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Comments and Quotes

- Fish eggs as big as oranges
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A Breeder's Dream

IF getting harlequins or needos to spawn is the height of your ambition then FEN can help you (in this issue, in fact). But if your mind reaches for greater challenges such as keeping and spawning the coolie wash 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 coolie washed 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 83 inches long and weighed 175 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 be that fruity coolie washes 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 FRAS 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 FRAS 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 home 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 fish are not just a collection of 'best in show' 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 51 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 this issue 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.
LETTERS

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 windowsill 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, Apistogramma, 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 berteroii, E. cordifolius, Cryptocoryne lutea, C. spiralis, Hygrophila corymbosa (often called Nymphaea stricta), H. difformis (usually called Syngnomon 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 Badis badis by R. Zohal in the March issue, I feel I must write and differ on one or two points. I have been keeping Badis 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 anabasitic style, the male squeezing the female, whereas I have, almost without exception, found that Badis badis 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. Zohal'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.
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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 throwing 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 switches 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 Asian fish that gives such service to freshwater sharks in Nature?

Sutton, Surrey

R. L. 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 57 guppies (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. The male mollies were seen to be picking something almost completely. I wrote this in reply to the letter that said mollies (black) could not be raised in saltwater (PM, March). The mollies grew to maturity and only much later on did I begin feeding.

Plainville, Conn., U.S.A.

DR. M. ROSS VON RUDINGWALD

TRANSATLANTIC TOPICS

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 ruined the water. Even those who preferred the real thing and prepared their own liver chicks found that though the cooking removed much of the propensity it allowed the water the liver lost a lot of its nutritional value in the process.

Now liver is fast finding favour among those with Stateside hobbies. They are using desiccated liver obtained from health food shops.

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Though the genus Tomistoma boasts four or five known species, the most familiar archer fish with the aquarium seems to be Tomistoma jaculator. Because of its cheaper price in the States than here in Britain one sees more of them there, particularly at

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

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

This fish feeds 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 lunge at the tank glass, even to the point where they damaged their jaws.

When rearing for disease never use methylene blue. One Rochat fishkeeper found that his archers were unable to withstand this popular dye and anemias 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

**
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, form 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 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, untreated 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 starring 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 brown algae will glow, the red 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 unseaborn fish food if the common sin of over-feeding has been perpetuated.

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 nitrates, 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

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 1 1/2 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 neonos 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.
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.

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 behavior of the neon I prepared a small, all-glass, 28 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 *Photobpha hyphecomic* and is incurable at the present time.

As the pair of neon 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.

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**Readers' Queries Answered**

**Horse-faced Loach**

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

*Asorhophus cherskynus* are very much bottom dwellers and certainly tubifex worms and/or white worms will probably form their best staple diet. Stomachs of specimens from tenth 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 mossambica*? 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 that 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 *Mormyrops cichlid* (*Tilapia mossambica*) 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, crustacean 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.

**Kuhli are Tough**

Can you please settle an argument? Is it necessary to provide "codie 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 require 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 gut 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 it should be a tank or a tank as scavengers 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 less important and relatively unimportant 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

Shall 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-tipped or without red. However, the FRAS 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 growing plants should I include in my pond, which is roughly 6 ft. by 4 ft.

One, or at 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 Lagarosiphon (once better known as Elodea crispa). 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 common 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 macracanthus 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 problem—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 kobli '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 plankton 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 1 ounce 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 1 drop 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 pulvurised 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.
LAST month we looked at the development of 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 3 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, 0.45 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 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.

