Roy Pinks

THE LAST WEEK in July saw a continuation of the wonderfully sunny weather which had enabled me to make such good progress with the restocking programme, and by the end of the month I was in a position to move the plants back and to refill the pool. I had an embarrassment of plants to re-site, though few of them, apart from the water-lilies, were what I would class as choice, and I ordered a selection of the latter from Lotus which, when they arrived, promised several pleasurable days ahead of sorting, grading and planting. The handling of my old plants had been greatly simplified by laying them, species by species, in the temporary pool, rather than muddling them all up together. One of the advantages of a replanting exercise is that you can deploy your material in groups, and if you have your species separate from one another you can readily select the big plants, the medium sized ones, and the midgets so as to form graded plantings, the visual effect of which can be very pleasing.

Lilies

I decided to set all the lilies and marginals in plastic crates or large flower pots, using well rotted compost as the planting medium. This came straight from the compost heap, and I covered it with about 2 inches of loam from the vegetable garden. On top of this I settled at least an inch of pea gravel, to prevent the fish from nuzzling about in the containers and stirring up what would soon become thick mud. The planting process was not difficult, and consisted of ramming the compost down solidly, inserting the plants to cover the roots and watering with a watering-can so that the compost immediately made intimate contact with the roots.

I had to bear in mind that the pond is not filled to the top in one fell swoop, but in several stages, day by day, and therefore the first items to go in would be the largest and heaviest, typically the waterlilies and the taller subjects like the mace and irises. This is a crucial planning point, and it is a grave mistake just to load the crates into the pond and to fill up without first forming a mental picture of what it will all look like later on. So you have to stand back and move around and look at the whole thing from a variety of aspects, pushing a crate here and adding one or two there, to form a basis for the effect you are setting out to achieve.

Broad splashes

This is certainly a matter of individual whim, but I consciously tried this time to achieve some broad splashes of colour rather than single bits dotted here and there. So I ordered ten of this and ten of that instead of the singles and pairs of the over-wide range which characterized my earlier efforts. For example, the Water Hawthorn in bits and pieces is interesting, but in a mass it is breathtaking, and you can say the same for *Lobelia cardinalis*, surely the most underestimated of all the marginals, with its arresting flowers of deep red which absolutely vibrate regardless of the state of the weather. These were surrounded with some *Iris kaempferi* (var. *Snowdrift*), which would help to support the flowering spikes in windy conditions. Groupings of *Typha*, the tiny reed mace, were placed in the shallows, where *Frogbit* and *Villarsia*, those useful and decorative floating subjects, were also found a place. Arrowheaded leaves always look interesting, so a group of *Sagittaria sagittifolia* was also placed in a strategically acceptable spot in the shallower water. I had to wield the pruning knife when planting all these subjects, and especially the waterlilies, because large areas of dead roostock had accumulated over the years, and only the live portions were given a place in the freshly-filled crates.

I surveyed the motley collection of containers before attempting to fill the pool and made a number of last minute adjustments, bearing in mind that further re-dispositions would probably be necessary day by day as the growing volume of water subtly changed the look of things by introducing another dimension. The great moment had arrived when the tap could be turned on, and I could judge for myself whether the patching had been effective. It is best to fill a pond by placing the business end of the hose in a bucket and tying an adjacent piece to the wire handle. This, placed in the deepest part of the pond, will provide a gentle inflow of water and will prevent the hose end, which wanders like an itinerant snake, from washing the compost from the planting crates.

I was satisfied on the first evening with about a foot of water, which just covered the majority of the waterlily crates. The purist will not allow lily leaves to sit below the water surface after introduction, but places the crates on brick supports which are gradually lowered as the plant grows. This may be helpful at the beginning of the season, when there are only small leaves anyway at the crown, but at other times of the year when the water is warm I doubt whether this precaution is in any way necessary. At all events, I overrode this practice and pressed on with filling the pool by a little under a foot each day.

Oxygenators

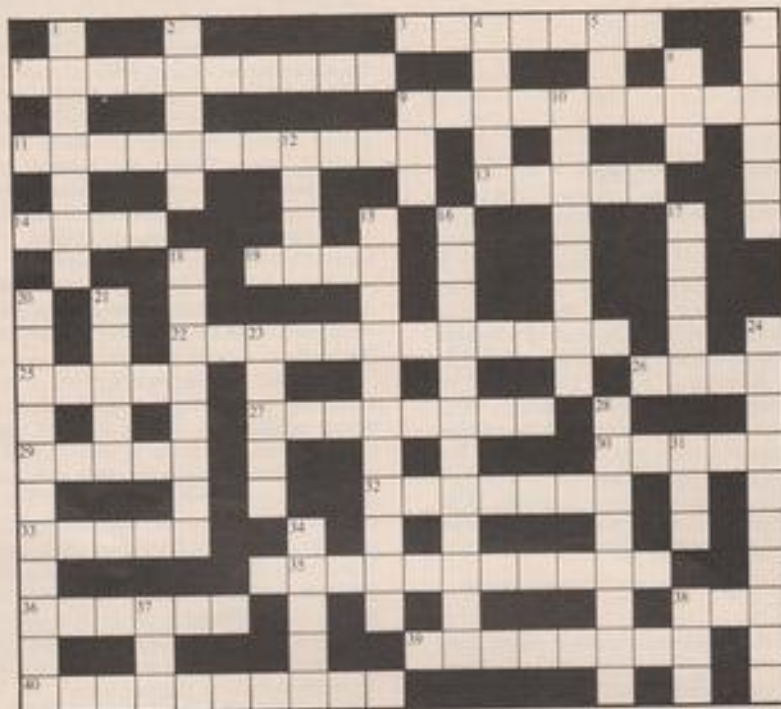
The next job was the addition of the oxygenators which I had temporarily accommodated in the plastic dustbins. These were (mainly) *Hornwort*, with a small quantity of *Lagarosiphon*, and I spent many hours picking it out, strand by strand, and rejecting dead or dying pieces. The plants were usually about 2 feet long, and I made bunches about 3 inches across at the base, tying them with plastic

Continued on page 53

Crossword Puzzle

Compiled by Dave Roberts

Merseyside A.S.



