

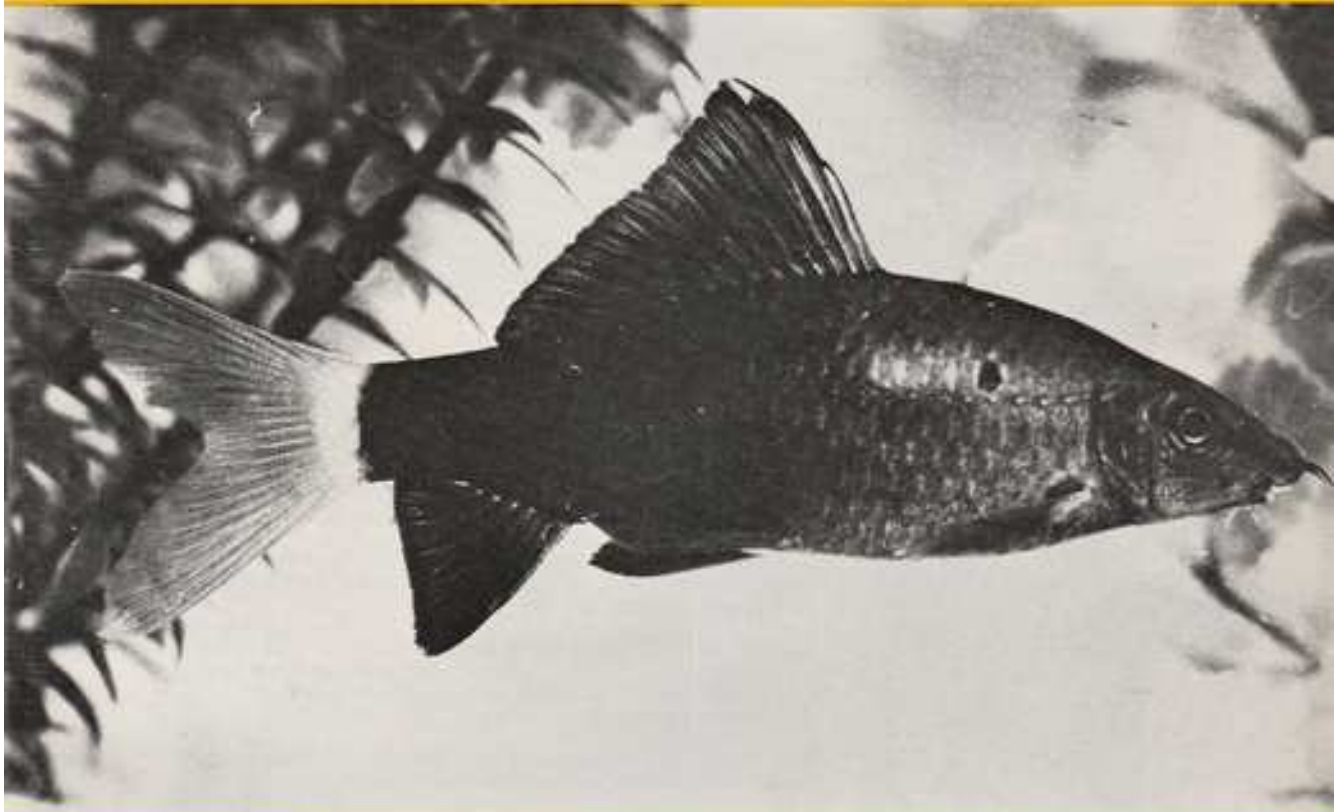
MAY 1972

15p

Pet Fish

monthly

The PRACTICAL FISHKEEPING MAGAZINE



Contents include:

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Keeping the Killifishes

Breeding the Harlequin

The Water Plant Rotala

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Comments and Quotes

- Fish eggs as big as oranges
- Championship classes

A Breeder's Dream

IF getting harlequins or neons to spawn is the height of your ambition then first can help you (in this issue, in fact). But if your mind reaches for greater challenges such as keeping and spawning the coelacanth we can do no more for the present than fire your enthusiasm with the report that another specimen of this surviving fish fossil was captured alive in March off the Comoro Islands to the west of Madagascar. What is more, in a female coelacanth examined in January, 19 eggs were found. They were described as being the size and shape of oranges and purplish pink in colour. Mum was 63 inches long and weighed 172 lb. This knowledge should undoubtedly be a stimulus to the breeder. A mere 19 oranges could comfortably be accommodated in a 48 inch tank and presumably could be raised without too much hauling of too many hundredweights of live food. The trouble's likely to be that fruity coelacanths will prove to want something the size of Covent Garden for their spawning run. Well, it's something to work towards.

Champions Line Up

SOME of this season's shows at which FBAS Championship Classes are included have already taken place and the results have started to become available. The majority, however, are yet to be held. Last

year was the first time in which the Supreme Championship competition was organised by the FBAS for the winners from all the individual classes, and the interest that this competition in 1971 engendered has undoubtedly crescendoed this year. Showmen intent on trying to secure a place in the 'finals' for their fancied champions are making entries in the appropriate shows, which sometimes involves their travelling to areas that otherwise might have been regarded as too far from base or not worth a journey. This is, of course, good for the local shows and good for the whole world of showing; it should result in an upwards trend in standards.

The competition at the end of the season, in October, involves the presentation together at The Aquarium Show in London of the class champions and provides a unique opportunity of seeing first-rate specimens of all types. These fishes are not just a collection of 'best in shows' but high-quality winners from classes that will be offering progressively tougher opposition. A full list of the Championship Class shows to be held is given on page 31 of this issue and 'Dates for Your Diary' gives further details of these shows.

EVENTS of the past 2 months, beyond our control, have conspired to upset the production schedule for 1972, so that this issue is being distributed later than is usual. We are sorry for the publication delay and are endeavouring to return to normal distribution dates next month.



Your comments and views on all topics of interest to aquarists are welcomed. Address letters to PFM Letters, 554 Garratt Lane, London SW17 0NY

Aquatic Plant 'Novelties'

As a professional botanist I have been fortunate to travel widely in the tropics and would like to make some comments on the cultivation of tropical aquarium plants. The choice of plants offered for sale is very large but many of these plants are really unsuitable for aquarium cultivation. Indeed some are by no means aquatic. For example, I have recently seen offered for sale *Chlorophytum* and Nipa palm seedlings. Actually, the Nipa palm seedlings are often no more than germinating dates—and dates are really desert plants! These and other 'novelties' can be grown in pots on a window sill but cannot be expected to live very long in an aquarium. However, a more serious difficulty is that many of our favourite aquarium plants such as many species of *Echinodorus* (Amazon sword), *Cryptocoryne*, *Aponogeton*, *Hygrophila* and *Limnophila* are also not truly submerged plants. In Nature they normally spend a few months submerged and then are land plants for the rest of the year.

It is often recommended in aquarist books to give these plants a 'rest'. The question is how does one do this? Last summer I put *Echinodorus berteroi*, *E. cordifolius*, *Cryptocoryne lutea*, *C. spiralis*, *Hygrophila corymbosa* (often called *Nomaphila stricta*), *H. difformis* (usually called *Synnema triflorum*), *Bacopa monnieri* and *Rotala rotundifolia* out doors at the edge of a pond. They all did well, flowered and put on a lot of weight. These plants all make an attractive display in the summer but they show no signs of resting—their resting period would appear to be the winter months when they sit in aquaria. I am aware that the summer in Switzerland is a little warmer than that in England but I would be very interested to hear if anyone has had success with this method in England.

PROF. DR C. D. K. COOK

Director, Botanical Garden and Institute for Systematic Botany, University of Zurich

Spawning Pattern

FOLLOWING the article on *Budis budis* by R. Zukal in the March issue, I feel I must write and differ on one or two points. I have been keeping *Budis* for nearly 3 years now, and although I know this in itself doesn't make me an expert, I

have taken a lot of time to watch these beautiful but shy fish. Despite what the experts say, I have now raised five generations of this species on flake food, although I admit to giving them *Tubifex* about every 3 to 4 weeks. Your author states that his fish spawn anabantid style, the male squeezing the female, whereas I have, almost without exception, found that *Budis budis* spawn cichlid fashion, the female passing over a rock and dropping eggs as she goes and the male passing over the eggs afterwards to fertilise them. I have also found that after the hatching the male will attack, and in many cases kill, any other fish large or small that swims toward the fry.

This, as in the case of your author, is only a personal experience and I, like most others in this hobby, am always willing to listen to and learn from others. I hope this may encourage someone else to gain experience.

London, E.2

J. BUCHAN

Variations in spawning behaviour occur far more frequently than might be imagined from reading the classic literature, where there is only space to give descriptions of the norm for each species. But it is the variations that make fishkeeping and fish-breeding of such interest; incidentally, in part it is such variations that account for the frequently conflicting reports about breeding behaviour that are to be seen when a 'new' species finally starts to breed in the aquarium. R. Zukal's pictures quite clearly show his pair of fish in a partial embrace and we thought it well worth recording that this species is another one capable of ignoring what books say about them!—EDITOR.

Shark-cleaning Service

YOU have published several letters in PFM from readers giving interesting personal observations on the behaviour of their aquarium fishes so I am prompted to report an occurrence from my own community aquarium. Everyone has heard about the seawater cleaner wrasse who regards it as a duty to clean up other fishes, who are reported to encourage and enjoy the process and even solicit this attention. I have not seen anything like this reported for freshwater fishes

Continued on page 9

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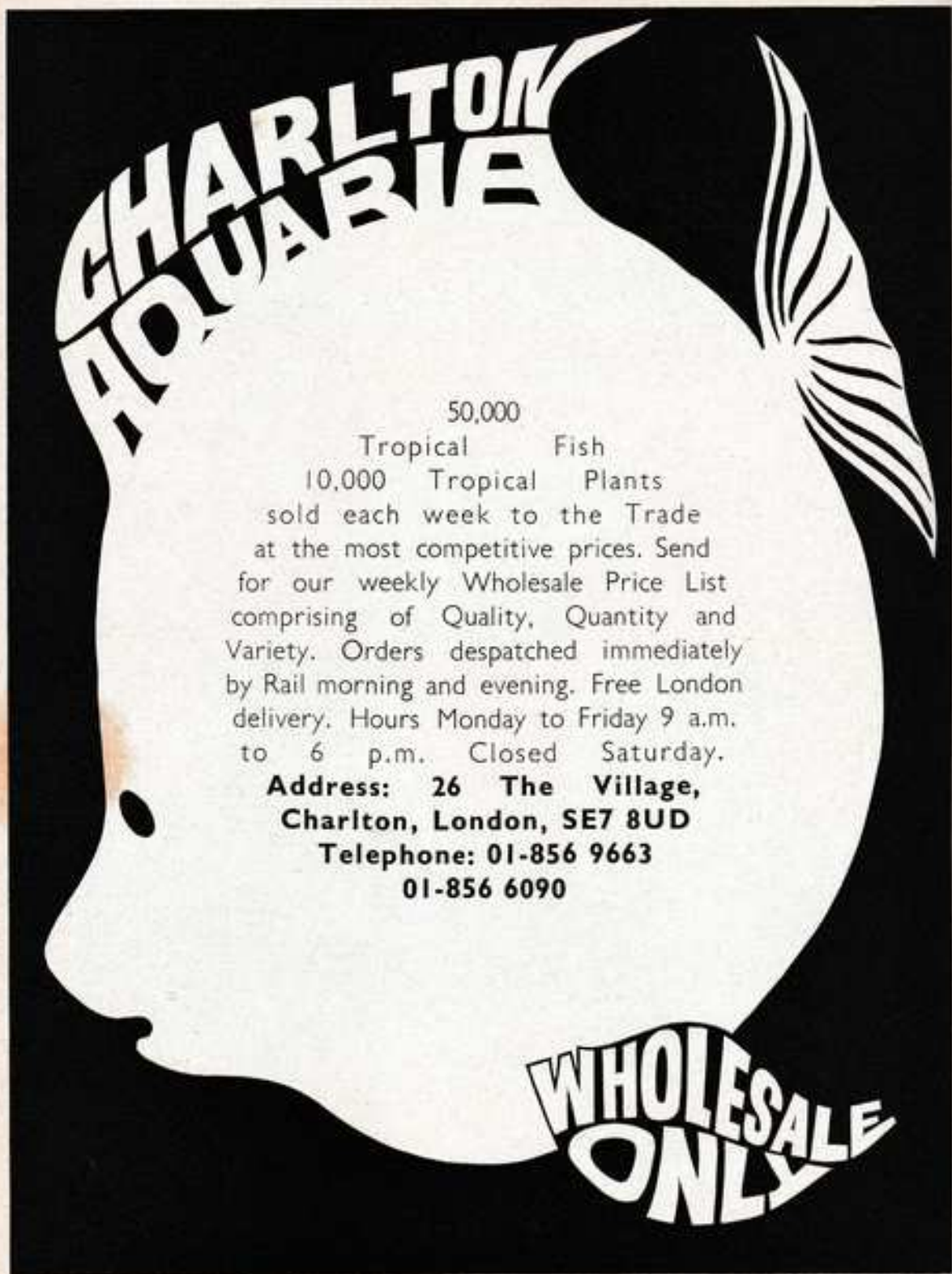
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LETTERS

continued from page 2

but in my tank one of four red-tailed black sharks (the dominant one) has taken to allowing a male guppy (the only male guppy in the tank) to pick at his body surface. The shark lies quite still on a rock whilst the guppy picks away; when the female guppy joins in, the shark twitches away and does not stay on the rock unless she goes. I believe all the fish in the tank to be in good condition and I have not seen any sign of surface parasites. The male guppy is very small compared with his mate and I wonder whether the shark regards the female guppy's larger nibbles as rather too much of a good thing. I also wonder whether there is an

Asiatic fish that gives such service to freshwater sharks in Nature?

Snebton, Surrey

B. I. EVANS

Saltwater Mollies

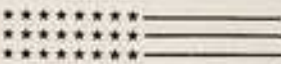
I HAVE successfully raised mollies under the following conditions. The tank was 42 gallons and designed for saltwater fish. I put in a pair of mollies (black). The water had a specific gravity of 1.020. There was gravel of a coarse nature on the bottom, which grew much infusoria as I could figure out because I never fed the newborn mollies. The tank had no aeration. There mollies were seen to be picking on something almost constantly. I write this in reply to the letter that said mollies (black) could not be raised in saltwater (PFM, March). The mollies grew to maturity and only much later on did I begin feeding.

DR. M. BOSS VON RYDINGSVARD

Plainville, Conn., U.S.A.



TRANSATLANTIC TOPICS



By JIM KELLY

BEING wrong when experimenting with new diets for our fishes can often be disastrous. The proof of wrong selection is that you have to pay for it eventually, or at least your fishes do.

One dietary item that arrived here from the States was dried liver. Though the fishes seemed to benefit from this manufactured product it had the disadvantage in that it quickly went bad and if fed to excess fouled the water. Even those stalwarts who preferred the real thing and prepared their own liver diets found that though the cooking removed much of the propensity to cloud the water the liver lost a lot of its nutritional value in the process.

Now liver is fast finding favour once more with Stateside hobbyists. They are using dehydrated liver obtained from health food shops.

Prepared from whole, raw liver, it is processed in vacuum low temperatures with its fat and connective tissues removed. Prepared this way all the health-promoting vitamins and minerals are retained.

Containing iron and vitamin B₁₂, liver is a top growth-promoting food and we welcome it back. Some health shops sell it in tablet form that doesn't require refrigeration. Advantage of the tablets over the powder is that they can be broken into morsels suitable to the tastes of most fishes.



Though the genus *Tetraodon* boasts four or five known species, the most popular archer fish with the aquarist seems to be *Tetraodon lineatus*. Because of its cheaper price in the States than here in Britain one sees more of them there, particularly at

shows, but U.K. importers tell me that more and more of these attractive 'Robin Hoods' of the aquarium world are becoming available.

Enough literature on *T. lineatus* exists to answer the questions of those tempted to purchase some but on my travels I did glean two bits of useful information our American aquarists have to offer.

This fish panics very easily, especially when you are attempting to net them. Their unusual range of vision covers a wide field so never approach an aquarium containing archers too quickly. When frightened they will often hide away for days. Others I witnessed made repeated lunges at the tank glass, even to the point where they damaged their jaws.

When treating for disease never use methylene blue. One Rochester fishkeeper found that his archers were unable to withstand this popular dye and immersion resulted in the fish being unable to control their swimming motions. Despite his prompt action in quickly transferring them to another aquarium free from methylene blue, four of them died a couple of days later.



Houston, Texas, is the headquarters of the American mounted

space programme. You are probably also aware that it boasts the largest room in the world, the AstroDome. Perhaps even that Houston has mosquitoes flying around the size of wasps. What you might not know is that this city of shining glass has a fishkeeper who has been selling off ordinary oscars as 'tigers'.