### Thickness of glass for aquaria of various dimensions

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<th>Depth (in.)</th>
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(Metric equivalents: 24 oz., 242 mm; 32 oz., 390 mm; 1 in., 64 mm; ½ in., 95 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 \( L \times (H - T_a) \)

Ends: Two pieces \( (H - T_a) \times (W - 2T_b) \)

where \( L = \) length, \( W = \) width, \( H = \) height, \( T_a = \) thickness of base glass, \( T_b = \) 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. Thawpox 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 fingerprints 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 1.5 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 poly-styrene 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., Olites hasseltii nebrodus 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 tin foil barbs (Barbus schwanenfeldi) 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 Labus, several of which are also familiar as 'aquarium sharks'. Like the Labus '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.
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 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 noi khoo* because of its supposed resemblance in coloration to a dove, which they call *nok khoo*. 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 khoo*. Another name used in some areas is *pla khi khoon*, 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 Discyllium 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 there was one 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; 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 xanthus), 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 nere 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 17th 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 sporoza 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 Percula 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 1:02.

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 Eucythus 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 here and there, 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 Tetramin. 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' (thus 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 coaxed 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 5th October—6 weeks to the day after the water had cleared from its early pollution, the nitrite level was nil. I left the water specimen for 48 hours and restested 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 a 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. arcurinata* 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 dace—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 *D. aureum*, 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 *H. humulus*, 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 *Charaxes hulul*, the gorgeous olive green and yellow moon butterfly. It was a hasty creature and took food within a few moments of introduction. It got on well with the *H. humulus* 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**

**AIRBOROUGH A.S.** President, Mr. A. D. Lowery; secretary, Mr. E. Ackerd (3 Greenwich Avenue, Upper, nr. Leeds, Yorks.); treasurer, Mr. F. E. Hennett; vice-secretary, Mrs. H. A. Pugh.

**AMERSHAM & D. A.S.** Chairman, Mr. W. J. B. Todd; secretary, Mr. E. W. Todd; treasurer, Mr. G. E. Godden; vice-secretary, Mr. H. W. Pugh; show secretary, Mr. M. J. Bland; show committee, Mr. G. W. Cooke; programme secretary, Mr. H. W. Pugh.

**ANKENYS A.S.** Chairman, Mr. W. J. B. Todd; secretary, Mr. E. W. Todd; treasurer, Mr. G. E. Godden; vice-secretary, Mr. H. W. Pugh; show secretary, Mr. M. J. Bland; show committee, Mr. G. W. Cooke; programme secretary, Mr. H. W. Pugh.

**BILLINGHAM A.S.** Chairman, Mr. E. C. Legg; secretary, Mr. D. K. Young (25 Oxford Road, Billingham, Teesside).

**CASTLEFORD & D. A.S.** President, Mr. D. J. Mansfield; chairman, Mr. E. C. Legg; treasurer, Mr. D. D. Godden; Community Centre, Castleford, Yorks.

**CHEWELL & D. A.S.** Secretary: Mr. J. M. Dodson (30 New Bradwell, Workop, Notts); phone 6054; Meetings: on Tuesday of each month, the Vice Hotel, Carlton Road, Workop, Notts.

**DERBY REGENT A.S.** President, Mr. H. Wilson; treasurer, Mr. T. Jeffery; secretary, Mr. W. Bland; (at Cumberland Road, Sheffield, Derby); show secretary, Mr. R. Harford (12 Mansfield Road, Derby); show committee, Mr. R. Harford; programme secretary, Mr. R. Harford; telephone 485555.

**DON VALLEY A.S.** (previously known as STOKESBRIDGE & D. A.S.) Secretary, Mr. G. J. Howard (67 Hassett’s Road, Gleadshill, Staffordshire); show secretary, Mr. E. W. Pope; (at 12 Mansfield Road, Derby); show committee, Mr. R. Harford; programme secretary, Mr. R. Harford; telephone 485555.

**FEDERATION OF NORTHERN AQUARIUM SOCIETIES.** President, Mr. J. J. Millett; vice-president, Mr. G. W. Cooke; secretary, Mr. C. E. Waller; (at 12 Mansfield Road, Derby); show secretary, Mr. J. E. W. Pope; (at 12 Mansfield Road, Derby); show committee, Mr. R. Harford; programme secretary, Mr. R. Harford; telephone 485555.