CLUES

ACROSS

3. Genus of African Cichlid (7)
7. It sounds as though you could draw with this one (10)
9. A Viviparous one (10)
11. *Ritodus irigatus* is known as this (11)
13. *Brachydanio*, the Zebra (5)
14. *Rhamphochromis*, large African Cichlid (4)
19. What word completes a longer one in each case?
. *fauciolatus*, *palatus*, *cinctus* (4)
22. Genus of the three-spined Stickleback (12)
25. Now complete these words *ostaz*, *omater* (5)
26. Tail form (4)
27. *Cheirodon*, the Cardinal (8)
29. *Botia*, the Cream Botia (5)
30. *Barbus*, a Barb around 10 cms. (5)
32. The *Anostomus*' markings could be described as this (7)
33. Vertical parts of the U/G filter (5)
35. *viracens*, the Green Knifefish (11)
38. Colour of the tail of *Labeo bicolor* (5)
39. *nigripinnis*, difficultly bred Characin (8)
40. These fish have a distinguishing black triangle on their bodies (10)

Solutions on page 59

DOWN

1. *Rolefia*, a Killie (7)
2. See 12 down
4. Internal organ of a fish (5)
5. It forms on ponds in cold weather (3)
6. Continent from which many Cichlids originate (6)
8. Young fish are called this (3)
9. *Bathybates*, Rift Valley fish (3)
10. A species of *Corydoras* (8)
- 12 & 2. Common name of *Lamia melanogaster* (4, 5)
15. Genus of Characin (11)
16. Genus of Cichlid (12)
17. Common livebearing fish (5)
18. Another species of *Corydoras* Catfish (8)
20. 'This fish sounds as if it had an 'Axe to Grind' (11)
21. Partial water changes keeps it this way (5)
23. Argusfish are also known as this (5)
24. *Phallichthys amater* (5, 5)
28. Species of *Tytocharax* attaining 2 cms. in length (8)
31. Your fish could be described as this, similar to other animals (3)
34. *Xanomyza*, the African Knifefish (5)
37. A slippery character (3)
38. This will be found in a dorsal fin (3)

Commentary

by

ROY PINKS

THE IMPENDING ARRIVAL in the shops of the new season's coldwater range is always something of an event so far as I am concerned, and I usually spend several pleasant half days wandering around local and more distant sources of supply. On the one hand there is a feeling that as last winter is out of the way, and on the other there emerges the possibility that this is the year in which all those elusive specimen fish and rare plants at last will become available. I also like to compare trends over a period of years.

I have been saddened, during the past year or so, to see a distinct phasing out of breeding specimens of the Common Goldfish, and although the Sarasa Comets, surely one of the best things to have happened to the hobby for a very long time, are freely available in a range of sizes, the shining golden fish of a few years ago seem to be taking a back seat. I cannot quite understand why this should be. In its place there are koi of every imaginable hue, largely rubbish, and largely sold to purchasers quite unaware of what they are taking on.

Then there seem to be hundreds of little orandas, ostensibly intended for the outside pool, where they will perish, certainly if we have another winter remotely resembling that of 1978/9. Numerous other small fancy goldfish jostle with them, most of them fated for early eclipse. Here and there are, it is true, quite acceptable small Common Goldfish at 30p or so, which must be good value for money these days, particularly when one bears in mind that little fellows like these put on a lot of size under the influence of roomy pond conditions and a diet of pond pellets and earthworms. The outside pools this year have warmed up more quickly than usual, and new purchases can be introduced without long acclimatization periods, an alarmingly more frequent requirement during the cold spring of the last few years.

Orfe and Rudd

The livelier offerings like orfe and rudd seem slightly less expensive this year than last, but I greatly regret the reappearance of hole in the body disease at the local aquatic centre on a number of large golden orfe. This disgusting and contagious condition was almost non-

existent last season, and I hoped never to see it again, but irresponsibility and the lack of effective controls are excellent partners in letting it loose again. It is time that all responsible authorities in the hobby got together on this matter: it is for the purchaser to make the running, as it is clear that the PTA and other odd marketing interests have no initiatives where public spirited gestures are called for.

Once again there was no evidence that demand for native species was being met in any way. True, in one pool there were a number of sticklebacks obviously on good terms with some small goldfish, and another retailer had some very nice carp. But these are not ideal fish for the garden pool, and roach, rudd, minnows, gudgeon and dace would make a nice change. There were plenty of tench to be had, but why anyone ever bothers with these, other than for the indoor tank, completely baffles me.

The quality of pond plants seemed generally to be excellent, but it was quite appalling how the garden centre pricing mentality has affected the market. What happens is that a common price is applied to a whole range of plants (excepting the rarer ones, which are much more expensive). The result is that medium priced plants carry medium prices, and so do the commoner and easier ones, which should be sold more cheaply. Hence I saw Water Mint, that terrible scourge of the pool, being sold for 65p for a single sprig set in a plastic pot alongside a plastic label bearing its likeness. The same price for an iris would not be altogether unfair (nor was it), but the Water Hawthorn, bless it, was £1.25. This is the sort of indiscriminate price bulldozery which I abhor, and which will not apply at the bona fide specialist growers. Places like these, usually without the huge overheads of the garden centres, are still the best hunting grounds for the collector, partly because the prices suit the goods, and also because the seller knows more exactly what he is talking about. You will sometimes be surprised, when visiting such establishments, to see the plants you want actually growing, but unavailable to you without due notice.

Waterside plants

As some compensation there seem to be longer lines of available waterside plants, and the double marsh marigold, one of the most wonderful of all the spring sights, was much in evidence. Ligularia, a little known pondside, is becoming more freely available, and varieties of primula, too, will help to add some colour to the scene. I am going to try to beat the market, however, this year, by growing many of my poolside plants from seed. One of the most exciting catalogues I have seen for years comes from Chiltern Seeds, Sunnymede Avenue, Chesham, Bucks. It costs 35p and lists everything imaginable, including iris, hosta, ligularia, and so on. Any reasonably competent gardener with a greenhouse and propagator can raise lots of plants from seed, and with the savings can buy some show grade fish or a pump for the pool, so why not join in and have a go?



Common Hermit Crab.

HERMIT CRABS are usually found in the inter-tidal zone in rocky sandy pools. The crabs being buried in the sand are revealed by gently stirring the water when their burrowing movements indicate their position. Their shells serve a number of purposes, prevention of desiccation and protection from predators and mechanical abuse, such as wave action and abrasion when burrowing.

After having passed through four stages as a planktonic zoea larvae, with each stage resembling the adult more closely, the hermit crab first selects its shell as an innate response at the glaucothoe or pre-adult stage. When viewed outside its shell, the abdomen should be tightly curled to the right, springy, and capable of contraction and expansion. This development of one side of the animal to the detriment of the other, leads to the tendency of the crab to turn to the left, which is readily observed in shell selection.

The optimum shell size is a compromise between space for growth and a tight fit to avoid being pulled out of the shell by predators. The efficiency or best fit of the shell is termed the 'shell adequacy index' and is defined as the ratio of the preferred shell size to the actual crab size. The volume, as a measure of the shell size, can be easily found using dry fine sand, whilst the crab size can be a measure of either its appendages, dry weight or total carapace length (that is from the tip of the rostrum—an anterior projection of the exoskeleton between the eyes—to the posterior medial notch). When removing hermit crabs from their shells for studying behaviourable responses a number of methods can be employed. Practise, caution and patience are required to avoid a high mortality rate when pulling the crabs out of their shells. The more common methods applied are:

- (a) Filing off the apex of the shell and prodding the crab with a blunt instrument.

Shell selection of the Common Native Hermit Crab

by David Steinhof

Waterlife Research Ltd.

- (b) Noisy but non-violent battery on the apical whorls with a flat piece of metal.
- (c) Using a soldering iron at the apex of the shell, forcing the crab to partially extend itself from the shell, when it can be readily withdrawn.
- (d) Anesthetizing the hermit crab in fresh water at 35°C and after removal reviving it in sea water, and finally,
- (e) Breaking its shell.

Of the primary factors which promotes shell selection, shading appears to act as a strong stimulus although there is no evidence that shapes are visually discriminated. However, in small aquarium tanks random motor activity is probably more effective in causing the crab to reach its shell than any visual stimuli.