I was first put on to the story by

Kappy Sprenger from California. She wrote that the fish concerned arrived in excellent condition displaying plenty of red colour, but after a short time (varying from a few days to a couple of weeks) the colour fades. What she didn't know was the source of these fish. That I found after a correspondent described how he had been bilked and named his

source.

Then, as everybody knows, Texans don't try to hide the fact that this seaport on Buffalo Bay was built for business. With the difference in price between ordinary oscars and red tigers being quite a figure it has meant big business for someone. Thank goodness they are the exception.

Are Algae the Bane of Your Life?

F. CAMPBELL

THERE is probably nothing more discouraging to the would-be aquarist than to find that the newly set-up aquarium, intended to be a decorative feature of the lounge, has become an eyesore through an excessive growth of algae. Care has been taken to follow the elementary rules, selecting a community of peace-loving fishes, keeping strictly within the limits of 1 inch of fish to 24 square inches of surface area, choosing plants which the man said were good oxygenators and letting them get established before introducing the fishes, yet, instead of being a joy to behold, the fishes and plants have gradually become enveloped in a green muckiness.

Advice may be sought and the answer most frequently given will no doubt be 'too much light'. Steps are therefore taken to decrease the amount of light reaching the aquarium but, unfortunately, this does not always result in the desired effect. Algae are low forms of plant life and their requirements are to a great extent similar to those of the higher plants that have been placed in the aquarium to enhance its beauty, and as light is vital to all forms of plant life, withholding it will be detrimental to the wanted plants as well as to the unwanted. The beginner, however, need not despair. By the logical application of a few general principles, a 'balanced' aquarium may be achieved, even without the artificial aid of filtration or aeration, which many people advocate as a necessity.

Algae, of course, forms a subject in itself. There are some 18,000 species, which are sub-divided into seven different categories, each with distinctive characteristics, but anyone

who simply wants to brighten a corner of the lounge need only be concerned with three that commonly affect aquaria. There is the one that floats about and turns the water green until it eventually resembles pea-soup; then there is the one that reveals itself as a slimy green or blue-green growth on gravel, rocks, plants and glass; finally, the dirty-looking brown algae (I will leave these for the moment because their requirements are somewhat different).

In considering the general needs of plants perhaps the most necessary quality is energy, without which materials cannot be absorbed and utilised in sufficient quantity to promote growth. The provision of energy is governed by the amount of light reaching the aquarium and the ultimate flourishing of the plants is dependent on the amount of nutrients available. In turn, the amount of these available is governed by the amount of organic matter present within the aquarium. This can be fish excreta, decayed leaves, uneaten fish food etc., which is broken down by bacterial action and becomes soluble in the water.

It is evident therefore that in setting up an aquarium the same care must be taken in planting as was taken in stocking with fishes. If the fishes are overcrowded the weaker ones will not survive and, similarly, the weaker form of plant life, algae, will also find survival difficult if the higher plants are absorbing most of the food available. The maintenance of a 'balanced' aquarium depends simply on a combination of fishes,

plants and light in the correct proportions, plus the vigilance of the owner in ensuring that none of the factors increases sufficiently to outweigh the others.

These are the sort of things that can go wrong. The plants, after starving the algae out of existence will continue to develop until the leaves of the taller growing ones spread over the surface of the water and prevent light from reaching the shorter growing ones, which will eventually result in their demise. The vigorous ones will grow new leaves, the old leaves will die and rot and soon the floor of the aquarium will be littered with organic matter that cannot be seen through the dense plant-growth. This may be further enhanced by the addition of uneaten fish food if the common sin of over-feeding has been perpetrated. The concentration of organic matter delights the bacteria which have a field-day breaking it down into food for the plants. The abundance of food now suits the algae, which soon become present again; this time, however, it will probably be the dirty-looking brown type, which seems to flourish better in decreased light.

The situation soon arises where there is an excess of organic matter, resulting in an excess of bacteria and the water full of unused salts, and this means an evil-smelling, polluted tank.

Precautions! Don't overstock with fishes, don't overfeed them, keep the aquarium well planted but don't let the plants develop to such an extent that light is excluded and remove dead leaves. There should be no further problems and filters and air-pumps will not be necessary.

Breeding sequence in pictures of

The Beautiful NEON TETRA



Hyphessobrycon innesi

By RUDOLPH ZUKAL

Photographs by the author

EVERY tropical fish enthusiast will, I am sure, be so familiar with the beautiful neon tetra that it is unnecessary for me to describe its appearance in any detail. The fish is sociable and peace-loving and only reaches about 1½ in. in length; it was imported for the first time into Europe in 1936 from the upper waters of the Amazon in Peru, Colombia and Brazil. As soon as importation started it became a best-seller, but unfortunately its price was not within everyone's reach. It cost then about 40 U.S. dollars, which was something like a month's salary for a well-paid worker! Everything about the fish was a mystery. The conditions necessary for its well-being were unknown. Of course, this state of affairs did not last long and in the following year a hatching was achieved, but it was only after World War 2 that aquarists really had the opportunity of successfully breeding the neon tetra and acclimatising the fish in quantity to tank conditions. Today, its propagation presents few difficulties—indeed, because it is modest in its heating requirements it can even be recommended to beginners.

For normal living conditions a temperature as low as 68° F (20° C) is quite suitable and certainly the lower seventies are preferred. A medium-sized tank, planted normally, can be used but it should be remembered that neons do not flourish in conditions that are too restricted and, as this is a shoaling fish to be kept with a number of its own kind, swimming space should be provided.

Translation by F. MARSH



The male was put into the breeding tank one day before the female and at first he seemed to attack the female, though quite harmlessly and gently. Soon the female also started to make 'attacking' movements: all the while, the display and enticement took place ever nearer the plants. Left, during coupling and in pauses in the display, the fish circle very quickly around each other. Later (right) the female swims into the plants, followed closely by the male



The male has made several attempts to start the mating and suddenly both the fish start the spawning procedure with one accord

Semi-hard water can be used and it is a good idea to provide a dark bottom to the tank, by using dark gravel or well-washed pieces of coal. Feeding presents no problems as neons will eat both dried and live foods.

In order to photograph the spawning behaviour of the neon I prepared a small, all-glass, 2 gallons tank with gravel for normal planting, which included Java moss and a few *Myriophyllum* stems. I took the water for it from a tank that was planted only with Indian fern—it was fairly soft water with a pH of 6.6. A temperature of 75° F was provided and this is sufficient—the temperature should not be higher.

Use Young Slim Males

Where possible the breeding pair should be about a year old, though the fish I photographed were in fact older than this. Successful breeding results depend on the male and not every male is suitable. According to my own observations and experience the best qualified males are, strangely enough, those that are very thin and indeed look almost as though they have tuberculosis!

The best time to breed these fish is from November to May and scrupulous cleanliness must be maintained. As you can see from the pictures, the fish spawn in the fine-leaved plants

and the parents should be removed after the spawning has taken place as they are likely to eat the eggs. The eggs themselves are transparent, very tiny, slightly sticky and sensitive to light. For that reason the spawning tank should be darkened. The spawning lasts about 3 hours and usually about 100 to 150 eggs are laid. The eggs hatch after a day and the fry are free-swimming after a further 4 days. Until they are something like 2 months old they are very sensitive to water changes and must not be put into different water.

Neons do suffer from a disease that produces loss of pigmentation. According to the experts on fish diseases, neon tetra disease is caused by the microsporidian parasite *Phthophora hypoleucobryconis*, and is incurable at the present time.



As the pair of neons separate the eggs are seen to fall from the female (right) on to the plants below, to which they adhere. Hatching of neon eggs should be done in darkness or with subdued lighting.

Readers' Queries Answered



Horse-faced Loach

What is the best food with which to feed my new horse-faced loaches? Presumably, it will have to be live food?

Acanthopoma choroerythrum are very much bottom dwellers and certainly tubifex worms and/or white worms will probably form their best staple diet. Stomachs of specimens from north Borneo have been investigated and found to contain many worms and small aquatic creatures such as insect larvae. They were also found to contain plant fragments, so (unless your tank is well planted a little spinach might be added occasionally. Daphnia and live brine shrimp, if available may also be given. The live food diet may be supplemented with frozen brine shrimp, frozen Tubifex and chopped

earthworms; some specimens also seem to enjoy pellet-type foods that sink to the bottom.

Large Tank Fish

Could you please give me some information about the Tilapia mozambicus? I recently purchased a pair ready to breed. I have them in a tank by themselves. The dealer said they had bred together before. I would like to know what they eat and is it all right for them to stay together all the time? Will they be all right in a community tank?

The Mozambique cichlid (*Tilapia mozambicus*) requires the largest tank you can provide; this should be well provided with rockwork or bark, arranged to form caves and hiding places for the fish. They are territorially minded and each fish will make a large area its 'own',

They are quite unsuitable for a community of mixed fishes though they could be kept with one or two large companions in a tank of a suitable size for all of them. They have very large appetites and the food should be big enough for them, i.e. they will take dried food in the form of pellets, garden worms, pieces of raw liver or ox heart, shrimps, crab etc., and it is also important that they be supplied with plant food such as lettuce leaves, cooked spinach, blanket weed (they are unfortunately plant-eaters). As the fish are a pair they may remain together but if they do breed the male should be removed after the female commences mouth brooding.

Kuhlis are Tough

Can you please settle an argument? Is it necessary to provide 'rookie loaches' with a sandy tank bottom? I am not very anxious to do this as I think they will stir the sand up all the time, but I have been told that they may injure themselves unless there is soft soil beneath them.

Like many of the Cobitidae (loach) family, kuhli loaches have a transparent skin over the eye that serves to protect these organs against the fish's burrowing habits (horse-faced loaches are other members of the

family with this eye covering). This skin is very tough; the nose and mouth, however, could suffer injury when coming into sudden contact with sharp sand or gravel made by crushing processes. It is not necessary to provide the tank with a sandy base, but it is wiser to use, even if it is only over one portion of the tank bottom, a fine river gravel that is not going to cause such injuries.

Pond 'Scavengers'

Since catfishes are a menace in a garden pond should I obtain a tench as a scavenger to keep the pond clean?

It is true that tench are bottom feeders and they will eat up food that sinks to the bottom and which might be left by the other fishes. But, other than in very small ponds and provided that dried food is not tipped indiscriminately into the water, uneaten food should not prove to be a great problem. Against their value as scavengers it should be remembered that tench are also 'mud-stirrers' as they dig about for their food; they are therefore of rather more benefit in a large, deep pond where mud-stirring can be quietly dissipated in the depths than in a small pond in which the water will soon look churned-up. On the whole it is best not to think of any fish merely as a 'scavenger'.

Fin Colour of Rudd

Should the golden rudd have an all-red tail fin or is it only the other fins of this variety that should be red?

Your query is presumably with reference to the requirements of the show bench, for there is, of course, no 'should' or 'should not' as far as the colour of the tail fin of the natural fish is concerned. In both the normal and the golden varieties the tail fin can be red, red-flecked or without red. However, the FBAS Show Fish Guide for the rudd appears to indicate that judges look for a deep-red colour in all fins, tail fin included, for full points for colour to be awarded to any rudd.

Initial Planting

How many oxygenating plants should I include in my pond, which is roughly 6 ft. by 4 ft.?

One, or at the most two, types of submerged plants are all that are required in a pond of this size, and

about six bunches will be sufficient to start off with. Hornwort (*Ceratophyllum demersum*) is one of the most useful submerged plants. It makes almost no root so that it does not require a soil or gravel base to the pond for growth. Half a dozen small pieces thrown into the water will eventually establish themselves on the bottom and make good growth. Another point in hornwort's favour is that its finely divided leaves in clusters make it ideal as a receptacle for eggs when spawning takes place. Another excellent plant is *Lygrosiphon* (once better known as *Elodea crispata*). This curly-leaved plant makes very sturdy growth and survives any winter weather.

Catching Spined Loaches

The last time I had occasion to remove my clown loach from its tank I had the very unpleasant fright of getting it tangled up in the net; but I find it impossible to get it to go into a polythene bag as an alternative method.

Certainly *Botia macrocañthrus* is an active species but if you are guiding it by means of a planting stick held in one hand it should be possible to get the fish into a polythene bag, provided that you are using a reasonable sized bag. It is inadvisable to use an open-mesh type net with spined loaches such as the botias, as the erectile spine under the eyes is likely to catch in the material. If a net must be used it will have to be of the non-mesh variety; unfortunately this type of net creates its own problems—it sets up a good deal of water resistance. So if you have to catch one of the very fast-swimming fishes (fortunately for the fishkeeper the spines on that other member of the loach family, the kuhli 'eel', are

very tiny and do not give the same problems), it is back to practising with the polythene bag and planting stick method.

Pond Pests

How can I get rid of the leeches in my garden pond? The sides of the pond are infested with them. I can't think what they are living on as the pond is a purely decorative water plant container since I don't dare put in any fish. I tried putting in tadpoles in the spring but after a few days they all disappeared and I believe the leeches got them. I thought that by leaving the fish out of the pond the leeches would soon die but there are as many as ever.

It is true that the tissue juices required by leeches for existence can come from fishes but there are a great many other creatures available to them in a pond who may be equally suitable as a source of food—frogs, water snails, *Chironomus* larvae (blood worms) and planarians for instance; some species of leech could live on earthworms falling into the pond or snails, tadpoles and insect larvae. As you have no fish in your pond, however, the task of ridding the water of these pests should not present too much of a problem. Take advantage of the early summer to clean out the pond completely. Scrub it (if suitable) or soak it with a solution of 2 ounces of chloride of lime (bleaching powder) per 10 gallons of water. Wash the plants thoroughly under running water and then immerse them briefly in bleach diluted to 5 drops of bleach per gallon. After plants and pond have been thoroughly rinsed with clean water the pond can be set up again.

Getting it to the Right Grade

TINNED dog meat is used by many aquarists as a food for their larger fishes, cichlids in particular. Whilst the meat itself will readily separate into individual fibres the liver content will not break up so readily into 'bite-size' pieces for the smaller fishes, and there are instances reported of them choking as a result. If the meat is kept frozen in a refrigerator once the tin has been

opened, it is not always possible to spot the dangerous lumps when feeding, and if it is put through a liquidiser first the resulting mixture is too finely pulverised to be acceptable to the larger fishes. A few seconds' work with one of the new hand-operated 'food choppers' will, however, produce the desired grade of fineness without destroying the basic texture of the meat itself.

By CLIFF HARRISON

LAST month we looked at the development of L-frameless aquaria, and we will now show how every hobbyist can construct his own tanks by using silicone rubber aquarium sealant. This sealant is not cheap—cost is around £1 for a large tube—but it goes a long way and in experienced hands one tube should be sufficient for a 4 ft. aquarium. Almost any size or shape of tank can be considered, so do not feel restricted to the stock sizes one normally sees available in angle-iron frames. A triangular-shaped aquarium to fit in the corner of a room is an interesting variation, and the extra depth of a 24 in. by 12 in. by 18 in. will provide a beautiful setting for angel fish or for shoals of colourful characins.

Once the size of the aquarium is settled, the appropriate 'weight' or thickness of glass can be selected. The British specifications used here are now being gradually superseded by their metric counterparts; your glass supplier will be able to supply the appropriate weight under either system. For all aquaria except very small show tanks the use of $\frac{1}{4}$ in. glass is recommended for the base, to ensure ample strength when being moved or placed on slightly uneven surfaces; for aquaria larger than 48 in. long by 15 in. wide, $\frac{3}{8}$ in. glass is advisable. The table shows the weight of glass recommended for the four sides of various lengths and depths of aquaria: this is applicable to widths of up to 15 in., and for greater widths than this the next heavier grade of glass should be used.

To save using excessively heavy weights of glass to counteract the tendency to bow at the top centre, all aquaria over 24 in. long should incorporate a strengthening bar; this can be either a glass strip fixed across the middle of the tank from back to front at the top, or two fillets of at least $1\frac{1}{2}$ in. width fixed lengthwise inside the tank, near the top, at right angles to the front and back glass panels. This latter method will provide a useful support for the cover glass or hood.

The All-Glass Look in Aquaria

For small breeding tanks, 'horticultural quality' 24 oz. glass may be used—this is rather cheaper than the normal window glass, but may contain some imperfections. Where $\frac{1}{4}$ in. or $\frac{3}{8}$ in. glass is specified, this may be either drawn or float glass (which is expensive but essential for the viewing panels), or alternatively rough cast glass (which is much cheaper and can be used for the back and/or sides in addition to the base). However, many hobbyists feel that the beauty of frameless aquaria is in the transparency of all four sides, and for that reason the use of clear glass would be preferable.

Float glass, which has now replaced polished plate, is optically the most perfect and free from distortion, but for most purposes the less expensive drawn glass will prove equally acceptable. Wired glass, often used in framed aquaria, is not recommended here because of the impossibility of getting a clean, smooth edge, which is essential for frameless aquaria. Some glass merchants do occasionally offer second hand plate, usually

Thickness of glass for aquaria of various dimensions

Depth (in.)	Length (in.)					
	12	15	18	24	36	48
6	24 oz.	24 oz.	24 oz.	32 oz.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.
9	24 oz.	32 oz.	32 oz.	32 oz.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.
12	32 oz.	32 oz.	32 oz.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.
15	—	—	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.
18	—	—	—	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.
21	—	—	—	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.	$\frac{1}{4}$ in.