**HUMBLED A.S.** New Society: Secretary, Mr. H. J. Smith (56 Bishop’s Drive, Kingskerswell, Northampt.).

**NORTHAMPTON & D. A.S.** Change of secretary to: Mr. R. J. Smith (56 Bishop’s Drive, Kingskerswell, Northampt.).

**PRIVATEERS A.S.** President, Mr. E. W. Fuller; secretary, Mr. J. W. C. Oakes; (at 3 South Hill Drive, Gledesh, Bradley, Yorks.); treasurer, Mr. B. Mann.

**SHEFFIELD & D. A.S.** President, Mr. K. L. Carton; chairman, Mr. G. J. Howard; secretary, Mr. S. Blundell (37 Atwick Road, Sheffield); programme secretary, Mr. T. Turner; assistant, Mr. E.stone; editor, Mr. J. J. Millett; meetings: alternate Fridays (14th May), Apr. Union Street, Sheffield.

**SOUTH LEEDS A.S.** Chairman, Mr. F. W. Fullam; secretary, Mr. J. S. Anderson; (at 12 Mansfield Road, Derby); show secretary, Mr. J. E. W. Pope; (at 12 Mansfield Road, Derby); show committee, Mr. R. Harford; programme secretary, Mr. R. Harford; telephone 485555.

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**HUMBLED A.S.** New Society: Committee, Mr. H. J. Smith (56 Bishop’s Drive, Kingskerswell, Northampt.).

**HAVANT & D. A.S.** New Society: Meetings, 1st Monday of each month, New Forest Day Centre, South Street, Emsworth, Hants. 

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

By J. ELIAS
Photographs by the author

Rotala Looks Best in Clumps

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 ½ 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 emerse and submerged forms are often taken for two separate species, the emerse for R. rotundifolia, the submerged for R. indica.

The plant is particularly prolific and will adapt
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 Gymnophis macrolepidotus (ignore the 'G' when pronouncing its generic name), pictured here. Unlike some other mormyrids it is rather conspicuously scaled, but in habit 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 Potter-Pet Fish Farm at Walton-on-the-Hill, Surrey.)

Photographs by CLIFF HARRISON

One to handle with care is the freshwater stingray (Paratrygon laticauda), 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.)
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 plung 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 fishkeeper 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 PFM, 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 tropica in unattended houses were unhappy about the prospect of covering 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 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 20 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 capsize 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 aquariums 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 a great deal of 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 eccentricities 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 inhabitants, 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 ichthyol tank. Quite suddenly the festivities and the keyholes (five adult fishes in all) have taken to unpredictable mad dartings around the tank, after which they disappear into the cryptocoryne thickets in (literally) black sulks, to nurse their wounds. I had this trouble some 3 years ago with angels and, like others who have 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 rainwater 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.

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 mint breeders, anxious to produce more males than females (the beak has the better coat), had been having remarkable success with red lighting. Throwing caution to the wind, our 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 any difference. Did this put our chap off? Not one bit. 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 effect' electric fires. The results were astonishing. 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 a blue bulb 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' clans. 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
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 consigned 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 Malay 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 neon 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, cardamone 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 Farez-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 neon, 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 condi-
tioned 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 70° 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 pest 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 pest. So it is
not surprising that the only two eggs I saw were
round the base of the plants on the surface of the
pest 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 pest
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 one
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

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

Many varieties exist, which have developed in different ecological conditions; the pistol-like Aplocheilus 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 "kill" 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 6.0-7.5 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 cold water 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.