On reaching the shell, tactile discrimination overrides any influence of shading. The weight of the shell is the first factor to be considered. This is determined by the hermit crab rolling the shell around with its chelipeds and pereopods (its walking legs). There is no difference if the shell's aperture is placed facing the tank's substratum or not. The chelipeds and antennae are then used to gauge the width of the shell aperture. Insertion and deep withdrawal of the abdomen into the shell yields information to the hermit crab on either the thickness of the columellar axis (this being the central pillar) or on the shape of the first whorl of the shell around which it wraps its abdomen. After selection the righting of the shell is achieved by the hermit crab partially extending itself and reaching beneath the shell with the second pair of pereopods and then flexing them forward.

Hermit crabs inherently investigate all shells available, even though their own shell may be perfectly suitable. Rejection can occur at any stage and although apparently

satisfied with a particular shell they may discard it several hours later if there is a wide selection of other shells present. Thus, when seeking a suitable new shell from a number of shells, the hermit crab should be left for at least 72 hours with all the shells present.

Shell selection is independent of previous usage; however the presence of symbionts (organisms which will provide mutual advantage) will make a prospective shell more attractive. Nevertheless, since weight is a crucial factor, too large an anemone on the shell will cause rejection. Some species of hermit crabs including *P. bernhardus* transplant their symbionts (*Galliactis parasitica*) as they transverse shells.

It is debatable whether hermit crabs differentiate on the basis of the shell species, results seem to be dependent on the genus of crab studied. Usually the limiting factor in shell species choice is the availability of shells of suitable size. Thus if selection does occur it may be due to a multiplicity of factors:

- (a) The type of shell available.
- (b) A mixture of selection and availability, or
- (c) Shell species preference alone.

Finally, the other factor which influences which shell a hermit crab will inhabit is aggression between the crabs themselves, for if there is a limited supply of shells the fitter will dispossess the weaker for a more suitable home.

Whilst the above notes stem primarily from a study of the temperate zone species—*Pagurus bernhardus*, study of hermit crabs from coral-reefs would indicate a high degree of comparability with the behaviour of these tropical species.

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Pond Saga - continued from page 49

string. Small pieces of walling stone acted as weights, and their rough configuration enabled the string to bite. (I could never understand how those gentlemen who advise us to tie stones on ever manage to do so, as all those I could ever find were round, and the string invariably slipped off before I even reached the water's edge!). Hour after hour I was to be found sitting bunching plants, but it was a pleasant and contemplative occupation and a rest from the back-breaking exertions of the previous few weeks, so who knows that I didn't perhaps prolong it a bit because I felt I deserved a break!

What became very obvious was the immense quantity of plants required to make the pool even look to be stocked, and though I had so much raw material, I felt that I could have done with still more. It is worth noting that I had not had an algae problem in this pool for many years, for the simple reason that there were so many higher plants in it, and they had completely taken over. The new pond-keeper has an immense challenge, therefore, and the pathetically small purchase of oxygenators he habitually makes put him completely at the mercy of the algae which can gallop away at almost any time of the year.

In parallel with the planting of the main pool I was making some progress with the bog garden. This only covered a few square feet and had never been much of a success, so I completely cleared it, placed some polythene sheeting on the bottom of it, and cut a few holes in the material to allow of no standing water, but simply a damp area in which beauties like the double Kingcup could flourish. An astonishingly beautiful subject with a vivid orange flower—*Ligularia*—would later take its place here,

Sarasa Comets

The reader may well ask what I was doing and thinking about all this time as regards fish, and until I saw the Sarasa Comets I had an open mind. The local man had some very good imports of these fish, ranging from small specimens at 70p to spawning size at £3.50. I think the red contrasted against the silver gave every promise that these would be showy pool fish, so I bought a dozen of the small ones and, of course, a quantity of golden orfe. These were sized about 3 inch. and cost me about 50p each. All went temporarily into the Nursery pond, where a few of those Shubunkins which I had overwintered for my colleague were still lurking. The depth of mud on the bottom made me realize that it would be no mean feat to catch them, but I was wise to acquire the fish when I did as they were selling rapidly, undoubtedly because they were such good specimens and in excellent health.

During August the weather deteriorated and we had some rain, but this simply topped up the pond and did the lawn good. All seemed to be going well, and I began to calculate what materials I needed to get my other two pools in working order. The Pit would need to be rebuilt from scratch, and the Nursery, already full of fish, would need to be drained down and remodelled. Then one morning I discovered that the main pool—Despond—had lived up to its name, and was leaking.



COLDWATER Queries

by Arthur Boarder

When I take fish from my garden pond and place them in an indoor tank, they lose much of their colour. Can you explain why?

I think that the change of colour is due to the fact that the glass tank allows too much light all round the fish which it has not been accustomed to in the pond. It is very noticeable that if a green tench is taken from a pond and placed in a tank it will lose its colour in a very short time. I have noticed this when I have placed a tench in a show tank for exhibition. It may be that the protective colouring of the fish reacts to the change of the surroundings and so in a lighter condition the colour becomes paler. You can help to keep the colour on a fish by shading out the ends and the back of the tank and having plenty of oxygenating plants.

I have made a concrete pond and would like to know how long it should be filled with water before it is safe to add any fishes?

Just keeping the pond filled with water for some time is not enough to make it safe for fishes. There will sure to be a quantity of free lime on the concrete. I have found that a safe way is to empty the pond after a day or two and then scrub it round with a stiff broom. Wash out well and after another day or so filled with water repeat the scrubbing and make sure that there is no white sediment left on the bottom. The pond could then be refilled and it will be safe. Some people paint the concrete with a sealer but although this could work for a time, it is possible for the seal to wear off and then there may be lime free to enter the water. Once you have cleaned and refilled the pond put something of little value in to test the water. If a small fish, water snails or *Daphnia* live in the water it can be presumed safe.

I have a Crayfish which was sold to me as a 'Turkish Crayfish'. It is bigger than the native one and is rather redder in colour. Can you tell me what it is please?

I think that the Crayfish you have is one known as the 'red-claw' and is found on the Continent and is bred there for food. It is known as *Astacus fluviatilis*, the true native species is *Potamobius pallipes*, which is much smaller than the foreign one. However, it is thought that some of these escaped or were released in some streams of the River Thames and some may have lived on and bred.

I have noticed in some of your replies to queries about goldfish eating water plants. I have had the same problem and find that only one water plant appears to be safe from my fishes. I am sending a sample of the plant and hope that you may be able to name it for me, as I think that this one plant will be all I need?

Although the water plant was almost completely disintegrated, I feel certain that it is *Hottotia palustris*. If you have found this one to remain uncaten, then use it alone, there is no point in trying to grow several types of water plants in a medium sized pond.

I intend to breed some Minnows and would like to know what family they belong to; their scientific name, and how they breed?

The Minnow is a member of the Carp family and is known as *Phoxinus phoxinus*. These fish prefer a very well oxygenated water and not too warm. They usually spawn in the spring and congregate in shoals over clean gravel beds. It will be an advantage to have several fishes of both sexes and they should be removed after spawning to save the eggs from being eaten. The eggs should hatch in about six days and the fry must be fed on very small types of food such as *infusoria* or liquid fry food at first, moving on to slightly larger live food as they grow.