(Metric equivalents: 24 oz., 2.92 mm; 32 oz., 3.90 mm; $\frac{1}{4}$ in., 6.4 mm; $\frac{3}{8}$ in., 9.5 mm)

from old shop windows, at around half the cost of new. However, minute scratches and age may well have combined to weaken the glass, and for that reason it should ideally be used only for the smaller sizes in its weight range shown in the table.

It is quite simple to calculate the sizes of glass required as there is no putty or framework to make allowance for. The dimensions are as follows:

Base: One piece $L \times W$

Front and back: Two pieces $L \times (H - Ta)$

Ends: Two pieces $(H - Ta) \times (W - 2Tb)$

where L = length, W = width, H = height, Ta = thickness of base glass, Tb = thickness of front/back glass.

Having obtained suitable glass cut squarely and to size, we must now prepare it for the construction: this involves smoothing down the sharp edges and then cleaning the glass to remove all substances that would weaken the bond of the sealant. The edges of the glass may be rubbed down with an abrasive stone, but probably the easiest method is to use a fairly fine grade of wet-and-dry sandpaper; the glass should be wetted at frequent intervals whilst the paper, on a suitable wooden backing block, is rubbed back and forth over the edges. This will remove only the sharpness; if the edges have to be rounded or bevelled, a flexible mesh-type sanding disc may be used with an electric drill. The Abramesh is one such abrasive disc, but eye protection such as goggles must be worn, and care taken to prevent flying splinters being trapped in clothing. When this job is completed the glass should be washed or hosed down and left to dry.

The actual construction is best done indoors on a table of ample dimensions and strength. The surface of the sheets of glass should be cleaned where they are to be bonded. Thawpitt is an ideal cleanser as it leaves no residue, and the cleaned areas can then be dried and polished with clean paper tissues. The hands should also be washed and dried thoroughly to prevent fingermarks marring the clean glass.

The base is placed flat on the table (suitably protected with clean newspaper), and the front glass placed 1 in. away supported vertically against a large tin or heavy box. A thin continuous bead of silicone-rubber sealant is run across the top edge of the base adjacent to the front panel, which is then lifted and seated on to the bead and still supported against the box. The in-facing edges of each end of the front panel, together with the top edges of the remaining three sides of the base, also have the thin bead applied. One end piece is seated upright on to the base, the front panel is brought upright to meet it, and the corner taped

with self-adhesive tape top and bottom; this is repeated for the opposite end. Sealant is piped on to the two exposed (cut) edges of the side panels, and the back glass panel is positioned and taped. Provided all the corners are well secured with adhesive tape, the glasses may now be moved slightly to ensure squareness of the finished aquarium; it should then be left to harden for 24 hours.

A small continuous bead of sealant is now applied to all internal angles, ensuring that no gaps are left and no air bubbles are formed. It is at this time that the strengthening bars, if required, should be fixed and supported until the sealant dries. One attractive variation of this procedure is to make the aquarium 3 in. taller than the depth of water required, and locate the cross pieces 2½ in. below the top edge; in this way the cover is recessed, and a narrow strip of self-adhesive plastic applied to the outside tops of front and side panels will ensure that it is hidden from view.

When the sealant has been allowed to 'cure' for a full 48 hours, the tank should be carefully washed in clean water and the pieces of tape removed from the corners. Provided the instructions have been followed, there should be no danger of it leaking when finally filled. The aquarium must *not* be placed directly on to an angle-iron stand since the welds are never absolutely flat and true. A polystyrene ceiling tile, cut into 1 in. strips, will provide a suitable seating material, and this should always be used with all-glass aquaria to prevent any danger of the glass fracturing on uneven surfaces. Any excess of sealant can be trimmed with a razor blade from the outside of the aquarium or from the inside of the panels, but great care must be taken to avoid damaging the bead, which forms the watertight seal.

Readers often write in to enquire whether there is a limit to the size of aquarium that can be constructed with silicone rubber: the short answer is no—provided the correct thickness of glass is used, the completed tank is supported squarely on a firm base, and normal care is taken in the building of it. If any problems do occur, it is unlikely to be due to a failure of the bond. It is worth remembering here that an excessively large bead on the inside of the aquarium is not always indicative of its strength. This strength in fact comes from closely bonding glass to glass, with a minimum thickness of sealant to cushion the two pieces from rubbing against each other.

One final word of warning—these all-glass aquaria are very slippery when wet, and have no framework to prevent them sliding from your hands on to the floor (or on to a foot!). So, provided that you take care when moving or cleaning them, they should give many years of leak-free, rust-free and inexpensive service.

'A Long-lived Magnificent Show Fish for a Mixed Aquarium'

The BONY-LIPPED BARB

THOSE of us who have large aquaria often like to stock them with fishes that are other than ordinary and which reach larger sizes than the usual aquarium inhabitants. Although many of these larger species lack the brilliance of the neon tetra or the red rasbora, there are those which combine the simplest colours to produce the most striking effects. While there is grace and dignity to

fade with age. Fins, especially the caudal or tail fin, are reddish in colour when conditions are to the liking of the fish.

This is an active fish, which seems ceaselessly to graze over the rocks, plants, walls and floor of the aquarium when not in harmless pursuit of some other competitive fish. Mock battles are frequently held with others of its kind or with similar species,

By
**BRAZ
WALKER**
(photographs by
the author)

The bony-lipped barb (*Osteochilus hasselti*) is sometimes called the silver shark in the U.S.A. In the U.K. *Solentochilus melanosternus* is the fish that bears that popular name.



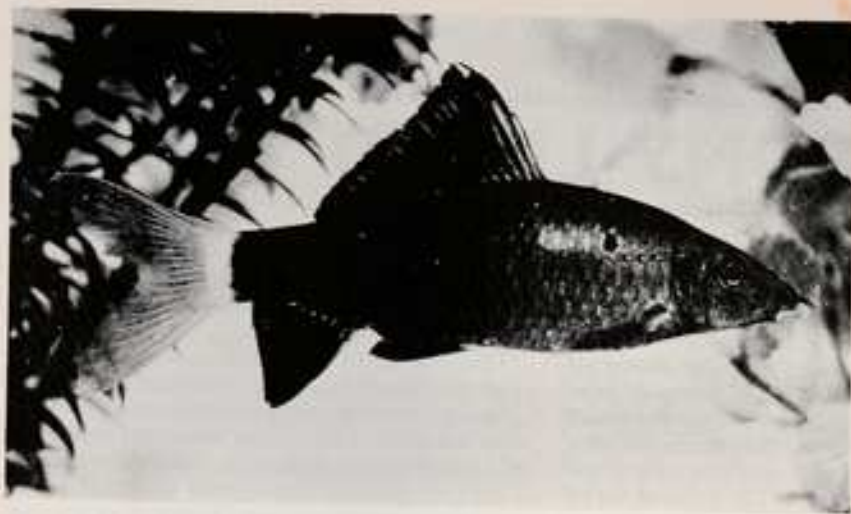
a school of brightly coloured characins, there is majesty to a group of 8- or 10-inch tinfoil barb (*Barbus schwanefeldi*) that simply cannot be approached by more diminutive fishes. Such examples of large size, peaceful nature and striking coloration are not encountered every day, but an interesting fish, which has the attributes for such an aquarium and which appears from time to time, under the name 'silver shark', is *Osteochilus hasselti* (Cuvier & Valenciennes, 1842).

The name *Osteochilus* means 'bony lip', in reference to the hard, bony prominence of the lower jaw, and the lips are fringed as in its close relatives of the genus *Labes*, several of which are also familiar as 'aquarium sharks'. Like the *Labes* 'sharks' of Asia and Africa, *Osteochilus hasselti* has a long-based, almost sail-like dorsal fin. Scales along its sides have dark dots that form several dark lateral bars against the otherwise shining silver body of the fish. Young specimens have a dark spot at the caudal base, although this may

and these can occasionally become serious. Cover, in the form of plants or rocks, helps keep aggression under control.

Like other members of the genus *Osteochilus*, or 'bony lipped barbs' as they are sometimes called, the silver shark is a highly prized food fish in Thailand and in other countries where it is found. Growing in Nature to as much as 16 inches in length, maturity seems to be reached at about 5 inches, which is a much more reasonable aquarium size and leaves open the possibility of a successful spawning. For most aquarists, however, I think the silver shark's primary application will be as a long-lived, magnificent show fish for a mixed aquarium of large fishes such as large barbs, large characins and mild-mannered cichlids.

The silver shark is quite common in Thailand, and yet its availability seems limited as far as the aquarist is concerned. The price is never really low, but small specimens appear from time to time at substantially lower prices than previously.



More 'shark-like' in its profile is the dorsal fin of the 'red-tailed black shark' (*Labeo bicolor*), but like the bony-lipped barb it also is imported from Thailand

While they are also less striking in appearance than larger and more expensive specimens, they are quite active and do an effective job of gleaning almost ceaselessly through upper layers of sand and over other parts of the aquarium in constant search of food scraps or other palatable items. If fed well their growth is quite rapid, and the specially formulated 'growth food' marketed by certain manufacturers of high quality flake foods seems to have an extremely good effect on their attainment of size and colour and the other attributes that bring them rapidly to show fish status.

The silver shark is an excellent jumper and its tank must be well covered at all times to prevent loss from such accidents. A well-planted aquarium seems to lessen the inclination to leap clear of the water, but carelessness is still an open invitation to tragedy. A sudden noise or even the shadow of a passing bird, if the aquarium is located in a window, can provoke a leap for safety that seems out of proportion to the size of the fish in its power and distance.

Barring such accidents, this is an extremely hardy and adaptable fish, which will live for many years. Water quality (pH and hardness) seem to have little effect on the fish although it is probably better to avoid extremes of alkalinity, acidity or hardness. *O. hasselti* is, however, a good case in point for proving the merits of frequent partial changes of water, since its colours, especially the red tinge of the caudal and other fins, fade as water becomes 'old' and takes on a yellowish colour. The immediate increase in activity and intensifying of colour after one-fourth or one-third of the water is replaced with fresh water is obvious, and the regular practice of this, perhaps bi-weekly, will also help achieve maximum growth.

Feeding the silver shark, as with most cyprinids, presents little problem. At least one species of *Osteochilus* feeds in Nature on diatoms, filamentous algae, plant fragments and arthropods, and even types of fungus have been found in stomach contents, so it should be safe to say that these fish are omnivorous. Certainly this is the case in the aquarium, although there is a definite fondness for pellet and tablet foods as well as paste, including cooked oatmeal or rolled oats. Flake foods are caught as they sink, and these and frozen or live foods are eaten greedily. An occasional alfalfa rabbit food pellet is a good substitute for algae.

Hugh M. Smith lists several interesting vernacular names that are applied to *Osteochilus hasselti* in Thailand. In Central and South-eastern Thailand it is called *pla soi khao* because of its supposed resemblance in coloration to a dove, which they call *nok khao*. The dove has an area of black and white spots on each side of the neck. The fish's name is also sometimes shortened to *pla nok khao*. Another name used in some areas is *pla khi khom*, which means 'bitter dregs fish'. *Pla* is the Thai word for fish.

Osteochilus hasselti, as with many cyprinids, is sexable at maturity by the roundness and fullness of the female's abdomen when she is in good condition. If spawning in aquaria has been accomplished it has probably been infrequent. A very large aquarium with heavy aeration and a temperature of 80-82°F (27-28°C) would probably be a good approach, using a scaled-up version of your favourite technique for breeding barbs.

This silver shark is a handsome and interesting fish as well as a moderately efficient algae-eater. Its easy maintenance, longevity and appearance make this among the choice species for the keeper of larger fishes.

TROPICAL MARINE PROJECT—4

ROY PINKS continues his account of his experiences of

Establishing the Marine Aquarium

I CHOSE a *Davyllus melanurus* to open the innings in the second of my marine tanks. In view of the pollution which had occurred after the coral was introduced he was on a sticky wicket straight away, or so it seemed. He made for a cranny in the red organ-pipe coral as soon as he was released and appeared to be extremely nervous. Repeated twitchings and shudderings during the next 24 hours or so indicated that he was off to a poor start; in the belief that a little company might encourage this uncertain creature at least to explore the tank I added a domino damsel on the following day, and this took food within 24 hours of arrival. Its effect on the *melanurus* was nil; the latter remained firmly holed up and it was a further 2 days before it tentatively took some daphnia. Meanwhile the domino was developing white lumps and going off food, but since the nitrite reading was minimal I took delivery of a clown (*Amphiprion xanthurus*), which my dealer had been keeping patiently for me for several weeks.

This almost black and vivid white clown was a little over 3 inches in length and quite heavily built: it roared away into its new quarters and gobbled up some white worm immediately. It also nuzzled into a shrimp and tubifex tablet, shaking it as dog shakes rat, and for a moment I wondered how I was going to cope with a monstrous appetite like this. I need not have worried on this score, unhappily, for during the next 2 days it gradually appeared less and less happy though it was far from clear what the trouble was. The nitrite readings were still quite low but none of the three fish looked at home except in terms of colour, which remained unimpaired. On 15th September the *melanurus* died and I sent it to Mr Harold Cotton for a post mortem.

In the notes I enclosed with the fish I recorded that it had trailed excreta in long strings for

several days and suggested that the digestive system of the fish had been wrecked by the change of water, from the dealer's tank to mine. Mr Cotton's opinion was much the same, and all organs were found to be clean with the exception of the intestine, which was infected with sporozoa of marine origin. A note at the end of the report caught my eye. It read: 'I suggest, by the way, that you start your tanks at specific gravity 1.020 rather than 1.025'. This highly relevant observation proved to be the clue to the whole sad situation and I swiftly made the necessary adjustments. It was too late to save the clown, which lay on its side on the following morning. The domino, however, responded swiftly to the change in conditions and began feeding quite well.

In an attempt to relieve the clown I transferred it unceremoniously to my now prosperous small marine tank, which was impeccable in terms of both nitrite level and understocking. Within a few hours the fish was apparently much recovered and I almost felt that it had pulled through. This was not to be so, for by the evening of the next day it began to develop oodinium noticeably and I isolated it in a smaller container, more to keep infection away from the other fishes than in the expectation that solitude would help it. It lasted only a few hours.

In parallel with these unhelpful happenings in the new tank, the *psacula* clown in the first tank gradually deteriorated and died. Apart from the fact that it had rejected food for nearly 3 weeks it displayed no distress symptoms. I was beginning to understand what was meant by the warning that clowns are not beginners' fish. It was perhaps saddest to note that the mistake about the specific gravity need never have happened if only I had read my early notes. I was well aware that the advertised figure for this is always too high, and

readers may recall that I had set the first tank up at about 1.022.

It thus seemed clear that salinity was as vital a factor as the nitrite level, and since both can be measured by simple means at least two of the conditions set by tropical marines can be controlled by the beginner—at any rate to the extent that realisation of what is going on can prevent losses or discomfort. It is quite true that, at the early stage, nitrite levels cannot be regulated much, but an awareness of their magnitude can certainly determine one's immediate policy—or should do so.

With this hurdle surmounted I decided to press on with another starter fish; at this point I was left with the solitary domino, and a *Dascyllus aruanus* soon joined him. Though the nitrite level was rising this fish took to the water well and it fed on brine shrimp, white worm and pure shrimp tablet shortly (hours) after introduction. So the situation remained for a few days; there was no deterioration in any of the main factors.

On 28th September I was reminded of some *percula* clowns, which were of modest price and had inhabited a local dealer's tank for many weeks, unsold. It struck me that if I were to lose any further fish in my experiments they might as well be cheap ones, so I acquired two of these, which were just under 2 inches in size and reputedly feeding well. My utter horror on finding that the salinity read 1.030 in their plastic bag was matched by the difficulty in reducing this to 1.021 within a few hours. I duly set my wife to a routine of achieving this during the afternoon whilst I was at work, and, spoonful by spoonful, the task was achieved by about 8 p.m.

With a high nitrite reading at the time it looked as though I just couldn't win, but wonders never cease; these two lovely creatures wriggled their way into strange water and absolutely cavorted about the place. They seemed especially to like the vigour of the water turbulence and wallowed in the bubble streams. They took some brine shrimp later that evening, but without great enthusiasm. They so improved during the next few days that I increased feeding somewhat and they responded favourably, taking white worm and Tetramarin. After 10 days I added a further specimen from the same source to make up a trio. The reason for this was not simply collecting for the sake of acquisition, but because I wanted a shoal of something in my marine tank and *percula* clowns are said to be happiest in their own company. So it seemed as time went on. Although the first two always go around together and the third is something of a 'loner' (this reflected exactly the way in which they were added to the tank), the three link forces from time to time in apparently mutually enjoyable excursions. The aggressive nature of so many marine fishes, even to their own kind (and often

particularly so when thus associated) makes it virtually impossible to muster shoals, which are such a feature of freshwater aquaria.