Pre 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, rotifers, micro worm and very fine dry food can be given. Only a few killifish (for example Pseudokryptopterus anomalous) 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 be roughly the same 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 Pseudocrenilabrus, for the upper strata, most of the Aplocheilus species, for the middle layers, and a few Aphyosemion and most of the South American bottom-swimmers, 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 Pseudokryptopterus or Rivulus 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. After 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. in depth of the same water. The eggs are examined every day and eggs
with fungus removed by using 
recreases. 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 7-26 days according 
to the species. As soon as the 
fish hatch transplant them either 
by dipping a teaspoon into the water, 
causing the fry to swim 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 show 
them into the 4 in. of air tubing, 
slip it into the second container and 
gently plunge the needle 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. Unrest 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 con 
tainer, move 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 straws (Impatiens 
capitata) 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-sweepers and Post-drivers.

THE GOLDFISH SOCIETY OF GREAT BRITAIN are to hold two 
important 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 exhibitors) 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, 
Satton, Sarrory.

221 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. Mount 
house and Mr. A. 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 (Buckley, Select, 82 points) and Merseyside gained the 
most points (23). The ladies award for 
highest number of points gained 
was made jointly to Miss Gregory 
(Nelson) and Miss Miller (ind.). A. 
Williams of North Staffs, won the 
Juvenile trophy. Mr. Charlton of 
Merseyside was the competitor with 
the highest total of points. Breeder's 
trophy, Mr. K. Barlow (Ashdon, 77) 
Pairs trophy, Mr. D. Charlton (28). 
Goldfish trophy, Mr. J. S. Hall (Athershote, 28). Exhibitor with most 
entrants, Mr. J. S. Hall (28).

Liveshowers: Guppy, 1 Mr. E. Smith 
(Weymouth, 78, section winner, 2 Mr. L.
Leather (Blackpool), 74, 3 Mr. N. 
Mitchell (Chatsworth, 75, section winner, 4 C. 
Cook, (Blackpool), 72. 5 Mr. E. 
Moss (Wexford, 74), 6 Mr. J. 
Menard (Hull), 75. 7 Mr. W. 
Ward (Memories, 75). 8 Mr. J. 
Gross (Wessex, 75). 9 Mr. S. 
Taylor (Welshpool, 74), 10 Mr. G. 
Brown (Memories, 75). 11 Mr. W. 
Smith (Wessex, 74), 12 Mr. J. 
Evans (Wessex, 75), 13 Mr. D. 
Brown (Memories, 75), 14 Mr. J. 
Smith (Wessex, 75).

CHARACTERS: Small, 1 Mr. G. H. 
Jackson (B.B., 75), 2 Mr. E. 
Wilson (Wexford, 74), 3 Mr. J. 
Brown (Memories, 75), 4 Mr. J. 
Brown (Memories, 75), 5 Mr. J. 
Brown (Memories, 75), 6 Mr. J. 
Brown (Memories, 75), 7 Mr. J. 
Brown (Memories, 75), 8 Mr. J. 
Brown (Memories, 75), 9 Mr. J. 
Brown (Memories, 75), 10 Mr. J. 
Brown (Memories, 75), 11 Mr. J. 
Brown (Memories, 75), 12 Mr. J. 
Brown (Memories, 75), 13 Mr. J. 
Brown (Memories, 75), 14 Mr. J. 
Brown (Memories, 75).

AQUARIUMS: Small, 1 Mrs. 
Moss (Wexford, 74), 2 Mrs. 
Moss (Wexford, 74), 3 Mrs. 
Moss (Wexford, 74), 4 Mrs. 
Moss (Wexford, 74), 5 Mrs. 
Moss (Wexford, 74), 6 Mrs. 
Moss (Wexford, 74), 7 Mrs. 
Moss (Wexford, 74), 8 Mrs. 
Moss (Wexford, 74), 9 Mrs. 
Moss (Wexford, 74), 10 Mrs. 
Moss (Wexford, 74), 11 Mrs. 
Moss (Wexford, 74), 12 Mrs. 
Moss (Wexford, 74), 13 Mrs. 
Moss (Wexford, 74), 14 Mrs. 
Moss (Wexford, 74).