Where can I get good quality Veiltail goldfish and what should I expect to pay for one year old fish?

I am enclosing an address from where you should be able to get the fish you require. However, I cannot give an accurate estimate as to their price, as so much depends on the quality of the specimens. This type of fancy goldfish vary so among a number of young fish that an exhibition fish is a rarity and under the circumstances one would have to pay much more for it than for good types which may not win a prize in good company. However, most fish from a very good, well established strain should be capable of producing at least a few very good fish from which a better specimen could be bred.

I have a pre-cast stone manufacturing company and make garden ornaments, etc. I would like to make ornaments for aquariums. There is no difficulty in making the moulds but would a normal fine cement mix be suitable?

I must point out that there are many of such ornaments on the market but the main trouble with your mixture is that free lime could come from the ornaments and be a danger to the fishes. This free lime comes from or near the surface and if you could thoroughly clean this off then there should be no danger. If a special coating was applied to trap the lime, it is possible for this to wear off in time and so become dangerous to fishes.



TROPICAL Queries

by Roy Pinks

Could you please give me any details about a fish called *Geophagus hondae*? I know it is a mouth brooder but wish to know maximum size, feeding habits and water conditions.

Unfortunately none of my reference sources gives details of *Geophagus hondae*, but I think you will find that it will not prove to be a difficult fish to keep in good health. The only problem might be its companions, as members of this genus, apart from *jurupari*, are pretty quarrelsome and there might be some squabbling. Therefore only keep it with the larger cichlids.

You would expect to have it grow to about 6 in. in a 36 in. tank, under normal conditions. Water quality is not important, and neutral is safe enough, but be careful always when transferring fish from one sort of water to another to do this very gradually. Some of these species are easily shocked. As they are sifters of the flooring medium, this should not be too coarse. Plants are usually uprooted and it is pointless to bother with them. Caves and rocks and retreats with sunken woodwork suit fish like these.

Food should not present any real difficulty, as certain types of dried food are accepted, but as most cichlids like living material, the smaller live foods are best. I say "smaller" because the shifting process is designed to cope with food like whiteworm, daphnia, bloodworms and the like.

If you have a pair give them a tank to themselves, leave them strictly alone during the breeding period, and write down all that happens.

I have seen some bogwood for sale in a local aquaria and I am considering buying some for my tropical aquarium.

Please could you advise me how I can clean it to make sure it is safe for use in the aquarium?

You can never be quite sure about the way in which wood of any kind might affect fish if it is used for tank decoration, and it is best to assume that it all needs lengthy seasoning. All that is necessary is to soak it for about two months, changing the water several times. However, some material marketed is claimed to be quite safe for immediate introduction, and this could well be so if the vendor has treated it properly. The best thing is to ask the retailer, and if he says it is safe, get this in writing! It will be quite expensive, anyway, and if he is not prepared

to give a guarantee, you must draw the inevitable conclusion that the wood needs a long and complete immersion.

You may have noticed a new range of "bogwood" made from fibreglass or the like. It is marketed under the trade name SIMLAWOOD, and is quite inert, so maybe used straight from the packet. There are a number of designs, it is very realistic and will last forever, so if you are in a hurry you might do a lot worse than try this. I normally dislike artificial furnishing in tanks, but this is really most tasteful, and when you spread the initial cost over the years it doesn't amount to all that. And petrified wood is quite expensive, anyway. I have no commercial interest in this, incidentally. Have you considered cork bark for your tank—this can be used after minimal washing, provided that you can anchor it down or otherwise keep it in place. It costs about £1 a pound, so comes much cheaper than the above.

Would I be able to put a blue Acara in a 39 in. x 12 in. x 12 in. tank which houses 2 angel fish 3 kissing gourami, 2 kribensis, red finned botia, a silver shark and four catfish.

I am afraid that your tank is already overcrowded—you should allow 12 sq. in. of surface area per inch of fish (ultimate size), and you are some 14 in. over the top as it is. Even if you disregard the catfish, which take in atmospheric air direct, you are still several inches on the wrong side, and you should, I think, re-think your overall holding. Do remember that if you reshuffle your species and include the Acara, just make it a single fish because if by chance you included a pair, you would almost certainly run into trouble in the event of mating and breeding.

I recently purchased two young fish labelled as "Red Check Zebras." I was told that they were a native of Lake Malawi. Could you please give me some more information on this fish as I have not been able to find it in any of my own fish books?

I think that the fish you have bought as Red Check Zebras are one of the naturally occurring colour forms ("morphs") of the species *Pseudotropheus zebra*, one of the finest and most variable of the Lake Malawi cichlids. These are a study all of their own, and for successful culture you need to set up an aquarium dedicated to this group of fish, rather than mixing them with others. Alkaline, very pure water, temperatures in the upper seventies, rock, slate, caverns for privacy, and *Vallisneria* for plant life (if you must) are features to aim for. The fish are territorial, therefore it is best to introduce your whole collection at one time, and they are quite successful breeders, given the right conditions. Most of the Malawis are mouthbrooders and feeding and rearing prove no great challenge to the normally competent aquarist. In fact, many aver that they are ideal beginners' fish. Though there is quite a lot of irrelevant picture material in it, the TFH booklet "Beginning with Mbunas" (Axelrod) should prove of interest to you. I wish you success in keeping these fish.



PLANT Queries

by
Vivian De Thabrew

Having read various articles on plant growing medium, I would like your advice as to which is the best to use. The types of media seem to be:

1. John Innes Compost—Which type do you use and what treatment do you do before use?
2. Peat—Which is the best type and what treatment do you do before use?
3. Clay and sand—What type and what treatment is necessary?

I have bought some fine gravel and is it best to use this three to four inches deep over the growing media? The water in this area is alkaline with a pH of about 7.2. Could I use de-mineralised water with the tap? I use a power filter with the hope of being successful in growing plants.

The choice of the type of planting media is a very important one, as this will determine the health of your plants to a considerable degree. The basic principles to be followed in selecting one are as follows:

1. The interaction of the medium on the water chemistry.
2. The ultimate efficiency in terms of nutrients available from such a medium to the plants.

Firstly, the medium should be such that the pH and DH factors are not drastically affected by it. It is well to maintain a slightly acidic water. This condition should not be altered to make it either too acid or alkaline. Secondly, the medium should contain substantial organic nutrients for plant sustenance. It should also give the adventitious roots good anchorage.

With the above observations in mind, John Innes Compound (heavy grade) with fine gravel at a proportion of 1:10, that is, one part of J.I.C. to ten parts of gravel can be used. The John Innes Compound should be spread as an inch-thick layer at the base, with a three-inch thick layer of gravel over it. In the case of peat, Irish peat moss can be used. This should be first put in a container and thoroughly soaked until all the moss has settled to the bottom. After a lapse of four to five days, the peat should be removed, put in a muslin or fine gauze and squeezed until almost dry. The peat should then be spread evenly at the tank bottom. Either coarse unwashed sand or fine gravel should then be spread over to a thickness of about three inches.