This rather risky venture with the *percula* clowns was a distinct success and the whole tank began to look as though it was settling down, despite occasional bouts of non-feeding on the part of the domino when the nitrite level rose from time to time. My only other addition was a curious little wrasse (*Halichoeres bivittatus*), which the family cajoled me into buying because it made them laugh. Its odd, back-heavy way of swimming and busybody nature certainly causes all sorts of amusement, and as it promises to remain smallish I shall continue to harbour it so long as these conditions are met. Its appetite was evident from the outset and it had hardly wetted itself in my brew of Tropic-Marin before it began to ingest white worm in large quantities. It has hardly ceased from that moment onwards.

On 9th October—6 weeks to the day after the water had cleared from its early pollution, the nitrite level was n'l. I left the water specimen for 48 hours and retested several times to establish the validity of this, but once again the prophecy had come true and we had a real marine tank ready for stocking. At this stage I had to do some thinking about what the future occupants would be. The first was a *Heniochus acuminatus*, without any doubt, but as the stocking capacity of a marine tank is limited to between $\frac{1}{2}$ and 1 inch of fish to a gallon of water, the choice has to be extremely selective. Quite apart from this the utterly uncompromisingly aggressive natures of so many marine fishes make apparently highly desirable associations quite out of the question, and added to this is lack of knowledge of and experience with many of the current importations, to the extent that both dealer and customer are frequently in equal ignorance of both the requirements and capabilities of the species they handle.

With this background I was pleased to obtain the agreement of M. S. Tropical Fish to an arrangement whereby I could try out some of their community fishes in my tank, over a period, and report on them to PFM readers. It was something on the lines of 'Rentafish'. All I have to do is to return each specimen after its period of trial bigger and better than when I got it. The prospects on present showing would appear to be that Mr Stray will be able to retire comfortably on the compensation he will receive from me for fish that never return, and PFM readers will be entertained in the process! My own position is a little less certain, but one compensation would seem to be that it will take some time to reach stalemate.

Returning to the narrative it may be recalled that I had reached the stage where my first £5 fish was about to be introduced, and I must admit to feeling

nervous as a kitten about the likely outcome. All the literature described *H. aramunata* as a boisterous butterfly with a hearty appetite and scant concern for water conditions. The transfer drill took about 2 hours and when at last I submerged the transparent plastic storage box, which serves as a sort of 'decompression chamber', the great fish sank like a stone, remained motionless for a few moments and then began to gasp and judder. I observed at the time that there are simpler and more enjoyable ways of getting rid of five pound notes, and nothing during the next 24 hours altered my views that this fish would not remain with us for long. In a day or so it looked a little more secure but was extremely inactive and only brine shrimp seemed to appeal to it: at this stage even chopped white worm was refused, and it took something like a week for feeding to begin in earnest. It gradually gathered strength and took a liking to chopped earthworm, and from then on became the principal personality in the tank.

An episode then followed which I found most interesting. A touch of colour from the other side of the spectrum was needed and we decided to add a blue damsel—a very fine 2 inch specimen with a peppering of black dots. It really glowed and made the fighters look dull. Its appearance was greeted with a concerted attack by the domino and the *Dacylus aramunata*, and for several days it was subjected to the most violent and humiliating harassment imaginable and at one time I almost

decided to remove it, to avoid further trouble. Right in the middle of all this was the *Hemiochus*, which by now had worked out a stately routine of inspection of all the corals at the front of the tank. I am sure that the mad feud got on his nerves as much as it did on mine, and there were numerous occasions when it seemed to intervene and flick its great body at the attackers in a gesture which unmistakably suggested that they should give it a rest. Gradually the fighting abated, but only after I had spent an hour or two one evening trying to make the domino lose face by driving it back into its hole with a length of dried reed mace stem. Surprisingly this seemed to help and involved no bloodshed or physical damage to anyone or anything, but it took a lot of concentration!

The period ended in almost idyllic fashion with the advent of a *Chaetodon lunula*, the gorgeous olive green and yellow moon butterfly. It was a lusty creature and took food within a few moments of introduction. It got on well with the *Hemiochus* and looked to be a real acquisition. With stock at this level it seemed that I should rest awhile, for not only was space being spent but so was my pocket money. Superficially it was a good time for consolidation for some weeks. A combination of circumstances decreed otherwise and I am still smarting from what followed.

To be continued

Meetings and Changes of Officers

AIRDROUGH A.S. President, Mr A. D. Lawson; secretary, Mr E. Ashford (3 Greenish Avenue, Yeading, nr. Leeds, Yorks.); treasurer, Mr P. Irwin; vice-president, Mr C. Thompson.

AMERSHAM & D. A.S. Chairman, Mr K. North; secretary, Mr S. Thompson (5 Woodhill Wood, Amersham); show secretary, Mr B. Jones (64 Oakley Lane, Hatfield East, Tring); Meetings: first and third Wednesday of month, 8.0 p.m., Community Centre, Amersham, Bucks.

ANSON A.C. Show secretary, Mr B. Bullock (8 Walton Close, London, N.W.1; phone 01-452 8505); assistant, Mr T. Burke.

BILLINGHAM A.S. Chairman, Mr E. Cragg; secretary, Mr D. K. Young (85 Oxford Road, Billingham, Teesside).

CASTLEFORD & D. A.S. President, Mr D. Newman; chairman, Mr E. Clowes; Meetings: first Wednesday of month, 7.45 p.m., Carleton Community Centre, Potterscroft, Yorks.

CHESWELL & D. A.S. Secretary, Mr A. M. Drakin (11 Newell Road, Worksop, Notts, 801 4LL; phone 6347). Meetings: first Tuesday of month, The Vine Hotel, Carlton Road, Worksop, Notts.

DERBY REGENT A.S. President, Mr L. Wilson; treasurer, Mr T. Jerram; secretary, Mr J. Blund (4 Cumberhills Road, Hatfield, Derby); show secretary, Mr R. Harlow (180 Mansfield Road, Derby; phone 44322).

DON VALLEY A.S. (previously known as STOCKSBRIDGE & D. A.S.). Secretary, Mr G. A. Hoiland (26 Haggston Road, Oughthorpe, Sheffield S20 1GP). Meetings: alternate Thursdays, Friendship Hotel, Stocksbridge.

FEDERATION OF NORTHERN AQUARIUM SOCIETIES. President, Dr J. F. Williams; vice-presidents, Mr G. W. Cooke, Mr C. Walker; secretary, Mr I. Wood (3 Henry Close, Bury, Lancs.; phone 051-554 8421); assistant, Mr D. Gibb; treasurer, Mr S. J. Nicholls; show secretary, Mr G. W. Cooke; programme aids, Mr J. Bland.

PGA LANCASTER SECTION. New section. Chairman, Mr J. Scovson; secretary, Mrs J. Scovson; show secretary, Mr J. F. Peck (3 Ridge Street, Birk, Lancaster); assistant, Mrs J. Peck (P.O. Mr D. Tennant). Meetings: third Sunday in month, 4.30 p.m., Gregson Institute, Moor Lane, Lancaster.

HAVANT & D. A.S. New venue: Emmerdale Day Centre, South Street, Emmerdale.

HUMBERSIDE A.S. New Society. Secretary, 11 Claremont Villas, Reynoldsian Street, Hull; assistant, Mr N. Wood (9 Main Street, Boulevard, Hull, Yorks.).

NORTHAMPTON & D. A.S. Change of secretary to: Mr R. J. Smith (22 Bishop's Drive, Kingshorpe, Northampton).

PRIVATEERS A.S. President, Mr E. Bowers; secretary, Mr F. W. Colles (18 South Hill Drive, Glaxford, Bingley, Yorks.); treasurer, Mr B. Stein.

SHEFFIELD & D. A.S. President, Mr K. Calvert; chairman, Mr R. Senior; secretary, Mrs S. Bland (64 Alcock Road, Sheffield, S12 1GE); show secretary, Mr F. Terry; treasurer, Mr E. Stanton; editor, Mr J. Bland. Meetings: alternate Fridays (5th May), 44 Union Street, Sheffield 1.

SOUTH LEEDS A.S. Chairman, Mr Pearson; show secretary, Mr B. Knightley; treasurer, Mr J. Sanderson; secretary, Miss A. Jackson (112 Arderton Crescent, Leeds 8). Meetings: first and third Wednesday of month, Cockburn High School, Leeds, 7.30 p.m.

STONE A.S. President, Mr J. Brough; chairman, Mr J. Sanders; secretary, Mr B. Hughes (4 Arthur Street, Hareby, Stailes-Freeze, Staffs. ST12 2SP); treasurer, Mr A. Fell; show secretary, Mr K. Evans; assistant, Mr P. Clemens.

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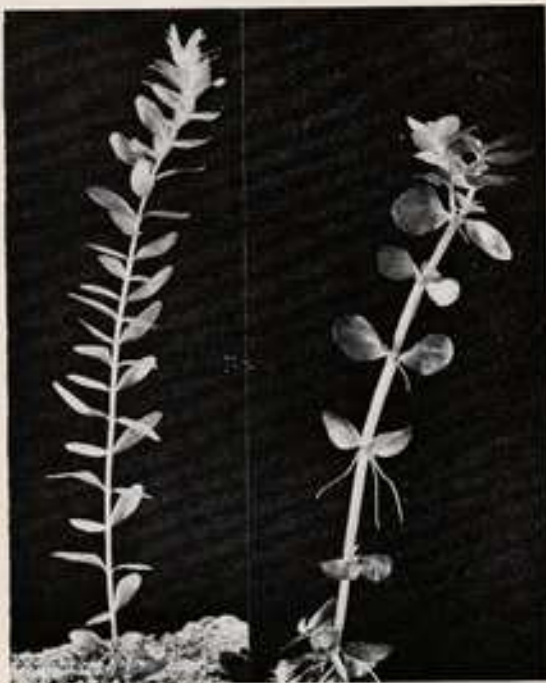


The beauty of *Rotala*—when grown in clumps is seen in this tank—two clumps are present (left and centre). Other plants include *Aponogeton* (hybrid), *Cryptocoryne beckettii* and *Microsorium pteropus* (right)

By
J. ELIAS

Photographs by the author

Rotala Looks Best in Clumps



Plants of distinctly different looks result when *Rotala* is grown underwater (left) and out of water (right)

THIS is a very beautiful plant, especially when arranged in clumps. It is an aquatic member of the Lythraceae, a particularly widespread plant family covering some 500 species in 22 genera. The genus *Rotala* alone is to be found in Asia, Africa, Australasia, America and, in one instance, Europe. The plant described here has not yet been identified with complete certainty, and the name *R. indica* is therefore given with a certain reservation.

The plants occur in abundance in the East Indies, where they grow in the paddy fields; from here they have spread to other areas as far as the Caspian Sea. They can be grown submerged or emersed—in either case very successfully. Emerged plants have stems up to 3 feet in length. The stalkless leaves are rounded and placed in pairs opposite each other alternately around the stem, and are approximately $\frac{1}{2}$ inch in diameter. From above the leaves are shiny green; below they are reddish with distinct veins. Submerged plants have smaller, spear-shaped leaves.

Leaves on the upper part of the stems, with plentiful lighting, are as red as the lower leaves. It is interesting to note that the emersed and submerged forms are often taken for two separate species, the emersed for *R. rotundifolia*, the submerged for *R. indica*.

The plant is particularly prolific and will adapt

easily to new surroundings. The emerse form establishes itself in water as well as the underwater form. New growing leaves are quite different from the original ones, being spear-shaped, and the stalk gradually becoming wavy. In conditions where the depth of water is low, the submerged leaf remains rounded, changing only in size.

Plants grown in the aquarium branch out freely, and if the top of the growth is pinched off it will quickly produce roots when replanted. If this is done repeatedly, the original, lower, section of the plant will develop an old, brittle root-system and, when this happens, it is as well to pull out the plant complete with roots, and to replace it with a young plant. This can be done repeatedly. Such rejuvenation is essential periodically, or otherwise growth will become stunted.

R. indica grows in any water, and is not fussy

in any way. Optimum temperature is between 68° and 78° F (20°-26° C). If it is necessary to rely exclusively on artificial light, fluorescent lighting is preferable. Under such light a reddish colour in the leaves is more often developed. I cannot say whether the plant will react unfavourably when kept in close proximity to other species; however, it is suggested that the requirements of any such neighbours should not be markedly different. I find that *R. indica* thrives along with *Microsorium pteropus*, *Vallisneria spiralis* and perhaps *Cryptocoryne beckettii*. Depths of water greater than 18 inches are no disadvantage.

A particularly pleasing effect is obtained by planting *Rotala* in clumps, when it becomes a delicately proportioned plant. It is a species that can certainly be recommended even to less experienced aquarists.

Is it New to You?

AN odd African division of freshwater tropicals is formed by the mormyrids. A recently imported member of the group is *Gnathopoma macrolepidotus* (ignore the 'G' when pronouncing its generic name), pictured here. Unlike some other mormyrids it is rather conspicuously scaled, but in behaviour it resembles all the group in being a shy and light-shunning fish. Its dark green-brown colour is unspectacular and body shape and swimming movements are its chief points of interest. In the aquarium with other fishes these mormyrids are harmless, although they grow to at least 6 inches in an ordinary tank, but since they are mainly active at night not much will be seen of them when the lights are on. White worms and tubifex are the best foods for these fish.

(Specimen photographed at the Inter-Pet Fish Farm at Walton-on-the-Hill, Surrey.)



Photographs by CLIFF HARRISON



ONE to handle with care is the freshwater stingray (*Pseudostyrax laticeps*), a bottom-living fish from South America. It is not harmful to other fishes in an aquarium and given a fine sand to bury in it spends much of its time entirely covered but for its prominent eyes. Spines on the tail of large specimens can cause painful wounds if the fish is handled. Like many flatfishes this one can change colour according to its surroundings.

(Photographed at Harrow Green Aquatics, London.)



Personal COMMENT

by
ARPEE

I DON'T suppose that even the most optimistic of us will imagine for one moment that the sad and degrading events of the winter, which plunged the country into darkness, will not be repeated at some time or the other. At such times the cold-water enthusiast can, of course, regard power cuts with equanimity, but the lot of the tropical fish-keeper is much less happy. I must confess that, even with past experience of electricity failures of greater or lesser magnitude, one of the first sources I turned to when the cuts increased in intensity was last winter's issues of *PFF*, which listed many of the points relevant to such situations. What seems to be missing, though, is a comprehensive statement of the real risks attendant on these periods of stress and the very numerous countermeasures that can be employed.

The essence of last year's analysis was that the tropical aquarist is more likely to be bothered by the loss of his air supplies than by the loss of his sources of heating. It is perfectly true that it is easier to conjure up alternative sources of heat than of air, but the primary need is for the individual to think ahead and to make contingency plans, thus to free himself to some extent from the compulsion of circumstances. I did come across those during the strike who spent much time apportioning blame and bemoaning the fact that they lived in electrically driven houses, yet who had not had the wit to lay in a single candle or a tin of paraffin. Those with the added problem of leaving their tropicals in unattended houses were unhappy about the prospect of covering up the tanks day after day, thus excluding much valuable light, but probably compromised, as I did, by sheathing their tanks in expanded polystyrene but leaving a strip of one panel uncovered. This would allow light to enter without wasting too much precious heat.

Incidentally, I was very disappointed with George Cansdale on BBC TV, who, at the height of the crisis, allowed to go unchallenged a fatuous piece of advice that tanks should be stood on polystyrene sheeting to conserve heat. His sole observation was that tanks weigh an awful lot and should be moved with care! I do wish that the media would take the trouble to get professional

advice from the competent quarters; since this gaffe was on a children's programme the matter was the more regrettable.

Air supply was probably our worst headache, especially for the amateur who had no alternative power supply for tanks containing undergravel filters. Tanks that were overcrowded, too, posed equivalent problems. Jim Kelly's recent tip about the tin with a nail hole in it, filled with tank water and balanced on the frame, may have come just in time for many of us, but it scarcely helped to relieve the anxieties of those who felt that their salvation lay only in turning round 50 gallons or so per hour. The inflated car inner tube, suitably adapted to the air line system, would take the edge off overcrowded community pollution, and the imagination boggles at grossly overinflated air-beds being harnessed to a similar task. My own contribution was to link a bicycle pump to the most critical tanks and to cajole the remainder of the family into taking a turn on it every half hour or so! The output was remarkably good and took our minds off the crisis, but there must be few things that Man does in his daily life which look quite as silly.

Whatever things we did to cope with the crisis, some will have been necessary, some not. Others will have been original, perhaps a few will prove to be real brainwaves. At all events, I am sure that most of us will have something to say about how we coped and how we fared, and I invite as much correspondence as you like on the subject, the object being to report and summarise before next winter. One of the things that struck me particularly was the need for a 6 or 12 volt aerator which could be run from a car battery, itself rechargeable. There is a D.C. aerator available, but since this consumes torch batteries at a rate of knots, it is not really a serious contender.