Open class: Charities, 1 Mr. E. 
Breadmore (Wessex, 75), 2 Mrs. 
J. Smith (Wexford, 74), 3 Mr. 
J. Smith (Wexford, 74), 4 Mr. 
J. Smith (Wexford, 74), 5 Mr. 
J. Smith (Wexford, 74), 6 Mr. 
J. Smith (Wexford, 74), 7 Mr. 
J. Smith (Wexford, 74), 8 Mr. 
J. Smith (Wexford, 74), 9 Mr. 
J. Smith (Wexford, 74), 10 Mr. 
J. Smith (Wexford, 74), 11 Mr. 
J. Smith (Wexford, 74), 12 Mr. 
J. Smith (Wexford, 74), 13 Mr. 
J. Smith (Wexford, 74), 14 Mr. 
J. Smith (Wexford, 74).

BEDWORTH A. & P.S. were the 
host for the first of the MID 
LAND AQUARIUM LEAGUE shows for 1972. Results were:

Anatomical, 1 Mr. C. Peek (Bedworth, 75), 2 Mr. 
E. Smith (Wexford, 75), 3 Mr. 
S. Hill (Nuneaton, 75), 4 Mr. T. 
Brown (Birmingham), 5 Mr. J. 
Black (Nuneaton, 75), 6 Mr. 
F. Smal (Birmingham), 7 Mr. 
J. Black (Nuneaton, 75), 8 Mr. 
F. Smal (Birmingham), 9 Mr. 
J. Black (Nuneaton, 75), 10 Mr. 
A. Brown (Birmingham), 11 Mr. 
J. Smith (Wexford, 74), 12 Mr. 
S. Hill (Nuneaton, 75).

Breeder's, 1 Mr. J. Black (Nuneaton, 75), 2 Mr. J. 
Black (Nuneaton, 75), 3 Mr. J. 
Black (Nuneaton, 75), 4 Mr. J. 
Black (Nuneaton, 75), 5 Mr. J. 
Black (Nuneaton, 75), 6 Mr. J. 
Black (Nuneaton, 75), 7 Mr. J. 
Black (Nuneaton, 75), 8 Mr. J. 
Black (Nuneaton, 75), 9 Mr. J. 
Black (Nuneaton, 75), 10 Mr. J. 
Black (Nuneaton, 75), 11 Mr. J. 
Black (Nuneaton, 75), 12 Mr. J. 
Black (Nuneaton, 75), 13 Mr. J. 
Black (Nuneaton, 75), 14 Mr. J. 
Black (Nuneaton, 75).

League placings are now: Bedworth (43 points), Coventry (43), 
Newport (43), Loughborough (30), Hinckley (26), Reading (21).

AT THE KEIGHLEY A.S. Open 
Show, Airborough & 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 Mr. Beckett. 247 
entrants were received and the following awards made:

Guppy, 1 Mr. P. Smith (Mount Pleasant), 2 Mr. E. 
Brown (Wells), 3 Mr. P. Smith (Mount Pleasant), 4 Mr. E. 
Brown (Wells), 5 Mr. P. Smith (Mount Pleasant), 6 Mr. E. 
Brown (Wells), 7 Mr. P. Smith (Mount Pleasant), 8 Mr. E. 
Brown (Wells), 9 Mr. P. Smith (Mount Pleasant), 10 Mr. E. 
Brown (Wells), 11 Mr. P. Smith (Mount Pleasant), 12 Mr. E. 
Brown (Wells), 13 Mr. P. Smith (Mount Pleasant), 14 Mr. E. 
Brown (Wells).
The Inter-society quiz and table show competition held between NORTHWICH & D. A. S. and THE"
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 59½. The table show was judged by Mr B. Nicholls of Middleton A.S. The best fish in show award was gained by L. & D. Thorpe (Northwich) with an A. ramirezi entered in the dwarf ciclid class. Other class winners were:

Platys: Mr C. Bowyer (C); barbs under 3 in, L. & D. Thorpe; barbs over 3 in, L. & D. Thorpe; killifish, L. & D. Thorpe; catfish, Mr P. Hyland (S); rasboras, Mr B. Burton (C); cichlids, L. & D. Thorpe; swordtails, L. & D. Thorpe; pairs, C. Bowyer (C); pairs, livebearers, L. & D. Thorpe; A.A.C., Mr B. Capell (S); guppy, M. E. Stokes (C).