The clay and sand idea is a very good one, as this is the well-tryed mixture used in most research herbaria. A layer of good granules of hard clay should be spread first and then gravel or coarse sand, preferably river sand, spread over it. De-mineralised water is suitable for your purpose. If you can collect rain-water, this is excellent.

My all glass tank is lit by a three foot tube for ten hours a day. About three months ago I started to get blanket weed on the plants and gravel. I emptied half of the water, cleaned the gravel and the plants. About a fortnight later the same growth appeared. Do you think I need some sort of fish like a cat fish to clear it?

The type of algae which you have encountered in your tank appears to belong to the blue-green algae group, *Myxophyceae*. The main causes for the development of this algae in the tank are:

1. Water with a pH of above 7.0 (alkaline)
2. Strong illumination

Therefore, experiment with your lighting by reducing the duration by about two hours per day, and also check your pH which most probably is on the alkaline side. These types of blue-green algae are usually eaten by fish and snails.

As you suggest, you could introduce a few fish of the *Cyprinidae* (carp) family or the loach family.

I recently introduced two bunches of Cabomba and three Malayan Sword plants. The tank receives ten hours of light. The Cabomba is flourishing while the Malayan Sword has deteriorated. The tank receives a dosage of liquid plant fertilisers once a month. Please give me some information about the Malayan Sword and tell me how to perk them up.

In the absence of any information about water temperature, water condition and intensity of light, I cannot determine the condition of your tank. However, the fact that your Cabomba plants are flourishing indicates that it is in mildly acidic water within a temperature range of about 72°F.

Though Malayan Sword (*Aglaonema simplex*) is sold to the aquarist as an aquatic plant, it is really a marsh plant which even adapts itself to a completely terrestrial life. Malayan Sword, in its native habitat, grows in dense, tall-growing clusters along marshy hedges and banks of streams and irrigation ditches in rice-fields.

This plant has a short life-span in submerged conditions and it is only with much coaxing that one can get it to root. It will generally hold its own for a relatively short period, maintaining its beautiful appearance. Eventually the leaves and stems brown off and rot away. During its short period of survival it should be provided with a good base consisting of mud or clay in conjunction with coarse unwashed sand or fine aquarium gravel. The layer of mud or clay should be placed under the 2½ to 3 inch layer of sand or gravel. Other conditions favoured by the Cabomba species are suitable for this species too.

EXPLODING SEAWATER

by Graham F. Cox

I have maintained a 39 in. x 12 in. x 15 in. fish-only marine aquarium for a few years now without experiencing any major difficulties. Recently I decided to establish another similar aquarium which will eventually house mostly invertebrates and algae with just one or two small, hardy and well-quarantined fishes to create some movement and add to the aquarium's general appeal.

For quite a few years now I have been working during school/university holidays for a friend who owns an aquatic store. During this time I have often encountered customers with the problem of a very low seawater pH reading once the aquarium maturing process is completed. My own new invertebrate aquarium showed exactly the same low pH once I had finished maturing the tank. To counteract this I added "AA Marine Buffer" and kept a close check on the pH. Small additions of the buffer seemed to do no good so I added even more. In the end I added a whole large-size pot of the buffer and eventually the pH increased to approximately pH 8.1.

"I added a whole pot of pH buffer and within a few minutes the Candy Shrimp was dead and the anemones looked very sick."

I next added a Candy Shrimp, a large white anemone and a Cerianthus anemone. Within a few minutes the shrimp was lying dead on the bottom and both the anemones looked extremely sick. I transferred the anemones to a spare aquarium filled with freshly-prepared seawater where they soon recovered. I couldn't see anything wrong and everything checked out okay as follows: temperature = 72°F, S.G. = 1.018, pH 8.1, and my nitrite tests showed nil nitrite present, but although the nitrites read zero (using a SEAQUARIUM Nitrite Test Kit) after I shook the vial numerous bubbles were given off and the white plastic lid blew off.

I didn't know why this happened since it never occurred when testing for nitrites in my other tanks. I then took a fresh sample of newly-prepared "Natura" seawater and did a nitrite test. Although the nitrite reading was still zero the cap didn't blow off this time. So I took another

vialful of my newly prepared "Natura" seawater—added a small amount of "AA Marine Buffer" and shook the vial until the buffer powder had all dissolved. Once this sample was clear I again did a nitrite test and again the top of the vial blew off.

"I again did a nitrate test and again the plastic lid exploded off the vial."

I can only pinpoint my troubles to the buffer, but it seems very unlikely that there should be anything wrong with it as AA are a reputable firm. My friend knows the owner very well and does business with him two or three times a week. I don't think there is anything else wrong with the tank which has a good deep cockle-shell/coralsand filter-bed and there can't be anything wrong with these because my friend and I shared the two sacks (one coralsand one cockle-shell) 50/50 and his tanks are giving no trouble at all. We both only ever use "Synthetica" or "Natura" sea salts and the rocks in the "bad" aquarium came from another trouble-free invertebrate aquarium. All I can think to do now is totally change the seawater and wait and see what happens next.

Please can you shed any light on the shrimp's rapid death and the mystery of the exploding seawater?

My first observations are that if you ever hope to successfully culture Indo-Pacific System marine creatures (and these were what you bought), your temperature is too low (should fluctuate in the range 78°-82°F or 25°-28°C) and the specific gravity (S.G.) of your seawater is also too low, should be 1.020 to 1.022 at 78°-82°F. Whilst discussing these two physical parameters (temperature and specific gravity) may I also ask you to carefully check out the calibration accuracy of both your hydrometer and

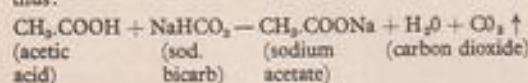
"Every year many marine mortalities are caused by "Micky Mouse" equipment giving wildly inaccurate readings."

thermometer. Every year I come across several instances of massively expensive marine mortalities which were caused, complicated or worsened by the aquarist having used "Mickey Mouse" equipment which gave wildly inaccurate readings. However, important though I feel the above caution to be, the loss of your shrimp and near-loss of your anemones were *not* due to your abnormal assessments of the correct S.G. and correct temperature for an Indo-Pacific sea aquarium.

Before explaining the shrimp's death I would like to try and explain to you the "exploding seawater" mystery. All aquarium nitrite test kits which I have laboratory-tested (and certainly the British kit to which you refer above) rely on the working principle of the formation of highly-coloured *diazo compounds* (a red compound in the case of the SEAQUARIUM'S kit) from the action of the toxic nitrites in aqueous solution on an *aromatic amine* in one of the kit's two reagents in the presence of a high excess of an acid. The acid must be present in excess if the process of *diazotisation* explained above is to complete the conversion of amino into diazo compounds.

The acid used by SeAquariums is *acetic acid*—hence the vinegary smell of both reagents A and B!

Now, as I think you already suspect, the chemical reaction which you produced and responsible for blasting the lid off your test kit vial, *which was entirely due to the excess of sodium bicarbonate* (= NaHCO_3 = formula of the "AA Marine Buffer") which you added to your aquarium. The chemical reaction would have proceeded thus:



As you can easily see from the above equation, for every molecule of sodium bicarbonate buffer which you added—a molecule of carbon dioxide gas would be evolved, until eventually the volume of CO_2 gas inside the vial reached an explosive level. The amount of sodium bicarbonate in a safe, life-supporting seawater formulation (such as your "Synthetica") is so low that it would not produce a lid-blowing explosion. On the other hand, using your own special brand of "seawater," massively enriched with sodium bicarbonate quite sufficient CO_2 gas would be evolved to blow the cap clean off the vial.