I sustained few losses that could be attributed directly to the power cuts, but we were making great efforts to preserve the marines and thus the whole collection benefited. My impression is that most other local aquarists fared similarly and that the sensible spacing of the cuts, coupled with astonishingly good weather, took the edge off what could have been a really sorry situation. However, this should not be allowed to diminish our concern for the future, as next time it could be immeasurably worse, and we shall be grateful for details of any measures calculated to preserve the lives and well-being of our charges. So let me have all your ideas, notions, fancies or suggestions, and I will try to assemble them in some form for future reference. I particularly have in mind the need to help those with aquaria who are at work all day, but I am sure that we shall all read with great interest any constructive comments on this potentially vital problem.

I was amused to read in PFM recently that no less an aquarist than Jim Kelly had got himself into lukewarm water with a correspondent over the suitability of tiger barbs for community life. Whilst I agree with Jim's logic I must admit that this beautiful fish has manifestly been at the root of so much strife when in association with other fishes, and cannot therefore be reckoned as a suitable choice for beginners. Even old hands can be taken aback by the unpredictability of individual fish, and all introductions should be watched carefully for a time. If nipped or torn fins begin to appear, or if tensions seem to be building up, alternative arrangements should be considered quite seriously.

Although I am reasonably convinced that the tiger is basically something of a ruffian, the possibility cannot be discounted that on occasions it is the state of the water that triggers off trouble. I do not suggest that such an obvious thing as pH value will account for the eccentricity of individual fish, though the difference in water values between the source of the fish and its new tank may contribute towards an explanation. Certainly the characteristics of new water are considerably different from those of old; quite apart from the large variations in quality brought about by the biological processes of the tank's inmates, the nature and frequency of feeding will also play their part in determining conditions. It is impracticable to arrive at an

accurate full analysis of the contents of each tank, and even were this readily achieved, it would be equally impossible to predict what the effect of the amalgam would be on any given fish, except for gross abnormalities.

It could well be that our tiger barbs get upset by certain chemical alliances, or that they are naturally aggressive but in some cases become dragged by the composition of some of the water they encounter. I am inclined to the latter view, but only controlled tests would enable us to judge how near the truth this may be.

I have recently had a reminder at first hand of the need for awareness of these constantly changing factors in tank water content, revealed by an attack of 'panics' in my cichlid tank. Quite suddenly the festives and the keyholes (five adult fishes in all) have taken to unpredictable mad hurtlings around the tank, after which they disappear into the cryptocoryne thickets in (literally) black sulks, to nurse their wounds. I had this trouble some 5 years ago with angels and, like others who had run into similar difficulties, found that a fairly comprehensive freshening up of the water made all the difference. Although I always top up with fresh rain-water it seems evident that there has been a build up of something that worries them, and replacement of half of the water may help to restore the status quo.



GUPPY

World

With the rest of the world holding its breath for some prospective Nobel Prize-winner to come up with a method for controlling the sex of offspring it seems that one PFM reader has beaten them all to it—with the guppy, that is.

It all started when he read that mink breeders, anxious to produce more males than females (the he-mink has the better coat), had been having remarkable success with red lighting. Throwing caution to the winds, one intrepid guppy breeder substituted two red bulbs for the normal 25 watt incandescent illumination on one of his aquaria. He

found to his disappointment it didn't seem to make a scrap of difference.

Did this put our chap off? Not one iota. With the sort of enthusiasm that could sell Real Estate to a Bedouin, he tried two pink bulbs—the kind sold for use on those 'cool

By PETER UNWIN

effect' electric fires. The results were amazing. In three successive broods with different females he found that approximately 75% of the fry turned

out to be male. A fourth female gave birth to 73 males and two females.

Further experiments revealed that pale blue bulbs reversed the effect and gave a preponderance of females. Coincidence? Fluke? It is hard to say. Perhaps some Guppy World readers would like to try to repeat his experiments and report on their findings.

With pink for the boys and blue for the girls, our correspondent seems to have reversed the normal order of things in more ways than one.



Newcomers to the show bench are often puzzled to find a date printed on jars or tanks containing breeders' classes. This is the date of birth demanded by our major aquatic authorities—a figure that is terribly hard to prove or otherwise.

Another ruling coming in much the same category is that of the

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Harlequins Challenge to

By

Once thought to be impossible
harlequin fish is now known to be
although when and how this will

EVERY fish hobbyist in his lifetime dreams of spawning a certain fish, even though the odds of breeding that particular species may be stacked against him because of the difficulty of breeding it in captivity. It may be a real favourite, and such a fish is the beautiful harlequin. For some 20-30 years after it was first introduced to the aquarium world it refused stubbornly to spawn and it was not until after World War 2 that a very few lucky aquarists had success with it. Even today it is still a problem fish. Indeed, in this country, many experienced aquarists have given up the attempt to breed it and have consoled themselves with the thought that it is downright impossible to do so.

I must admit that after nearly 20 years of endless trying I nearly gave up myself; this is the only fish in my long years of fishkeeping that has reduced me to real frustration. Numerous times I'd think they had spawned after seeing the female upside down under a leaf, but always the result was the same—no eggs were to be seen. Why then is this little gem so stubborn?

This species is to be found from Thailand to Sumatra. Indeed it is reported that in Malaya these fish are so abundant that they are used on the land as fertiliser—a heartbreaking thought! It is a peaceful fish, a good mixer and fairly hardy; and it presents no feeding problems. Although I have had a minor success with them I think I shall be learning more about harlequins for a very long time. Of one thing I'm sure—for a hobbyist to hope to breed them certain rules and conditions must be strictly adhered to.

First of all the mating pair must, of course, be prepared so that they are fit and healthy. For sexing them it has been noticed that frequently the male's triangular black wedge goes deeper

down into the belly region whereas his mate's triangle is cut short, but always the male has a strong gold-red glow along his back and all his fins are a deeper orange-red than those of his partner. The whole of the body carries a suffused violet hue like velvet. The belly is silver, the dorsal is red edged with white, sometimes showing black tints that come and go, and the colour of the tail fin resembles that of the dorsal. A large velvety black triangle covers most of the flanks or sides.

For my harlequin breeding attempts over the years I've used rain water, distilled water, various pond waters with an acid reading, spring water and conditioned tap water, or a mixture of several. After reading an assortment of books on the subject one becomes very confused. They give widely varying recommendations on practically every aspect including water hardness (DH) and water reaction (pH) and one finishes up with a list of about 10 different pH values and water hardness readings from 2' to 8' DH. I tried all the combinations without success. The Americans report that water requirements are as exacting as those required for breeding neons and they mention the use of rainwater with an acid reaction of pH 6.3-6.4 for optimum results. Personally I disagree with this. Equally successful results can be obtained from conditioned tap water—I really do not think the pH value is critical as long as the water is on the acid side (i.e. under pH 7.0).

Likewise with plants. Czechoslovak and Dutch aquarists say that cryptocorynes are the plants to use for spawning. Plants that have been used with success are narrow and wide-leaved cryptocorynes, large bacopa leaves, cardamine leaves and even Alpine violet leaves and leaves of Amazon swords. Plastic plants have also been used though I do not

are still a Breeder's Skill

J. LEE

to breed in aquaria, the ever-popular
quite amenable to spawning in tanks
happen is very hard to control

know how successfully.

All the books emphasize strongly the question of partners, suggesting that half the reason for success lies in this. I think the best results will come from young stock aged 6, 10 or 12 months. The female should be fit and full of roe and when choosing a male it is best to remember that he should be a little larger than the female as this makes it easy for him to embrace her during the mating. Not all pairs put together will spawn; as a matter of fact it is a very choosy business and it is possible to try eight or more males without success. This is why it is necessary to be able to pick from at least 20 or 30 fish in a shoal to find a compatible pair.

One of the prime factors is conditioning before spawning. I achieved this with my breeders with a diet comprising a large amount of brine shrimps, red daphnia, white worms, Grindal worms, micro worms, scraped dried meat and an occasional feed of freeze-dried tubifex worms, ghost larvae and soaked Farex-type cereals. When the fish are moved from hard water in the community tank to the soft water required for breeding, it is necessary, as when moving neons, that this should be done very gradually and the water samples mixed over a period of time to avoid disaster, for these fish can react very quickly to extremes of pH change.

A lot of the literature advises the use of all-glass tanks for breeding. I tried a variety of these over the years, 2-gallon all-glass battery jars, 5-gallon and 8-gallon tanks, but I struck a blank with them all. The successful results were achieved with a 24 in. by 12 in. by 12 in. angle-iron tank, well scrubbed out and filled with 6-9 inches of conditioned tap water, which showed a reading of 2° DH hardness with a reaction of pH 6.5, i.e. soft and

acid. According to articles on harlequins, a wide range of temperatures may also give a successful hatch, from 76° to 82° F (24-28°C). I have boosted the temperature to 85° F, but they eventually spawned at 83° F (28°C).

In the matter of spawning procedures also, the books will record that *R. heteromorpha* spawns characteristically in an upside down position with the female rubbing her belly on a cleaned spot on a particular leaf or leaves and that yellowish eggs are seen either on top of or underneath the plants.

The spawning I witnessed was unorthodox, not on the plants at all (plants were mixed and included large cryptocorynes, large leaves from an Amazon sword plant and two or three cuttings from a cardamine plant as well as plastic plants). Only once did I notice the breeding pair rise beneath a leaf and then they paused and swam down again to near the bottom, about an inch above a layer of boiled peat moss. They sped round the tank and now and again the male would land on top of the female—forcing her down on to the peat. So it is not surprising that the only two eggs I saw were round the base of the plants on the surface of the peat medium.

It seems now to me that if the leaves in the tank are not to the liking of the pair of fish they will just as well dump their eggs on the top somewhere in a corner or in characin fashion drop them anywhere on the bottom.

One can go on forever asking questions about harlequins and getting no answers. I've tried this species in the past with a tank placed high in the fish house and a fair amount of sun penetrating it, in all-glass tanks and angle-iron tanks, without success. Some experts say harlequins breed better when the barometer is high, which is worthwhile considering. My successful breeding tank was placed in subdued light with a substrate of peat moss boiled in freshly collected rainwater. All the plants were rinsed in strong Dettol solution, then rinsed again under the tap.

Some years ago a German breeder told me that if one cannot get harlequins to spawn and all the males are stubborn the pair should be placed in a gallon of fresh tap water with a good handful of salt in it. The fish will tilt in the salt water and then rise to the top on their sides. They must then be netted out and placed back into their breeding quarters. This, of course, is shock treatment and the fish certainly go mad for the next hour and do everything but lay their eggs! This same breeder then went on to suggest that if they do not then lay their eggs they should be starved for a month. I did try this on one or two occasions, but it is malpractice that is best forgotten.

I hope this article will be of value to others who may have tried in vain to spawn this very difficult species. Patience and perseverance are

must have but these steps are necessary ones in the vital sequence for successful harlequin spawning:

1. Make sure that the fish are healthy and young.
2. Make sure they are a compatible pair and that the male is the larger of the two fishes.
3. See that the female is full of roe and willing to spawn.
4. The water must be soft and acid—and clean; this applies to the tank as well.
5. Check that the temperature is 80°–85°F.
6. See that the change-over to the soft water in

the breeding tank is very gradual.

7. Make sure that the fish are conditioned on liberal supplies of mixed, rich, live food (not in the breeding tank, of course).

If the spawning is successful the fry will hatch within 24 hours. Although the spawning will probably be on or under the plant leaves it is as well to inspect the whole of the spawning tank.

My first successful spawning was not a big one but from now on who knows what the future may hold. It's worth all the challenge for the satisfaction I derive from breeding the harlequin and, indeed, I feel I've reached a milestone in my fishkeeping.

Harlequins True and False



Which is the harlequin fish? *Rasbora heteromorpha* is the fish at the left and the right-hand fish is *Rasbora hengeli*, with no popular name of its own.

ALTHOUGH *Rasbora hengeli* is often seen in the tanks of aquatic dealers, almost invariably it is incorrectly labelled as the harlequin (*R. heteromorpha*). Since its introduction into this country *R. hengeli* has been regarded as a substitute for the true harlequin (and usually thought a poor substitute at that), for when young they are certainly very similar in appearance—the shape of the black triangle occupying the afterpart of the body being the most obvious distinguishing feature.

However, in adult specimens the two species are far more readily identified: *R. hengeli* develops a brilliant golden-copper sheen, which surrounds the triangle and extends forward over the flanks. Fins are clear, tinged with an even pale orange—contrasted with the patches of red and streaks of black on the dorsal and caudal fins of *R. heteromorpha*. The true harlequin is also slightly deeper bodied.

In fact *R. hengeli* is a very beautiful and impressive fish—in many respects superior to *R. heteromorpha*—and yet, overshadowed by its longer-established relative and lacking a common or popular name in its own right, it has never achieved the fame it deserves.

CLIFF HARRISON

Guppy World

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28-day ownership. In theory, it is sound legislation, an attempt to see that the fish entered in the show have been in the possession of the exhibitor for a minimum period of 1 month. Yet another outdated law that I feel would be almost impossible to prove should any judge be brave enough to challenge its validity.

I much prefer the specialist guppy societies' attitude to these two rules. On the date of birth, they acknowledge that certain types of guppy grow much faster than others and because they have recognised the average abhorrence towards keeping records held by most of us, have abolished the date of birth from their shows.

The 28-day ownership rule they have amended to 24 hours, only retaining this minimum amount of time to stop would-be exhibitors from purchasing fish from a trade stand at the show. This rule has been adopted by just a few exhibitors who, at benching, discovered that certain of the advertised show classes were under-subscribed. To put it in a nutshell, any guppy remotely resembling the stated variety would have won, being the only entry in that particular class!



R. C. ARMSTRONG introduces

Keeping the KILLIFISHES

KILLIFISH keeping and breeding represents a growing interest of aquarists, and it is hoped that this column will become a regular feature in *PFM*. I shall be dealing with breeding habits, egg incubation times, methods of fry rearing, up-to-date details of name changes and recent imports into this country. Queries that readers have will be answered in the text of future articles.

The Cyprinodontidae ('toothcarp') family can be split into two groups: (a) egg-laying toothcarps and (b) live-bearing toothcarps.

The Rivulinar are the major representatives of the first group. About 250 different species of Rivulinar are known at the moment, but in the future I am sure that many new species of rivulins will be described from Africa, South America and possibly the Far East.

Many varieties exist, which have developed in different ecological conditions; the pike-like *Aplochanna* and *Epiplatys*, which live near the surface, and the deep-bodied bottom-dwellers. Some of them, the South American forms, have long dorsal and large anal fins, and some of the species adapt themselves to live in temporary pools. These are the true 'annuals', which in some cases, in their natural environment, may live only a few months, surviving in egg form during the dry season. In recent years these types have been used by anti-malaria biological control stations to great effect.

To the aquarist the killifish is a highly coloured aquarium jewel with the added advantage that live eggs of killifish can be sent by mail all over the world. Many associations exist for the 'killi' enthusiast: the American Killifish Association, the British Killifish Association, the German Killifish Association and many other small groups.

These Associations exchange eggs, fish and knowledge gained by keeping

and breeding killifish. A great number of letters and recorded tapes speed back and forth every week in this very close-knit fraternity of enthusiasts.

Water conditions. Most killifish tolerate a wide range of water conditions: pH 5.5-7.5 and 4-10°DH. As long as the fish are not plunged from water at one end of the scale into water conditions at the other end, tank changing of fish and fry presents no problems. Temperature range is 66-78°F (19-26°C), the majority of the species preferring the lower temperatures. In odd cases species do survive in water temperatures in excess of 100°F (38°C).

Food and feeding. Live or frozen foods are taken with great relish and so are many of the dry foods. It is possible that wild fish may be acquired who do not recognise dry food as being edible. This is quite easily overcome by placing the fish in a tank with species that take dry food readily. Very soon the killie realises that it is missing out on something, when it sees the other inmates of the tank rushing about after dry food. It will eventually join in and, after a few days, one can move the fish back to its previous quarters.

Fry feeding. Killifish fry should be fed immediately on hatching as they absorb the yolk sac before hatching from the egg and are free-swimming immediately. Brine shrimp, micro-worms, micro-eel and very fine dry food can be given. Only a few killies (for example *Pseudoplatys amulianus*) need Infusoria when first hatched. The majority can eat food up to the size of freshly hatched brine shrimp.

Community aquaria. I have several community tanks that contain killifish. I find that the general rule is that the fish community should roughly be matched size for size and of an even temperament, and

the community tank should contain fishes that live in the upper strata, those that live in the middle layers and also bottom-dwellers. Killies that fit in well with these conditions are *Epiplatys*, for the upper strata, most of the *Aphyoseioides* types, for the middle layers, and a few *Aphyoseioides* and most of the South American bottom-dwellers, to complete the picture. Generally speaking killies are not plant-eaters and enjoy the conditions that many of the characins enjoy.