MR. J. BLAND, secretary of DERBY REGENT A.S., reports that much is happening in the Society. A recent lecturer, Mr Ron Trench, arrived accompanied by his 17 in. albino Clarias catfish. During the 5 years he has had it, Mr Trench 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. 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. Eason, 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 R. Pawley; barbs, Mrs D. Crucikshank; breeders, livebearers and egglayers, Mrs D. Barrett; toothcarps, Mr R. Longstaff; guppy, Mrs C. Sawford; novice table show shield, Mr D. King; coldwater breeders table show shield, Mr T. Longstaff; and Mr Gerry Greenhalph received the awards for labyrinths, catfish, livebearers, table show shield, E.S.M. 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 seems for too long to have been assumed by many to be practically different hobbies. These have now emerged as 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 Nicoll 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 is 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 BOURNEMOUTH 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 ciclids was won by Mr R. Smithers and that for dwarf ciclids by Mr M. Whittington.

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

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

. . . 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 (Black Bream) and to Mr. A. Worth (5 lb, o.n.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 Cookburn High School, Leeds. Rumours that the Society may be folding or combining with another 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: Senior 1st Mr. N. Bagwell (604), best fish in show with Mr. Clark; 2nd Mr. A. Laidze; 3rd Mr. B. Ayres, Junior 1st Master Sharp (1468); 2nd Master Tulip; 3rd Master Poulton.

"HOW TO set up a marine tank" — by candlelight inadvertently because 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 lectures were undamaged and all present enjoyed the evening.

A new society with a difference is the MEMBERSIDE 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 as informal an 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 41 Claremont Villas, Reinhold Street, Hull.

**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 fantastic class, and Mr. C. H. Truman those in the guppy class. Goldfish: 1 and 2 Mr. W. Ham; 3 Mr. E. Bowden. Gobies: 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 table show were: Fish of the month (cichilds) Mr. Taylor; 2nd Mr. Sugr; 3rd Mr. Illingworth; Junior A.V., Master Beckett.

"THE Committee came to the rescue when the taped slides 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 Moreton, 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 1st and 2nd place in the Beaux slide exhibition by Mr. F. G. Parry, and Mr. C. Brown on exaggerting toothcarps. Winners of the table show for livebearers were: mollies, Mr. S. Crabtree; platys and swords, Mr. W. Blofeld; guppies, Mr. A. Ford; 2nd Mr. N. Crabtree.

"IN the lead for the Endeavour trophy after two table shows under the new WREXHAM T.F.S. point system is Mr. T. Oliver with 156 points (2 Mr. T. Pound, 161; 3 Mr. G. Poulton.)"

The MERSEY SIDE A.S. official journal recently printed a comment from member Mr. Fred Mulla on the subject of fines for fish entries at open shows. He points out that in the many shows he has visited fees have been reduced in the last 10 years but the number of fish 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 unsightly fish out of the show and improve standards; could 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. Hoby of Chester on marine life.

**NEW honorary president of CASTLEFORD & D. A.S.** is Mr. Derek Newman of Aquaria International. E. and S. Clove 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 114 plants being auctioned by Mr. G. Sibson. The final results of a two-legged inter-society competition with WREXHAM 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 than usual and the winner of the award 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 Culter.

**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
Dates for Your Diary

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

7th May. AQUARIUMS FILM SHOW (Mr C. L. D. Cropley) at Foot's Café, Leek, Staffordshire, at 7:30 p.m. Entry fee £1.00. Details: Mr C. L. D. Cropley, 75 Hall Lane, Leek, Staffordshire.