I would now like to deal with the reason why you almost

"There is a widely prevalent idea that the pH of captive seawater can be indefinitely and safely kept at pH 8.2 by continuing to shovel sodium bicarbonate into the system."

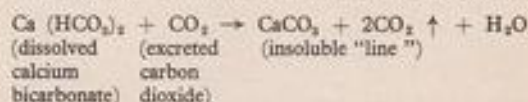
lost all your invertebrates. There is a widely-prevalent (but disastrously mistaken) idea that when the pH of "captive" seawater (i.e., seawater in physically-enclosed systems such as marine aquaria), begins to fall below pH 8.0, you can just keep on shovelling sodium bicarbonate into the system with impunity. *Nothing could be further from reality!* Whilst you may get away with this sort of behaviour for quite a long time with the more indestructible species such as most of the damselfishes, most of the groupers, many brackish-water fishes (e.g. *Monoactylus argenteus*, *Therapon jaybua*, etc.), it is certainly *not* true for the more delicate species of coralfishes, e.g., angelfishes, butterflyfishes, surgeconfishes/tangs, batfishes, wrasse species, etc., *nor* for any of the invertebrates.

The misconception that sodium bicarbonate is a safe pH buffer (for captive seawater) which can be used for an indefinite period *by itself*, i.e., to the total exclusion of other pH adjusters has been around for many years and is featured in many reference books on marine aquatics. This notion stems from the chemically half-educated notion that sodium bicarbonate in aqueous solution produces a stable pH of approximately 8.25 and that the material is a true buffer in that it chemically "resists" any internal/or external influences trying to drive the pH of the solution above or below pH 8.25.

These facts, plus the fact that both sodium and bicarbonate ions do occur naturally in seawater have resulted in a *little* sodium bicarbonate being used in nearly all synthetic sea salt formulations. However, the fact that the pH of captive seawater eventually begins to decline:

- inevitably during the bacterial maturation of a filter-bed, and
- inevitably at an accelerating rate as soon as fishes and invertebrates are added to the aquarium,

is *not* caused by the loss of sodium or bicarbonate ions from the seawater so much as by the loss of calcium ions and to a lesser extent, the loss of magnesium ions. This loss of calcium and magnesium ions is caused by these two metallic cations forming insoluble compounds with various excretory metabolites produced by *all* liveforms within the aquarium from bacteria up to the fishes inclusively. To a lesser extent calcium/magnesium loss from seawater is also caused by the *assimilation* of both cations by all the organisms in the system. One example of this calcium loss due to the excretion of all organisms within the aquarium, from the aerobic bacteria (i.e., all the nitrifiers in the filter-bed) up to and including all the invertebrate animals, all the algae (at night or under poorly-lit conditions below the photosynthesis shut-off level) and all the fishes, which we should consider is these organisms' excretion of carbon dioxide, as follows:



You will notice that one of the effects of the above reaction is the production of even more carbon dioxide to bring even more calcium ions down from solution.

Thus recapping the above, we can see that all "inhabited" or "living" seawaters (as distinct from sterilized seawater isolated in hermetically sealed containers) suffers a gradual and unavoidable decline in pH value below the normal pH of freshly-prepared seawater of pH 8.1 to 8.3. We can see that this falling pH value is produced by the progressive loss of calcium ions and to a lesser extent magnesium ions from solution and by the decomposition of the unstable bicarbonate radical into water and acidic carbon dioxide.

It must therefore be equally obvious that if the seawater is losing calcium and bicarbonate ions *but* you are replacing this loss *only* with sodium and bicarbonate ions, you are producing a gradual but progressive disruption of the normal life-supporting qualities of seawater, i.e. you are producing a serious and chronically deteriorating ionic imbalance in the seawater.

You will have realised that what you should have done is three things as follows:

- (1) Certainly add a little of the excellent "AA Marine Buffer" to your synthetic seawater, but no more than the carefully-researched manufacturer's instructions suggest, and *even then only if*:

- (2) Within a few hours of adding the "AA" powder you also add the correct amount of a correctly-formulated cationic pH adjuster such as "Seabuff" (the white liquid form). In this way you will be replacing both the missing anions *and* cations which were causing the fall in pH value, and,

"You must accept the fact that in stocked, captive seawater the time inevitably arrives after some one to three months when a 25% to 33% partial change of seawater is inevitable."

- (3) Accept the fact that owing to numerous other deteriorations which also occur in organism occupied seawater, you will eventually reach a stage after some 1 to 3 months (depending on stocking level/feeding efficiency/filtration efficiency) when a 25-33% partial seawater change is highly desirable—indeed inevitable if you are ever to succeed with the more delicate marine creatures and plants.

Finally, I would like you and all readers to consider how many totally healthy-as-sold corallifishes, invertebrates and algae are killed by their purchasers as a result of being taken home and placed in ionically-unbalanced seawater in this way.

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ANSWERS

ACROSS

3. Tilapia
7. Pencilfish
9. Livebearer
11. Herringbone
13. Rerio
14. Elox
19. Semi
22. Gasterosteus
25. Therm
26. Lyre
27. Axelrod
29. Horae
30. Apher
32. Striped
33. Tubes
35. Eigenmannia
36. Inesi
38. Red
39. Markiana
40. Harlequins

DOWN

1. Patern
2. Limia
4. Liver
5. Ice
6. Africa
8. Fry
9. Leo
10. Barbans
12. Blue
15. Microlepis
16. Apistogramma
17. Guppy
18. Pygmaeus
20. Hatchetfish
21. Clear
23. Scats
24. Merry Widow
28. Madeirae
31. Pet
34. Nigeri
37. Eel
38. Ray

Solutions to Crossword on page 50



KOI Queries

by Hilda Allen

I have kept Koi for almost two years, apart from losses in the early days I have been generally satisfied, but I seem unable to get the good growth-rate I believe Koi should have. I would appreciate some advice on the best foods for Koi.

Koi, being carp, are capable of growing into large, heavy fish but only if their needs are understood and accepted. There is no magic formula for feeding, and growth rate is determined by a number of factors. Koi need space, they need healthy conditions for good appetites and sensible feeding at regular intervals. I have no idea of the size of your pond or your Koi so I can only reply in generalities applying to all.

If six small Koi are put into a pond, some will inevitably grow more than the others despite the same conditions; it should cause no concern. Small Koi can be fed on small or chopped earthworms, flake foods, freeze-dried *tubifex*, Bemax, soaked pellets, puppy meal etc. The list is endless, but not all at once please. Koi cannot digest large quantities and a little and often is the golden rule. Koi will grow in keeping with their environment and it is hopeless to expect to grow Koi up to 2 feet long in tiny ponds.