Breeding habits. Breeding habits of killifish can be used to differentiate species into five sections: (1) top-spawners; (2) plant- and switch-spawners; (3) bottom-spawners; (4) peat-divers; (5) ubiquitous types.

Top-spawners. The top-spawners and plant- and switch-spawners can be considered together for breeding details, the main difference being that the top-spawner will often lay its eggs out of the water. An example of this is that one will find *Aplochanna* or *Rivular* eggs on the top of the cork of spawning mops, well clear of the water, or on terrestrial mosses hanging down into the water, although the majority of their eggs are collected either from floating plants or close to the cork or in the upper third of the spawning mop.

The plant- and switch-spawner lays its eggs in a mop and will group most of them in the centre area of the mop. A few hours after being laid the eggs are quite hard enough to be removed by the fingers, from a lightly squeezed out mop or from plants.

The eggs are then placed in a clear hard plastic sandwich box containing water, about 1 in. in depth, taken from the aquarium in which the fish spawned. A second clear plastic box is made ready at the same time but containing 1 in. depth of the same water. The eggs are examined every day and eggs

with fungus removed by using tweezers. Eggs should be kept in an area giving a water temperature the same as that of the tank in which the eggs were laid.

If the plastic boxes are kept on the tank hood, watch out when you put the lights of the aquarium on or you will have hatched eggs; also if you float the containers in the tank water they will soon overheat if the lights of the aquarium are left on for long.

Hatching time is 7-10 days according to the species. As soon as the fish hatch transfer them either by dipping a teaspoon into the water, causing the fry to swirl into the spoon bowl, or by the method I now use—with a large hypodermic syringe with the needle replaced by 4 in. of air tubing. One can corner the fry in the plastic container and draw them into the 4 in. of air tubing, dip it into the second container and gently depress the plunger of the hypodermic syringe to expel the fish into the plastic container. Do not, repeat do not, feed fry in the egg container where they hatch; they must first be removed to the second container. Unwatered dead brine shrimp will support bacteria, which will in turn attack the unhatched eggs, so hatched fry must be removed and fed in another container.

As fry grow in the second container remove them to larger quarters or their growth will be stunted; larger fry will also attack and eat the fry that have just been placed in with them from the egg container. I use small apple snails (*Ampullaria* sp.) in the container with the fry, as these will eat any food left over by the fry and assist in reducing any water pollution.

Next month: the Bottom-spongers and Peat-directs.

The GOLDFISH SOCIETY OF GREAT BRITAIN are to hold two major events each year in future, to be known as: the Open Show (on the same lines as the present Convention but without a speaker and with maximum viewing time for the exhibits) and a Convention to include an exhibition of some kind with a film or lecture. An auction will certainly be held at the Open Show and possibly at the Convention. This year the Open Show will be held on 23rd September at the Adult School, Sutton, Surrey.



721 ENTRIES made a record for BELLE VUE A.S. at their Open Show recently. The Committee wish to thank judges Mr. C. Walker, Mr. G. Holmes, Mr. P. Moorhouse and Mr. I. Wood. Apologies are made for the lack of heating, due to circumstances beyond the Society's control. The award for the best fish in the show went to Mr Atwood and Mr Williams (Bubery Select, 82 points) and Merseyside gained the most points (43). The ladies award for highest number of points gained was made jointly to Miss Gregory (Neison) and Miss Miller (ind.). A Williams of North Staffs. won the Junior trophy. Mr Charlton of Merseyside was the competitor with the highest total of points. Breeders trophy, Mr K. Barlow (Ashton, 77). Pairs trophy, Mr D. Charlton (58). Coldwater trophy, Mr J. S. Hall (Aireborough, 78). Exhibitor with most entries, Mr J. S. Hall (36).

Livebearers. Guppies: 1, Mr E. Smith (Sheffield, 78, section winner); 2, Mr L. Ludbetter (Blackpool, 74); 3, Mr S. Mitchell (Fleetwood, 73). Swordtails: 1, Mr F. Cook (Bishopcleeve, 87); 2, Mr & Mrs Cobb (Belle Vue, 74); 3, Mr A. Dorby (Huddersfield, 73). Platies: 1 & 2, Mr J. Murray (Dunfermline, 73); 3, Mr G. Ward (Doncaster, 74). Molli: 1 & 2, Mr J. Igoe (Sherwood, 77, 78); 3, Mr L. Ludbetter (73). A.S. livebearers: 1 & 2, Mr J. S. Hall (84, 85); 3, Mr N. Farnon (R. Select, 87).

Characins. Small: 1, G. W. & A. K. Jackson (B.V., 73); 2, Mr B. Wilson (Merseyside, 73); 3, Mr A. Thomas (Luton, 76). Large: 1 & 2, Atwood & Williams (B. Select, 81, section winner, 80); 3, Mr B. Smith (Merseyside, 74). **Anabantids.** Dwarf: 1 & 2, Mr D. Charlton (Merseyside, 71, 69); 3, Mr & Mrs Kivogian (Doncaster, 64). Fighters: 1, Mr & Mrs Lord (Valley, 74); 2, Mr & Mrs Roberts (Valley, 71); 3, Mr J. S. Hall (74). Large: 1, Mr E. Charlton (Merseyside, 77, section winner); 2, Mr F. Mulla (Merseyside, 74); 3, Mr R. Warrington (Sheffield, 72).

Mintnows. Killies: 1, Mr & Mrs Thomas (B.K.A., 74); 2, Mr M. Fagan (Oldham, 73); 3, Mr D. Farnham (B.K.A., 74). Danios and minnows: 1, Mr J. Smith (Sheffield, 74); 2, Master A. Kaye (Top Top, 74); 3, Mr R. Holmes (D. Regent, 74). Rudelets: 1 & 2, Mr D. Charlton (76, section winner, 75); 3, Mr & Mrs D. Stone (Chatterfield, 74). **Sharks and fowls.** Sharks: 1, Mr & Mrs Williams (N. Staffs., 77, section winner); 2, Mr B. W. Carter (Merseyside, 78); 3, Mr D. Norris (Oldham, 72). Fowls: 1, Mr & Mrs Fyfe (Carnegie, Bay, 78); 2, Mr R. Patten (74); 3, Mr & Mrs Cobb (B.V., 74). **Botias and loaches.** Botias: 1, Mr E. Smith (76, section winner); 2, Mr R. Thomas (Luton, 74); 3, Master M. Igoe (Sherwood, 72). Loaches: 1, Mr J. Bennett (Middleham, 71); 2, Mr J. Higgins (Warrington, 67); 3, Mr & Mrs D. Clarke (Manchester Bay, 63).

Barbs. Small: 1, Mr F. E. Gregory (Oldham, 76, section winner); 2, Mr A. Gregory (Oldham, 78); 3, Mr I. Bowick

(74). A.S.: 1, Master J. Williamson (Huddersfield, 74); 2, Day Barber (N. Staffs., 69); 3, Mr J. Higgins (Warrington, 58). **Cichlids.** Dwarf: 1, Mr L. Ludbetter (77, section winner); 2, Mr K. Jackson (N. Staffs., 76); 3, Mr K. Walsh (Blackpool, 74). Angels: 1, G. W. & A. K. Jackson (B.V., 74); 2, Mrs M. Igoe (Sherwood, 74); 3, Mr L. Ludbetter (71). A.S.: 1, Mr D. Robertson (D. Regent, 75); 2, Mr R. Dixon (Blackpool, 75); 3, Mr S. Patten (74).

Catfish. Corydoras: 1, Atwood & Williams (B. Select, 78); 2, Mr & Mrs Cobb (B.V., 75); 3, Mr K. McCoy (Middleham, 75). A.S.: 1, Mr E. Jackson (Sheffield, 75, section winner); 2, Mr B. Bailey (Sherwood, 73); 3, Mr D. Charlton (74). **Fishes.** Lion: 1 & 2, Mr L. Ludbetter (74, 74); 3, Master A. Kaye (66). Eaglefish: 1 & 2, Mr D. Charlton (75, section winner, 76); 3, Mr F. Martin (Oldham, 74). **Brederers.** Livebearers: 1, E. & W. Barber (Ashton, 87, section winner); 2, Master A. Kaye (74); 3, Mr J. Higgins (Warrington, 71). Eaglefish: 1, Mr A. Charles (Sheffield, 75); 2, Mr & Mrs Wells (Doncaster, 74); 3, Mr D. W. Coates (Merseyside, 71).

Coldwater. Common goldfish: 1, Mr & Mrs Cobb (B.V.); 2, Mr J. S. Hall; 3, Mr & Mrs H. Wadding (Latham). Fancy goldfish: 1 & 2, Mr J. S. Hall (78, section winner, 75, 74). A.S.: coldwater: 1 & 2, Miss J. Miller (64, 74, 73); 3, Charles Bradburn (74). **Bananas.** A.S. tropical livebearers: 1, Master A. Williams (N. Staffs., 76, section winner); 2, Master F. Bailey (Sherwood, 75); 3, Master A. Moss (Barnsleyfield, 73). A.S. egg-laying specialist: 1, Master R. Black (Fleetwood, 74); 2, Master F. Cobb (B.V., 74); 3, Miss A. Gregory (Dunfermline, 73). A.S. coldwater: 1 & 2, Master A. Kaye (74, 73); 3, Masters J. & S. Jones (Sheffield, 74). **A.S. A.S. tropical fish:** 1, J. W. & A. K. Jackson (B.V., 74); 2, Mr & Mrs Ankers (71); 3, Mr & Mrs Cobb (74). **Tropical fish:** 1, D. & R. Standing (Luton, 81, section winner); 2, P. & H. Hatcher (Luton, 80); 3, Mr K. Adams (74).

BEDWORTH A. & P.S. were the hosts when the first of the MIDDLELAND AQUARIST LEAGUE shows for 1972 was held. Results were:

Anabantids: 1, Mr C. Pratt (Bishopcleeve); 2, Mr T. Parry (Loughborough); 3, Mr E. Steady (Coventry). Livebearer pairs: 1, Mr & Mrs Hill (Nantawan); 2, Mr B. Todd (Bishopcleeve); 3, Mr M. Law (Bedworth). Loaches: 1, Mr P. Dewar (Coventry, best in show award); 2, Mr E. Steady (3); 3, Mr J. Anson (Nantawan). Barbs: 1, Mr S. Harwell (Nantawan); Mr & Mrs Deakin (Nantawan); 2, Mr P. Hoads (Coventry). Open classes. Characins: 1, Mr E. Burt (Levensington); 2, B. & F. Burt (Coventry); 3, Mrs R. Parry (Loughborough). Cichlids: 1, Mr R. Todd; 2, Mr S. Harwell (Nantawan); 3, Mr Atwood & Mrs Williams (Babery).

League placings are now: Bedworth (45 points), Coventry (48), Nantawan (41), Loughborough (50), Hinckley (13), Rugby (11).

AT the KEIGHLEY A.S. Open Show, Aireborough & D. A.S. were the society gaining most points and they received the Barraclough trophy. The S. Gear trophy for the Keighley member gaining the best exhibit was awarded to Master Beckett. 747 entries were received and the following awards made:

Guppies: 1, Mr Shanks (Mount Pleasant); 2 & 3, Mr Ludbetter (Blackpool). Sword-

tails: 1, Mr F. Cooke (Lagoon Tropicals trophy, Blackburn); 2 & 3, Mr N. R. Gibson (Huddersfield); Mollies: 1 & 2, Mr J. Igoe (Sherwood); 3, Mr Ledbetter; Platys: 1, Mr C. Ward (Doncaster); 2, Mr & Mrs Gates (Castleford); 3, Mr E. S. Claxson (Castleford); A.O.V. livebearers: 1, Mr Hepinstall (Castleford); 2 & 3, Mr J. S. Hall (Aireborough).

Barbs over rosy: 1 & 2, Mr & Mrs Cohen (Castleford); 3, Mr Rowbottom (Hyde). Barbs up to rosy: 1, Mr A. Barrett (Wellbeck); 2, Mrs Rhodes (Four Star); 3, Mrs Dourden (Independents). Characins up to bleeding heart: 1, Mrs Smith (Keighley); 2, P. & H. Batchelor (Loyne); 3, Mr & Mrs Cohen. Characins over bleeding heart: 1, Mr H. Smith (winner of Society trophy, Keighley); 2, Mr I. Rowbottom (Hyde); 3, D. & R. Stander (Loyne). Rasboras, danios, minnows: 1, Mr & Mrs Booker (Morecambe); 2, Mr A. S. Allison (York); 3, Mrs P. Hepinstall (Castleford). Sharks and flying foxes: 1, P. & H. Batchelor; 2, Mr G. Thickbroom (Wellbeck); 3, Mr & Mrs Gates (Castleford).

Fighters, true colour: 1, Mr & Mrs Kivington (Doncaster); 2, Mr J. S. Hall; 3, Mr J. G. Robertson (Mount Pleasant). Fighters, multi-colour: 1 & 2, Mr & Mrs Roberts (Valley); 3, Mr & Mrs Kivington. Anabantids up to three spot: 1, Mr J. Whitley (Hinds trophy, Aireborough); 2, Mr B. Nagar (Keighley); 3, Mrs Rhodes. Anabantids over three spot: 1, Master P. Beckett (Keighley); 2, Mr J. S. Hall; 3, Mr M. Woodley (Dukeries). Toothcarps: 1, Mrs Atkinson (Tingley Tropicals trophy, Harrogate); 2, Mrs Beckett (Keighley); 3, Mr & Mrs Blades (Crosswell).

Angels: 1, Mr & Mrs Kivington; 2, Mr E. Milne (Doncaster); 3, Mr & Mrs Blades. Dwarf cichlids: 1 & 2, I. & R. Hepinstall; 3, Mr B. Morrell (Privates). Cichlids over *kribensis*: 1, Mr I. Rowbottom; 2, Mr & Mrs Gates; 3, Mr P. Kenyon (Belle Vue). Corydoras: 1, Mr A. S. Allison; 2, Mr & Mrs Waring (Lytham); 3, Mr J. Mosley (Keighley). Loaches and botias: 1, Mr J. G. Robertson (Eastburn Tropicals trophy); 2, Mr T. Smith (Sheffield); 3, Mr Coward (Independ.). A.O.V. catfish: 1, P. & M. Shipley (G & A Taylor trophy, Gooles); 2, Mr & Mrs Gates; 3, Mr A. S. Allison. A.O.V. tropical: 1, Mr D. Kennedy (Pet World trophy, Keighley); 2, D. & R. Stander; 3, P. & H. Batchelor.

Breeders. Livebearers: 1, Mr G. Thickbroom (Exotic Aquaria trophy); 2, Mrs S. Gibson; 3, Mr & Mrs Cohen. Egglayers: 1, Mr A. Curbin (D. & J. Mosley trophy, Swillington); 2, Mr Sooley (Huddersborough); 3, Mr & Mrs Cohen. Pairs. Livebearers: 1, Mr Ledbetter; 2, Mr Shanks; 3, Mr & Mrs Lofthouse (Huddersfield). Egglayers: 1, I. & R. Hepinstall; 2, E. & S. Claxson; 3, Mr & Mrs Cohen.

Common goldfish: 1, 2 & 3, Mr J. S. Hall. Fancy goldfish: 1, 2 & 3, Mr J. S. Hall. Shubunkins: 1 & 2, Mr J. S. Hall; 3, Mr A. Kaye (Top Ten). A.O.V. coldwater: 1, 2 & 3, Mr J. S. Hall. Juniors. A.V. livebearers: 1, Master S. Harrison (Society trophy, Sherwood); 2, Miss Gregory (Nelson). A.V. egglayers: 1, Master A. Thomas (Castleford); 2, Master P. Beckett (Keighley); 3, C. & G. Broadhead (Huddersfield). A.V. coldwater: 1, Master G. Thickbroom (Wellbeck); 2, Master P. Beckett; 3, Master A. Kaye. A.V. marines (two entries): 1, Mr C. Stewart (Nelson); 2, Mr Lawson (Aireborough).

Mr I. Rowbottom of Hyde received the best in show award, the gold pin, the A.Y.A.S. Diploma and the Seven Seas trophy for his entry in the 'cichlids over *kribensis*' class.