8th May. BOSTON A.S. Open Show, Boston Town Hall, Lincoln, Lincolnshire, at 10 a.m. Details: Mr John W. B. Day, 54 Bank Street, Boston, Lincolnshire, PE21 7NH.

9th May. CAMBERNOUGH A.S. Open Show, St Mary's Church Hall, Barkingside, Essex, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

10th May. COVENTRY A.S. Open Show, The Old School House, Kenilworth, Warwickshire, at 10 a.m. Details: Mr A. J. H. Smith, 3 Highfield Way, Walsgrave, Coventry.

11th May. DUKERIES A.S. Open Show, The University of York, York, North Yorkshire, at 10 a.m. Details: Mr D. K. Duke, 2 York Road, York, YO10 3JA.

12th May. EIGHT BAY A.S. Open Show, The Royal Oak, Ilminster, Somerset, at 10 a.m. Details: Mr P. H. Brown, 108 High Street, Ilminster, Somerset, TA19 8BB.

13th May. NEW FOREST A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr P. H. Brown, 108 High Street, Ilminster, Somerset, TA19 8BB.

14th May. NOTTINGHAM A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr P. H. Brown, 108 High Street, Ilminster, Somerset, TA19 8BB.

15th May. ROEHAMPTON A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr P. H. Brown, 108 High Street, Ilminster, Somerset, TA19 8BB.

16th May. ASHTON UNDERLYNE & D.A.S. Open Show, Ashton Underlyne, Lancashire, at 10 a.m. Details: Mr G. Trice, 24 Burrowfield Crescent, Ashton-under-lyne, Lancashire.

17th May. SOUTHEND, LEIGH & D.A.S. Open Show, Leigh-on-Sea, Essex, at 10 a.m. Details: Mr R. D. Oliver, 8 Champion Chase, Leigh-on-Sea, Essex.

18th May. TREVOR Bridge & D.A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr W. S. Burton, 17 Pendle Street, Trevi, Hampshire.

19th May. BASS Meeting, Folkestone Lecture Hall, London Zoo, Regents Park, London, W1, at 3 p.m. All welcome. Tickets from Mr F. J. Kneschke, Highcliff, Old Hill, Woking, Surrey.

20th May. HULL A.S. Open Show, Hull, East Yorkshire, at 10 a.m. Details: Mr T. M. Day, 33 Witham Road, Hull, East Yorkshire.

21st May. MERSEYSEIDE A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

22nd May. SOUTH WALES A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

23rd May. DERRY REGENCY A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

24th May. NORTHFINCH A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

25th May. LEICESTER A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

26th May. YEVIL & D.A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

27th May. CROYDON A.S. Open Show, The Royal Oak, Basingstoke, Hampshire, at 10 a.m. Details: Mr R. H. J. Smith, 35 High Street, Barkingside, Essex.

28th May. PHILIPPE HENRY REPTILE CENTRE, Moorland Avenue, Crouch End, London, N8, at 10 a.m. Details: Mr A. J. H. Smith, 3 Highfield Way, Walsgrave, Coventry.
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16th August - BLACKPOOL & FYLDE A.S. Open Show. Blackpool Parade Avenue, Old Grammar School, Church Street. Details: Mr. W. Coates, 25 Stanley Avenue, Blackpool; phone 4295.

17th August - CUMBRIAN NATIONAL A.S. Open Show. T. & A. Smith Hall, Carlisle. Details: Mr. B. Coates, 25 Stanley Avenue, Blackpool; phone 4295.

18th August - HARLOW A.S. Open Show. Details: Mr. P. Burrows, 25 Stanley Avenue, Blackpool; phone 4295.

19th August - BLACKPOOL & FYLDE A.S. Open Show. Details: Mr. W. Coates, 25 Stanley Avenue, Blackpool; phone 4295.

20th August - BLACKPOOL & FYLDE A.S. Open Show. Details: Mr. W. Coates, 25 Stanley Avenue, Blackpool; phone 4295.

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