Carp are robust, lively fish and we must regard Koi more as carp, with the habits of carp, than as exotic fish upon which the wind must not blow. Because most of us cannot provide our Koi with lakes then we are forced into at least keeping their living conditions as hygienic as possible by drainage, filtration and partial water changes. Koi will tolerate a certain amount of green water and mulm, but pollution must be avoided at all costs and this is the topic I find the most difficult to explain to beginners. Koi will not feed in foul water and common-sense and observation should determine whether or not you are providing the best possible conditions for growth, health and breeding. Some of the queries I receive demonstrate both the fascination of Koi and the widespread misconceptions of their requirements. Long term Koi keeping and breeding may demand we dig large holes, buy pumps, wash endless gravel and generally devote all our attention, but once 'hooked' on Koi who can doubt that it is all worth the effort.

Well-kept Koi are remarkably easy to feed and a good mixed diet for large Koi should consist of protein, vegetable and carbohydrates in the form of worms, shrimp, prawns, mussels, eggs, minced ox-heart etc.

I have a few small Koi which may be described as of "unknown parentage" but they have all survived the winter and I would like to add some more Koi, preferably of the red, white and black type. I hope to be more selective in future purchases and wonder if you can explain something about these particular fish. My local shops appear to receive the small Koi in job-lots and really very little is known about varieties.

Your problem is well understood and from the rest of your letter you have my sympathy, but generally on the subject of small, cheap Koi it is a fact they are unsorted and often defy classification.

Koi may be imported from several countries although the word 'Koi' is an abbreviation of the Japanese word *Nishikigoi* and it was in Japan these beautiful, patterned carp originated. It is often mistakenly assumed that all fish sold as Koi have come from Japan.

The brightest coloured fish are probably from Japan and it is possible to find moderate examples that can develop into attractive fish. It must be understood that the best small Koi are retained for growing on to larger and more expensive fish and it is unrealistic to expect to buy cheaply, smaller versions of the superb Koi depicted in books.

In some cases, Koi that may be highly coloured when purchased can lose their imported colouration and change or lose colour. This is probably due to changes in water, food and temperature.

However, to answer your main question, there are two basic types of red, white and black Koi.

The first tri-colour to appear was the TAISHO SANKE, named after the Japanese era of TAISHO (1911-1924). It is a white Koi with red and black patterns, the colours should be strong and clearly defined and TAISHO SANKES generally have black stripes in the fins, but no black on the head.

The modern SHOWA SANKE (pronounced SHO-WA) is predominantly black, with red and white patterns SHOWAS often have black on the head and a black spot at the base of the pectoral (breast) fins.

If red predominates, with very little white the Koi is known as HI-SHOWA (Red Showa). Showas are very popular in Japan at the moment and it is doubted if any real SHOWA Koi will be found in the cheaper, smaller range of fish.

There are numerous variations of the SANKE type of Koi and it is necessary to study to understand the finer points. Opinions on colour and pattern are divided and I would suggest that providing you buy Koi which are pleasing to your eye and complement your pond then you should not worry unduly about the endless confusion of names. Only if and when you are bitten by the well-known "KOI BUG" and begin to specialise in these enchanting fish will you get yourself into deep water.

As your present Koi have survived and will be growing I would hope that you will not overstock your pond and certainly not endanger your healthy fish by carelessly introducing new, unquarantined fish.



MARINE Queries

by Graham Cox

I am in the process of setting up a marine tank, and I would like to know what type of rock I may use in the tank. Are there any beginner's angel or butterfly fishes which you recommend?

Every book I read tells me something different about how easy or difficult they are. I only have a 3 ft. tank.

If you wish to use "dead" rocks, i.e. rock which is, geologically-speaking very old and therefore containing no encrusting marine lifeforms, you should use limestone or Purbeck stone or Westmorland stone or Devon-black. These four are very old (and therefore very hard) forms of calcium carbonate. As such they are useful in a marine aquarium for the following reasons:

- (i) having been formed as part of millenia-old seabeds, they have an appropriate appearance for use in a marine aquarium, i.e. they look "right".
- (ii) being calcareous in composition they have marginal value as pH buffering material.
- (iii) as calcareous materials they are the substrate preferred by nitrifying bacteria for colonisation purposes, i.e. they will marginally increase the nitrification potential of the system as a whole.

All four of these rocks sell in aquatic stores for 6p to 10p per lb. wt., depending on size and shape.

Tufa is geologically much younger than the four types of rock listed above—indeed most surface-quarried pieces available in aquatic stores were probably formed during the last 50 years or so. Tufa is again predominantly composed of calcium carbonate and so has all three of the useful qualities (i) to (iii) above. Additionally, because it is very soft it is easily drilled out to produce interesting shapes and, being much more porous than the more ancient forms of calcium carbonate it presents a greater surface area to the seawater and so has greater value to the marine aquarist under headings (ii) and (iii) above than the older rocks. Tufa sell for around 20p to 30p per lb. wt., in most parts of Britain.

Finally we come to so-called "living"-rock. These are pieces of the living sea-bed which are collected in the tropics and airfreighted to Europe. I think that the best way to describe this material is to say that it is mineral but with strong animal and vegetable connections. The mineral rock base is predominantly a mixture of calcium and magnesium carbonates and phosphates, with calcium carbonate accounting for over 90% by weight. The shape of the rock is extremely complex with many caves and tunnels, but its principal attraction is that the entire

surface is covered with colourful invertebrate and algal life. Living-rock is the ideal décor material for natural and semi-natural systems.

Owing to a huge airfreight component in its pricing structure, the cost of living-rock in Britain varies from £2 to £4 per lb. wt.—depending on merit (i.e. how much life is on it and how interesting is the shape?) and distance from London (Heathrow) Airport. An additional factor affecting the price of living-rock is the substantial cost of labour, capital equipment and materials (mostly seawater) involved in making it suitable for sale.

The above are the only rocks available in the UK which are both safe and appropriate for usage in a marine aquarium.

The best beginner's butterflyfish is undoubtedly *Chaetodon kleinii* (the Sunburst Butterflyfish). This butterfly is tough, easy to feed (even on flake-foods), and is not aggressive—in other words a very good "doer".

The comparable beginner's angelfish is either *Holocentrus xanthurus* (the Chequered Angelfish) or *Pomacanthus semicirculatus* (the Koran Angelfish).

May I recommend that you read "Tropical Marine Aquaria" (Hamlyn paperback) before actually stocking your tank, and that you then read Frank de Graaf's excellent book "Marine Aquarium Guide" (Pet Library Publications), sometime during the next 12 months.

Please can you advise me on:

- (1) How much fluorescent lighting I would need to grow *Caulerpa* spp. algae in a marine aquarium measuring 72 in. × 20 in. × 18 in.?
- (2) What is the difference between a "Truelite" and a "Truelite Powertwist" fluorescent tube?

1. *Growing Marine Algae.* The lighting requirements of tropical marine algae and tropical marine invertebrates from the littoral zone (i.e. inter-tidal areas) and immediately sub-littoral zone are virtually identical and may be expressed as follows:

- (a) *Aquaria of up to 18 in. vertical depth*—require 2½ ft. of fluorescent tube per each square foot of water surface area, using a colour temperature light mixture given by one "Gro-Lux" tube to each two white light tubes.
- (b) *Aquaria of from 18 in. to 24 in. vertical depth*—require 3 ft. of fluorescent tube per each square foot of water surface area using the same colour temperature ratio as that given above.