THE Inter-society quiz and table show competition held between NORTHWICH & D. A.S. and

FEDERATION



NEWS

Championship Classes Eligible for the 1972 Supreme Championship

1972 Championship Class Results

Class D Cichlid (Tottenham & D. A.S. Show) Mr A. Kinsey		Class R Platy (Runnymede A.S. Show) Mrs D. Cruickshank	
7th May	Roehampton A.S.	Dc*	Rift Valley cichlid
7th May	Ilfracombe & D. A.S.	Ya*	Tropical marine
13th May	Southend, Leigh & D. A.S.	S*	Mollie
21st May	Yeovil & D. A.S.	Nb-m	Pairs
28th May	Corby & D. A.S.	H*	Corydoras & Brochis
4th June	Half Moon A.S.	X.O-T	Breeders
11th June	High Wycombe A.S.	K*	Danio & W.C.M.M.
17th June	Riverside A.S.	T*	a.o.s. Livebearer
24th June	Anson A.S.	V*	Twintailed goldfish
25th June	Gosport & D. A.S.	Ea*	Fighters
2nd July	Exeter & D. A.S.	Yb*	Coldwater marine
8th July	Basingstoke & D. A.S.	Cb*	Nannostomus & Poecilibrycon
22nd July	Port Talbot & D. A.S.	W*	a.o.s. Coldwater
5th-12th August	Portsmouth A.S.	Eb*	Colisa etc.
6th August	Tonbridge & D. A.S.	L*	Loach
12th August	Bracknell A.S.	J*	Rashora
19th August	S.P.A.S.S. Kingston	U*	Singletailed goldfish
26th August	Plymouth A.S.	No-t	Pairs
2nd September	Bethnal Green A.S.	O*	Guppy male
3rd September	Wellingborough & D. A.S.	B*	Barbs
10th September	Weymouth & D. A.S.	XB-M	Breeders
16th September	Hounslow & D. A.S.	F*	Egg laying toothcarps
24th September	Torbay A.S.	Ca*	Hypheosobrycon etc.

* Winners of Federation Championship Trophies in classes for single fish automatically become eligible for the Supreme Championship Trophy Competition (to be staged at The AQUARIUM SHOW '72 at the Royal Horticultural Society's Old Hall, London, S.W.1, 27th-29th October). Six awards are made at this Competition.

The Dinner Dance and Social of the FEDERATION OF BRITISH AQUATIC SOCIETIES, held in London in April, was a resounding success. Not only was it a 'sell-out' but those present, who included coach parties from Kent, Berkshire and Hertfordshire, gave clear evidence of enjoying every minute of it. Chairman Mr Bob Esson, in welcoming the Federation's guests, emphasised that 'The Federation is the membership'—and the membership had come prepared to enjoy the historic occasion—the first venture of its kind in the 34 years of the Federation's history. But as usual with an event of this kind it was the work put in by the Council Officers both before and during the occasion that really determined the evening's success; and here a special mention must be made of the efforts of 15-year-old Miss Moyra Sherwin, who most ably took over the last-minute arrangements for the dinner when her father, Mr Reg Sherwin, fell ill. A telegram of good wishes from Mr George Cooke, on behalf of the Federation of Northern Aquarium Societies was very much appreciated and the plea of Mr Anthony Evans, responding on behalf of the guests, would surely be endorsed when he urged the Council not to wait another 34 years before the next occasion of this kind.

Chester & D. A.S. was finally resolved with an overall victory for Northwich. The quiz took the form initially of two leagues with each society providing two teams per league. Northwich gained 65½ points as against Chester's 39½. The table show was judged by Mr B. Nicholls of Middleton A.S. The best fish in show award was gained by L. & D. Thorne (Northwich) with an *A. ramirezi* entered in the dwarf cichlid class. Other class winners were:

Platy: Mr C. Bowyer (C); barbs under 3 in., L. & D. Thorne; barbs over 3 in., L. & D. Thorne; killifish, L. & D. Thorne; catfish, Mr P. Hyland (N); rasboras, Mr R. Dutton (C); carps & minnows, L. & D. Thorne; swordtails, L. & D. Thorne; pairs, egglayers, C. Bowyer (C); pairs, livebearers, L. & D. Thorne; a.o.v., Mr H. Connolly (N); furnished mini-jar, Mr E. V. Stokes (C).

MR. J. BLAND, secretary of **DERBY REGENT A.S.**, reports that much is happening in the Society. A recent lecturer, Mr Ron Tench, arrived accompanied by his 17 in. albino *Clarias* catfish. During the 5 years he has had it, Mr Tench reported that it has twice jumped out of its tank, once remaining out of the tank all night, and it has even survived a violent electric shock received when it smashed its heater. Two first-class lectures in April are to be followed by the high spot of the year—the annual Open Show on 14th May. The Show has been extended into an extra building at the Sherwood Forester's Recreation Centre and there should be plenty of seats this year. The Mayor has kindly agreed to open the proceedings and four of the country's top judges will be present.

NEWS from **KINGSTON & D. A.S.** highlights their very successful annual dinner and dance and their plans for their joint open show with **SOUTH PARK A.S.S.** in this their 25th anniversary year. At the annual dinner Mr A. Barber, one of the founder members of the Society, and his wife were given life membership. Mr R. Esson, chairman of the FBAS, presented the annual awards to the following: characins and pairs, Mr M. West; rasboras and plants, Mr D. J. Mackay; cichlids, Mr B. Pawley; barbs, Mrs D. Cruickshanks; breeders, livebearers and egg-layers, Mrs D. Barrett; toothcarps, Mr R. Longstaff; guppies, Mrs C. Sawford; novice table show shield, Mr D. King; coldwater

The FEDERATION OF NORTHERN AQUARIUM SOCIETIES propose to produce a quarterly Newsletter in future and just to start the ball rolling, Mr D. Glen, the editor puts forward the following as food for thought: "In recent times there appears to have been a marked decrease in the number of judges available for Open Shows and to complicate matters the number of Open Shows has increased considerably. I wonder if the time has come for the idea of an Area Open Show to be considered as a feasible proposition. . . . It should increase the number of entries, widen the scope for prizes etc., and would definitely improve the achievement of winning 'Best Fish in Show'."

breeders table show shield, Mr T. Longstaff; and Mr Gerry Greenhalf received the awards for labyrinths, catfish, livebearers, table show shield, FFM trophy and member of the year.

On the subject of the combined Open Show, P.R.O. Mr N. E. Sawford writes "This is the second year that the two societies have run a show together. Last year was the first venture in bringing together two distinct sections of the fish game, which seem for too long to have

been assumed by many to be practically different hobbies. . . . There has now emerged a new approach. South Park and Kingston had toyed with the idea of a combined show for a long time and last year it was put into practice with success".

THURROCK A.S. report very good attendance at meetings in 1972. Members have been presented with a varied programme, some highlights being the return of Mr Pye giving another of his interesting and knowledgeable talks on plants, a crossword from member Mr Jim London and the informative comments given by Mr Ed Nicol after an evening of practical judging by members. At each meeting a table show was held; Mr P. O'Bryan, Mr J. London and Mr K. Appleyard were congratulated on successes gained at the East Dulwich Open Show. The society are particularly sorry to lose the services of Mr Derek Durrant as member, officer and very competent aquarist. Owing to the re-location of his job Mr Durrant has reluctantly decided that he can no longer carry out the arduous task of show secretary. The Society extends good wishes for the future and sincere thanks to both Mr Durrant and his wife.

In Brief . . .

. . . MR J. GIBSON and Mr M. Abraham, chairman and secretary of the Pisces A.C., were among 46 members and guests of **BOURNE-MOUTH A.S.** who heard Mr Fancy of the local Water Board talk on the treatment and distribution of the local water supply, illustrated with a colour film. Mr T. Hatton of Weymouth judged the table show, class winners being: danios, rasboras and minnows, Mr J. V. Jeffery; owner-bred pairs, livebearers except guppies, Mr J. Scott-Morgan.

. . . WHEN Mr Armstrong (BKA) lectured to **BRIGHTON & SOUTHERN A.S.** he took along many specimens of killifish for members to see including eggs nearly ready to hatch. He also took micro worm and fruit fly cultures and described how to keep them

multiplying. Members were so interested that Mr Armstrong has agreed to a return visit later in the year. The table show class for large cichlids was won by Mr R. Smithers and that for dwarf cichlids by Mr M. Whittington.

. . . **STOCKSBRIDGE & D. A.S.** is now to be known as **DON VALLEY A.S.** Meetings are still held in the Friendship Hotel, Stocksbridge on alternate Thursdays.

. . . **SECRETARY of PRIVATEERS A.S.**, Mr F. W. Coles (18 South Hill Drive, Gilstead, Bingley, Yorks.) informs us that the new date of the club's inter-society show, cancelled because of power cuts, will be announced shortly.

. . . THERE was a record attendance, including several visitors who became new members, when Mr P. Carter of Preston Aquarium lectured to members of **WEYMOUTH & D. A.S.** The Society plan to double membership this year and already it seems that a hall larger than the

Small Sydney Hall now in use will be needed. Mr Jack Jeffries of Bournemouth A.S. judged the table show and awarded firsts to Mr M. Squibb (82, *Corydoras*) and to Mr A. Worth (78, a.o.v. catfish).

... **SOUTH LEEDS A.S.** report that they are still holding very successful meetings on the first and third Wednesday of each month at Cockburn High School, Leeds. Rumours that the Society may be folding or combining with any other society are quite untrue. New members are very welcome.

... **MR F. COLEMAN**, Whitley Bay, judged the **BLYTH T.F.S.** bi-annual show and made the following awards. Seniors: 1, Mr N. Buglass (964, best fish in show with Mr Clark); 2, Mr A. Lisle; 3, Mr B. Aynaley. Juniors: 1, Master Sharp (1498); 2, Master Tulip; 3, Master Popley.

... 'HOW to set up a marine tank—by candlelight' inadvertently became the title of the talk given by Mr D. Deamer and Mr H. Humphries to members of **STEVENAGE A.S.** during the power cuts, but the lecturers were undismayed and all present enjoyed the evening.

... A NEW society with a difference is **HUMBERSIDE A.S.** formed by a group of enthusiasts in Hull. A limited membership of 35 adults and 12 juniors meet weekly in what is hoped will be an informal atmosphere as possible, since it is felt that this is what people really prefer. The Society would be pleased to hear from other clubs and correspondence should be addressed to the secretary at 11 Claremont Villas, Reynoldson Street, Hull.

... VERY good support was given to the quarterly table show held by **BRISTOL A.S.** Judges Mr Ball, Mr Fowler, Mr Russell and Mr Short from Bath A.S. answered members' questions. Mr H. T. Jago won the first four places in the fantail class, and Mr C. H. Truman those in the guppy class. Goldfish: 1 and 2, Mr W. Ham; 3, Mr E. Bowden. Cichlids: 1, Mr A. Gilbert; 2, Mr E. Bowden; 3, Mr A. H. Morgan. Characins: 1, Mr A. H. Morgan; 2, Mr A. Gilbert; 3, Mr J. Phillips.

... **KEIGHLEY A.S.** members enjoyed a lecture by Mr F. W. Coles on genetics. Class winners in the

SHEFFIELD & D. A.S. now have available a slide show, with taped commentary, on killifish. For details, please contact the secretary, Mrs S. Blizard, 62 Abwick Road, Sheffield S12 2GE.

table show were: Fish of the month (cichlids) Mr Taylor; a.o.v., Mr Sagar; novices a.o.v., Mr Illingworth; junior a.v., Master Beckett.

... **THE** Committee came to the rescue, when the taped slide show failed to arrive at a meeting of **HARROGATE & D. A.S.**, by supplying a panel of three to answer members' questions. Plans for the year, it is hoped, will include a visit to Morecambe Marmeland, a visit to a trout hatchery and a trip to the B.A.F. in Manchester.

... **HAVANT & D. A.S.'s** immaculate new venue at the Emsworth Day Centre, South Street, Emsworth is well appreciated and has already resulted in increased attendance. Recent events have included slide lectures by Mr P. Ginger of Uxbridge on barb and by Mr C. Brown on egg-laying toothcarps. Winners of the table show for livebearers were: mollies, Mr S. Crabtree; platys and swords, Mr W. Blotfield; guppies, Mr A. Ford; a.o.v., Mr S. Crabtree.

... **IN** the lead for the Endeavour trophy after two table shows under the new **WREXHAM T.F.S.** pointing system is Mr F. Oliver with 166 points (2, Mr T. Pound, 161; 3,

The MERSEYSIDE A.S. official journal recently printed a comment from member Mr Fred Mulla on the subject of fees for fish entries at open shows. He points out that in the many shows he has visited fees have altered little in the last 50 years but the number of fishes exhibited has steadily increased. The host society is delighted at the revenue obtained but there has been a fall in the standard of fish entered. Mr Mulla feels that a price increase might keep unworthy fishes off the show bench and improve standards, would ease the judges' task while not affecting the host society's revenue. Any comments from other societies about this

Miss V. Jones, 155). Miss V. Jones won first, second and third in the junior table show. At this meeting the talk was given by Mr K. Hobley of Chester on marine life.

... NEW honorary president of **CASTLEFORD & D. A.S.** is Mr Derek Newman of Aquaria International. E. and S. Clowes won the first, second and third places and the best in show award for the small cichlid class in the table show.

... **MR TERRY CRUICKSHANK** was the guest speaker at the meeting of **BETHNAL GREEN A.S.** in March and gave an informative talk on keeping, breeding and showing livebearers.

... **VISITING** societies to the **CHESTERFIELD & D. A.S.** fish auction made it a great success, with 178 fishes and 124 plants being auctioned by Mr G. Sibson. The final results of a two-leg inter-society competition with **CRESSWELL A.S.** resulted in a draw.

... 45 members attended the 'best fish in club' meeting of **RHONDDA A.S.** It was a good opportunity to see more fishes benched than usual and the winner of the tankard was Mr T. Davies. During the judging members heard an excellent lecture on plants by Mr Gwyn Ellis Assistant Keeper of the National Museum of Wales.

... **WHITLEY BAY A.S.** members thought themselves fortunate to hear an illustrated talk by local expert Mr Gordon Lowthian on breeding and raising cichlids at the first of two enjoyable club meetings in March. At the second, Mr John Robertson, open show fish judge, spoke on the various aspects of judging, and then judged the jar show and the competition for the best poster advertisement for the Society. This was won by Miss Pauline Stocks of Cullercoats.

... **SECRETARY** of **BLACKPOOL & FYLDE A.S.**, Mr Gordon Howard, reports that the Society is well pleased with the recent influx of really keen, new members all of which augurs well for the club's Open Show on the 6th August.

... **MEMBERS** of **TORBAY A.S.** are urged to look out their waders and tackle for the beachcombing picnic that is planned for the

summer. Enthusiasm for it has already been roused by the talk that Mr Lew Doubleday of the BMAA gave on tropical, Mediterranean and native marine fishes. Members are also well informed on goldfish after coldwater judge and breeder Mr Ron King gave a history of the development of the common goldfish.

... THE FBAS was well represented at the March meeting of the MID-SUSSEX A.S. as while FBAS chairman Mr Bob Eason spoke on breeding goldfish, Mr Frank Tomkins (chairman, Judges and Standards Committee) judged the 43 entries in the sexed pairs table show. This year the Society introduces its new Breeder's Diploma Scheme. To win Master Breeders Awards members will need to breed and raise to 6 months four different livebearers and 11 different egglayers including danios, barbs, cichlids, killies, labyrinth, characins and rasboras. In early May (7th) the society holds its third annual Fish Exhibition at the Park Centre, Burgess Hill.

... BRADFORD & D. A.S. propose to hold an Anniversary Exhibition, open to the general public and intended to appeal to the non-member fishkeeping fraternity. In the meantime members are enjoying informative lectures such as that given by Mr Hemmingway of Batley, an expert in breeding the rarer characins, and by Mr C. Binns on foods and feedings.

... COLDWATER fish breeding should be on the increase in the Coventry area after the talk given by Mr Tony Roberts of Birmingham to members of COVENTRY POOL & A.S. Mr Roberts emphasised that the golden rule for rearing quality fish is space—space even more than food ensures growth. In keeping with the meeting the best fish in the show was a common goldfish entered by Mr F. E. Watts.

... MERSEYSIDE A.S. have solved the problem of a member gaining 'best in show' at every table show with one particular fish. It has been decided that when a fish gains 'best in table show' award it is unable to gain best in show again but can be shown with the possibility of getting a first in its respective class. On the last table show of the year the five 'best in the show' winners will be judged and a champion picked from them.

Dates for Your Diary

Dates preceded by ★ are of shows to which FBAS Championship Classes are allocated.

6th May. AQUARIUS FILM SHOW (M. Carole and M. Watts) organised by HEMEL HEMPSTEAD A.S. and Kodak Ltd. 7.30 p.m. at Kodak Ltd., Maylands Avenue, Hemel Hempstead, Herts. Tickets (10 p) from Mr A. Tuffs, 22 Fir Tree Close, Hemel Hempstead, Herts.

7th May. DUKERIES A.S. Open Show. The Winifred Portland Technical Grammar School, Sparken Hill, Worksop. Schedules: Mr M. Woodley, 20 Park Street, Worksop, Notts.

★7th May. ROEHAMPTON A.S. 1st Open Show. Alton Parish Hall, Alton Road, Roehampton, London, S.W.15. Details: Mr D. Lambourne, 7 Wheeler Court, Plough Road, London, SW11 1AN (phone 01-223 2550).

7th May. MID-SUSSEX A.S. annual Fish Exhibition, Park Centre, Burgess Hill. Details: Mr J. Reeve, 35 Bumbolds Lane, Haywards Heath, Sussex.

7th May. ASHTON-UNDER-LYNE & D. A.S. Open Show. Jubilee Hall, Thadfield, Cheshire. Schedules: Mr D. Trice, 25 Burnside Crescent, Ashton-under-Lyne.

★11th May. SOUTHBEND, LEIGH & D. A.S. Open Show. St Clements Hall, Leigh-on-Sea, Show secretary: Mr R. D. Orford, 8 Blenheim Chase, Leigh-on-Sea, Essex.

11th May. TROWBRIDGE & D. A. & P.S. Open Show. Nelson Hudson Girls School, Trowbridge. Schedules: Mr W. S. Burton, 17 Polsham Road, Trowbridge, Wilts.

11th May. BASS Meeting. Fellows Lecture Hall, London Zoo, Regent Park, 2.0 p.m. All welcome. Tickets from Mr F. Keen, Highcliff, Old Hill, Woking, Surrey.

14th May. HULL A.S. Open Show.

14th May. MERSEYSIDE A.S. Open Show. The British Legion Club Ltd, Holyoke Hall, 2 Crosswood Avenue, Liverpool L18. Details: Mr B. T. Hill, 121A Roughedge Hey, Central Farm, Liverpool L25 1RY (phone: 051-484 8613).

14th May. DERBY REGENT A.S. Open Show. Sherwood Foresters Recreation Centre (Normanton Barracks), Chansons Road (A111), Derby (follow R.A.C. signs). Show secretary, Mr R. G. Harlow, 180 Mansfield Road, Derby (phone 44712).

22nd May. NORTHWICH & D. A.S. Open Show. Hartford Secondary 207 School, off Chester Road, Hartford. Details: Mrs D. J. Thorne, 28 Whitegate Road, Winsford, Cheshire; phone Winsford 2380.

22nd May. LEICESTER FISHKEEPER'S CLUB Fishkeeping Exhibition. St Marks Church Hall, Belgrave Road, Leicester. Details: Mr D. Freeman, 30 Sheffield Street, Leicester LE2 0GX.

★22nd May. YEovil & D. A.S. Open Show. The School Hall, Church Street, Martock, nr. Yeovil. Full details later. Show Manager: Mr D. Phipps, 5 Hill Terrace, Boveyhitton, Martock, Somerset.

28th May. CROYDON A.S. Open Show. Sir Philip Games Reception Centre, Moor-

land Avenue, Croydon, Surrey. Details: Mr A. J. H. Smith, 3 Hothhead Way, Wallington, Surrey.

27th-28th May. FGA INTERNATIONAL GUPPY OPEN SHOW. Globe Farm Community Centre, Globe Farm Road, Stockton, Birmingham. Open to viewing, Sunday 28th, 3-6.00 p.m. Details: Mr D. R. Beacham, 17 Fildes Close, Woodrow Street, Redditch, nr. Birmingham.

28th May. BOSTON A.S. Open Show. Blackfriars Theatre, Spence Road, Boston, Lincoln. Details: Mr S. Noble, 175 Wood Farm Road, Boston, Lincoln.

★28th May. COBBY & D. A.S. Open Show. Cobby Civic Centre, Schedules: Mr A. Slow, 176 King Street, Kettering, Northants.

4th June. PRIORY A.S. Open Show. Mariners Lane Boys Club, Tynemouth, Northumberland. Schedules: Mrs E. McCrystal, 47 South Terrace, Waltham, Northumberland.

4th June. ACCRINGTON & D. A.S. Open Show. St John Ambulance Drill Hall, Bull Bridge, Accrington. Schedules: Mr S. Walsh, 123 Lamtrack Road, Blackburn, Lancs.

★4th June. HALF MOON A.S. Open Show. Details: Mr K. Greenley, 5 Robson Street, Haslemere Hill, Billingham, Teesside.

4th June. GKN POND & AQUARIUM SOCIETY (regular) Open Show. GKN Canteen, Salisbury Street, Darlington, Staffs. Entertainment for all the family. Schedules: Mr K. Rowley, 115 Welberhampton Street, Darlington, Staffs.

4th June. LOUGHBOROUGH & D. A.S. Open Show. Loughborough Sports Centre, Grandby Street, Loughborough. Details: Mr T. H. Perry, 447 New Ashby Road, Loughborough, Leics.

4th June. BOURNEMOUTH A.S. Open Show. Bournemouth Community Centre, Fellbarn Park, Bournemouth. Schedules (after 1st May): Mr J. V. Jeffery, 39 Rosemead Avenue, Southbourne, Bournemouth, BH1 4JF. No entries accepted at door.

4th June. LINCOLN & D. A.S. Open Show. Details: Mr H. Kuhn, 44 Score Street, Lincoln.

10th June. LLANTWIT MAJOR A.S. Open Show. Llanywit Major Town Hall. Details: Mr A. Robertson, 84 St Mary's Avenue, Barry, Glam.

10th June. BISHOPS CLEEVE A.S. Open Show. Tythe Barn, Evesham Road, Bishops Cleeve, Cheltenham, Glos. Further details: Mrs M. Scriven, 27 Warden Hill Road, Cheltenham, Glos.

★11th June. HIGH WYCOMBE A.S. Open Show. Lane End Hall, Lane End, High Wycombe, Bucks.

11th June. THORNE A.S. Open Show. The Grammar School. Details: Mr H. C. Jewison, 94 Hawthorn Road, Thorne nr. Doncaster; phone 813041.

11th June. W.K.F.R.A.S. Open Show. The Town Hall, High Street, Colindale. Details (after 1st April): Mr R. J. Trimmans, 27 Melville Road, Kingshurst, Birmingham; 021-784 7343.

★17th June. RIVERSIDE A.S. Open Show. St Saviours Church Hall, Cobbold Road, off Askew Road, Leaden, W.12. Schedules (later): Mr M. Goss, 3 Bishops Court, Flaxton Road, Amersham, Bucks.

18th June. F.G.A. LANCASTER SECTION Open Show. Gregson Institute, Moor Lane, Lancaster. Running 2.30 p.m. Details: Mr J. F. Pock, 5 Ridge Street, Bulk, Lancaster.

16th June. **BILLINGHAM A.S.** Open Show. Billingham Community Centre. Details: Mr J. Arnall, 34 Hatfield Place, Peterlee, Co. Durham; phone Peterlee 4054.

16th June. **SOUTH SHIELDS A.S.** 1st Open Show. Details: Mr G. Freeman, 234 South Elson Street, South Shields, Co. Durham NE33 5AL.

17th June. **SALISBURY A.S.** Open Show.

17th June. **GLOSSOP A.S.** Open Show. The Education Centre, Talbot Street, Glossop. Details: Mrs M. Beasley, 9 Water-side, Hatfield, Hyde, Cheshire.

19th-24th June. **BRISTOL TROPICAL FISH CLUB.** Open Show. Congregational Church Hall, Newton Street (off Stapleton Road), Bristol 5. Schedules: Mr R. Lawrence, 26 Brombridge Park, Eastville, Bristol BS5 6RR.

24th June. **ANSON A.C.** Open Show. St Andrew's Hall, Willenden High Road, Willenden, London, N.W.10. Details: Mr P. Ballack, 6 Walton Close, London, N.W. 1; phone 91-431 839.

24th June. **MID-HERTS A.S.** Open Show. Held in conjunction with Cell Barnes Fete. Cell Barnes Hospital, 36 Albans. Details: Mr C. S. A. Wilkins, 13 Chesham Road, St Albans, Herts.

25th June. **ALFRETON & D. A.S.** Open Show. Adult Education Centre, Alfreton, Nottingham. Details: Mr D. Hoakley, 19 Meadow Close, Eastwood, Notts., NG16 3DQ.

25th June. **GOSFORD & D. A.S.** Open Show. Community Association, Southington, Southington, 225 Links Road, Park Gate, Southamptn.

2nd July. **CASTLEFORD & D. A.S.** Open Show. Carleton Community Centre, Carleton, Pottersfract, Yorks. Details: Mr B. Stevens, 74 Falcon Drive, Low Lane, Carleton, Yorks (or phone Mrs Goss, Pottersfract 3213).

2nd July. **EXETER & D. A.S.** First Open Show. Kenford Village Hall, Kenford, nr. Exeter. Booking by 14 noon. Schedules: Mr W. F. Bly, 14 Bosworth Close, Exeter EX4 5LB; phone 25015.

2nd July. **NORTH WARWICKSHIRE A.S.** Open Show. The Settlement, Kingsstanding Road, Kingsstanding, Birmingham. Details: Mr T. Stow, 108 South Road, Erdington, Birmingham.

2nd July. **LYTHAM A.S.** Open Show. Lytham Gardens Pavilion, Lytham, Lancs. Details: Mr D. Wright, 13 Cambridge Road, Southill, Lancs.

2nd July. **BASINGSTOKE & D. A.S.** Open Show. Carnival Hall, Basingstoke. Schedules from Mr M. Strang, 50 Loddon Court, Neville Close, Basingstoke, Hants.

10-15th July. **BOMFORD & BEACON-TREE A.S.** Open Show (Dagenham Town Show). Central Park, Dagenham, Essex. Schedules (over): Mr D. G. Kent, 74 Lyndon Drive, Collier Row, Romford, RM5 9JT (phone 70-67844).

12nd July. **PORT TALBOT & D. A.S.** Open Show. Y.M.C.A., Port Talbot (F&AS Rules, 11 judges. Schedules (over): Mr M. John, 36 Golden Avenue, Sandfields, Port Talbot.

19th July. **G.E.G.B.** Quarterly Meeting. Curlew Hall, Red Lion Square, Hallow, London, W.C.1.

20th-22th August. **PORTSMOUTH A.S.** Open Show. Portsmouth Community Centre, Tyneside Avenue, Portsmouth. Fish entered 5th, judged 6th, public 7-12th. Schedules: Mr J. Stalwood, 34 Silcocke Avenue, Copner, Portsmouth.

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6th August. **BLACKPOOL & FYLDE A.S.** Open Show. Rufus Parade, Avenue, 66 Grammar School, Church Street, Blackpool. Details: Mr G. Howard, 45 Stanfield Avenue, Blackpool; phone 4257.

6th August. **TONBRIDGE & D. A.S.** 1st Open Show (professional date).

9th-13th August. **CYMRU NATIONAL A.S.** Open Show. T.A. Drill Hall, Cardiff. Booking 9th and 10th. Details: Mr R. Gorwill, 21 Galsala Road, Llandaff North, Cardiff.

12th August. **HARLOW A.S.** Open Show. Details: Mr P. Moorlock, 21 Brook Lane Field, Harlow, Essex.

12th August. **BRACKNELL & D. A.S.** Open Show. Pleasantwood Community Centre, Pleasantwood Court Road, Bracknell opposite Admiral Cunningham Hotel. Schedules: Mr L. Jordan, 62 Fernbank Place, Ascot, Berks (phone: Winkfield Box 3400).

13th August. **NORTH STAFFS. A.S.** Open Show. Victoria Hall, Hanley, M&AS Rules. Schedules: Mr J. S. Booth, 135 Beverley Drive, Beeston, Stoke-on-Trent.

13th August. **BEDWORTH A. & P.S.** Open Show. Nicholas Chamberlaine School, Bulkington Road, Bedworth. Schedules: Mr T. Page, 74 Lister Street, Amlborough, Nuneaton. Change of date.

14th August. **SOUTH PARK AQUATIC (STUDY) SOCIETY & KINGSTON & D. A.S.** combined Open Show. Ham Hall, Ham Close, Richmond, Surrey. 50 classes, F&AS and G&GB standards. Schedules: Mr G. Greenhall, 38 Girth Close, Morden, Surrey; phone 81-332 4642.

20th August. **OLDHAM & D. A.S.** Open Show. Werneth Park, Oldham. Details: Mr E. Rockwood, 30 Inverness Avenue, Blackley, Manchester 9.

20th August. **PLYMOUTH D. A. & P.S.** Open Show. Plymouth Y.M.C.A. Details: Mr J. Rundle, 50 Durham Avenue, Lipton, Plymouth, Devon.

22nd September. **BETHNAL GREEN A.S.** Open Show. Bethnal Green Institute, 229 Bethnal Green Road, London, E.2. F&AS. Championship Trophy class G (rule 2009). Schedules: Mr D. Bandy, 78 Everham House, Old Ford Road, Bethnal Green, E.2.

22nd September. **YATE & D. A.S.** Open Show. Newcastle Centre, Yate, Clipping Redbury, Glos. Schedules: Mr M. Estery, 134 Sandridge Park, Yate, Bristol (phone: Clipping Redbury 213643).

27th September. **LUCAS A. & P.S.** Open Show. Joseph Lucas Ltd., Gate no. 4, Spring Road, Half Green, Birmingham 28. Schedules: Mr G. H. Roberts, 20 Charles Road, Solihull, Warks.

3rd September. **WELLINGBOROUGH**

& D. A.S. The Drill Hall, Wellingborough. Schedules: Mr D. Bristow, 18 George Street, Wellingborough.

3rd September. **WHITLEY BAY A.S.** Open Show. Empress Ballroom, Whitley Bay, Northumberland. Show schedules available later.

10th September. **WEYMOUTH & D. A.S.** Open Show. Small Solway Hall. Details: Mr E. R. Jones, 11 Ludlow Road, Weymouth, Dorset.

10th September. **NUNEATON A.S.** Open Show. Friary Youth Centre, Abbey Street, Nuneaton. Details: Mrs P. Dodkin, 1 Grosvenor Drive, Barwell, Leicester (phone East Shilton 4278).

20th September. **BRIGHTON & SOUTHERN A.S.** Open Show. The Marnion Centre, Marnion Road, Hove, Sussex.

19th-17th September. **BRISTOL AQUARIUM SOCIETY** Open Show. St Michael's Parish Hall, Bishopston, Bristol. Details: Mr H. C. B. Thomas, 2 Green Park, Bristol BS6 4EP.

16th September. **HAVANT & D. A.S.** Open Show. Dunsell Hall, Purbeck, Hants. Details: Mr V. B. Hunt, 120 London Road, Witley, nr. Portsmouth, Hants.

16th September. **HOUSLLOW & D. A.S.** Open Show. Houslow Youth Centre, Cecil Road, Houslow.

17th September. **WEST CUMBERLAND A.C.** Open Show. Civic Hall, Whitehaven, Cumberland. Details: Mr J. Parker, 2 Southey Avenue, Oragill, Egremont, Cumberland.

17th September. **RHONDDA A.S.** Open Show. Details: Mr M. Williams, 121 Top Trebanog, Trebanog, Rhondda, S. Wales.

17th September. **G.E.G.B.** 1274 Open Show. Adak School, Sutton, Surrey.

14th September. **HUCKNALL & BULWELL A.S.** Open Show. Bulwell Youth Club, Coventry Road, Bulwell. Schedules: Mr G. P. Swainwick, 74 Westleigh Road, Straley, Nottingham.

14th September. **NORTHAMPTON & D. A.S.** Open Show. Details to follow.

14th September. **OSRAM A.S.** Open Show. Recreation Hall, Refuge Street, Oldham, Lancs. Details: Mr J. E. Shore, 33 Helgate St, Shaw, Oldham, Lancs.

14th September. **TOBBAY A.S.** Open Show. Torquay Town Hall. Details to follow.

1st October. **EALING & D. A.S.** Open Show. Northfields Community Centre, Northcroft Road, London, W.12.

1st October. **CHESTERFIELD & D.**

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A.S. Open Show. Clay Cross Social Centre, Chesterfield Road, Clay Cross, 10, Chesterfield, Derby. Fri: 20-21 May, 4.30-10.00. Sat: 22 May, 10.00-12.00. Following: 23 May. Details: Mr D. Stone, 217 North Wingfield Road, Grassington, 20 Chesterfield.

7th October. BASS Meeting. Fellows Lecture Hall, London Zoo, Regents Park, 2.30 p.m. All welcome. Tickets from Mr P. Stone, Highfields, Old Hill, Woking, Surrey.

7th October. EAST LONDON A. & P.A. Open Breeders Show. Regatta Road School, Barking, Essex. Breeding from 8.2.9.00-8.4.00. 8th October—9.0.0.0. 7th. Schedule from: Mr P. Vicker, 11 Irons Way, Romford, Essex.

10th October. BUXTON & D. A.S. Open Show. The Pavilion Gardens, Buxton, Derby. 10-11.00.

14th-15th October. R.A.F., Belle Vue, Manchester.

14th October. SHERWOOD A.S. Open Show. Details to follow. Show secretary: Mr J. Agon, 25 Maple Avenue, Mansfield-Woodhouse, Notts.

★27th-29th October. THE AQUARIUM SHOW '79. Royal Horticultural Society, 105 Hall, Vincent Square, London S.W.1. All details from the Organiser, 114 Geyser Lane, London SW17 2NY (01-847 2502).

10th November. G.S.O.B. Quarterly Meeting. Conway Hall, Red Lion Square, Holborn, London, W.C.1.

12th November. HARTLEPOOL A.S. Open Show. Langham Hall, Station Cross, Hartlepool. Mr J. D. Wilson, 42 Birkthorpe Road, Hartlepool, Co. Durham. Tel: 0729.

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