NB—

- (i) The above requirements could be substantially reduced by using quartz—halogen or tungsten spotlights provided that the considerable amounts of excess heat so generated could be adequately disposed of.
 - (ii) This level of lighting is required for twelve hours every day.
2. "Truelite" fluorescent tubes. As far as I can discover the "Powertwist" version gives 20% more light per watt consumed than the standard tube.

Product News and Views



I AM PLEASED to be taking up my pen again, after three-and-a-half years' break, to pass on some news and views about products for use by aquarists. Some of the items discussed will be new on the market; others may have been available for some time. In the latter category I hope to include occasional comments about the reliability of products that I reviewed some years ago and which I have been using continuously ever since. When one wishes to buy, say, an expensive air pump or a power filter it is useful to know which ones will give trouble-free service over a period of years, and those for which one can readily obtain spare parts should one ever need them.

The **Derbert Filter Fountain** is manufactured by the Derbert Filter Fountain Co. Ltd., of 41 Lambs Close, Dunstable, Beds., and is distributed by Lotus Water Garden Products Ltd., of 260-300 Berkhamstead Road, Chesham, Bucks. Two models are available: the Minor Derbert, price £34.02 including VAT; and the Major Derbert, price £41.64 including VAT.

These products are made of strong, tan-coloured plastic, with grey and green plastic fittings for connection to a water pump. The inlet and outlet nozzles are situated on top of the unit (see photograph on page 11 of the January, 1980 *Aquarist*). The Derbert is a pool filter and the base of the unit screws off to enable one to remove, wash, dry and replace the filter medium—filter wool. When necessary, new filter wool may be obtained direct from the distributors.

The Derbert may be used with pumps operating a fountain jet or a waterfall in a pool.

The Minor unit is suitable for pools of up to 1,000 gallons capacity; those of larger capacity will require the

Major Derbert. The Derbert is a sturdily-constructed unit that should be useful to those who already have a water pump operating in a garden pool. It should certainly clean up the water and enable one to see the plants and fish in the pool.

Interested pondkeepers can contact Lotus Water Garden Products Ltd. at Chesham 74451; or the Derbert Filter Fountain Co. Ltd. at 01-452 6322.

Algarde Water Treatment Capsule, manufactured in England by Algarde, of Hall Lane, Upminster Common, Upminster, Essex, telephone number Ingrebourne (04023) 71702.

The following letter was written to Mr. Graham F. Cox, our marine expert, by Mr. F. W. Gardner, one of the two proprietors of Algarde Plastic Products. "In the December 1979 issue of *The Aquarist & Pondkeeper*, in answer to a reader's enquiry, you stated that "The only known weakness of the otherwise excellent air-lift-operated U/G filter is that you can't use charcoal with them. . . ."

"May we introduce our Water Treatment Capsule, especially designed by us to be used with our U/G filter. It has been on the market for some years now and has been advertised in all the consumer magazines. We hope you will test it for yourself and let us know your findings."

The letter and the Algarde Water Treatment Capsule were forwarded to me by the staff of *The Aquarist*—who asked me to comment on the Capsule. I should make it clear that I am not attempting to reply to the comment made by Mr. Cox. He is a—if not the—leading World authority on Marine Aquaria. Regular readers of my

monthly feature will no doubt be aware that I have never even kept a tropical marine aquarium so I am totally unqualified to comment on the use of the Algarde Capsule in that context.

However, the Algarde Water Treatment Capsule is equally suitable for marine or freshwater aquaria. It may be used in two ways: as a corner filter; or plugged into the Algarde Under-Gravel Filter for the treatment of aquarium water with activated carbon, peat, etc. The unit consists of a transparent, plastic cylinder of about 3½ in. in length and 1 9/10 in. in diameter, a perforated plate for each end of the cylinder, two end cones, an air-lift tube, a bottom fitting, a split ring and a pair of clear plastic suckers. Each of the component parts is made of high-quality material and each fits perfectly onto the others—as one would expect in a product from Algarde.

For use as a corner filter, the unit is assembled by pushing together all the parts—and the simple task is made particularly easy because the unit is supplied with a set of clear instructions—in five languages—and a series of excellent diagrams. After assembly one end cone is removed and the required type of filter medium—charcoal, filter wool, peat, etc.—is inserted into the body of the Capsule. It must not be tightly packed or water flow will be excessively restricted. The bottom end of an air supply tube is then pushed well down into the cone; an air stone may be fitted, if desired. For best results the filter medium should be changed regularly. The suckers are then fitted to the filled unit which can then be attached to the glass side of the aquarium in a position that ensures that there is at least 25 cm. of water above the top of the air-lift tube. When the air supply is switched on the filter begins working. The bottom fitting and split ring are unnecessary when the unit is used as a corner filter.

When used in conjunction with an Algarde U/G filter, the Capsule is fitted in addition to the normal air lift and not as a replacement for it. The water turnover rate through the Capsule is about half that of the normal air lift and could be insufficient if used alone in a large aquarium. The leaflet supplied with the Water Treatment Capsule gives clear instructions about the fitting of the Capsule to the U/G filter. It may be fitted before the filter is installed; or easily fitted to a U/G filter already in use in an aquarium. This latter point is a great advantage because it means that one does not have to strip down a tank to fit the Capsule if the tank is already fitted with an Algarde U/G filter. The suckers are not required when the Capsule is used with a U/G filter. One can thus have the Water Treatment Capsule operating at one corner of an Algarde U/G filter, and an ordinary Algarde air lift at the other corner. When servicing the Capsule, the air-lift tube can be removed from the top of the capsule and pushed into the bottom fitting on the filter to prevent the entry of small fish or gravel.

The Algarde Water Treatment Capsule is well made and under test worked well in a freshwater aquarium.



A lot of thought has obviously gone into its design and operation; and it can be hidden reasonably easily behind a rock or a thicket of plants. It comes sensibly packed in a cardboard tube, with metal ends, to ensure that it is not damaged in transit. Readers who have used the unit with an Algarde U/G filter in a marine aquarium may care to drop me a few lines.

Phillips Vegetable diet, price 74p for a 1.4 oz. tin, a new fish food manufactured by Phillips Yeast Products Ltd., of Park Royal Road, London NW10 7JX.

Readers will already be aware of the wide range of high-quality fish foods manufactured by Phillips. The latest addition to their range is Phillips Vegetable Diet, a specially formulated flaked food providing nutritious vegetable material suitable for all plant-eating fish—but equally suitable for providing other fish with a variety of foods when added to their regular diet.

Vegetable Diet is composed of wheat flour, fish meal, cod liver oil, alfalfa, kelp, carrot, spinach and brewers' dried yeast. The food, which should be fed to fish twice daily or as required, does not cloud the water. Its guaranteed analysis is: minimum crude protein 31%; minimum crude fat 5%; and maximum fibre 3%.

The food, which is sold in a cardboard drum with a metal base and lid, is in the form of green and yellow flakes, which range in size from medium to small, making them suitable for a variety of fish—especially those such as mollies that require a diet with a vegetable content. The food was readily eaten by all my fish and will make a useful addition to their usual diet.

B. WHITESIDE.

