SEPTEMBER 1973

20p

Pet Fish

monthly

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PetFish

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In This Issue

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Comments and Quotes

- **The era of the plug-in approach**
- **Killies in Space**
- **Success in cleaning rivers**

Instant Fishkeeping

MORE and more obviously the movement towards the 'plug-in aquarium' can be seen to be taking place. Manufacturers have taken the point that aquaria and stands of the old styles are not acceptable items for the modern living room. Certainly their accompanying growing clutter of equipment that could be hidden only with great difficulty has hastened the re-thinking on how to give the would-be aquarium owner the 'living picture' he wants, without the aquarium itself obtruding and upsetting the room decor and without him having the trouble of assembling aerator, filter, lighting and heating equipment all sold to him as a lot of unrelated separate items.

Where there seems to be further scope for bringing accessories together into compact units to promote and facilitate fishkeeping is in the garden. Pond-makers these days want moving water, they want to use all possible aids to keep the water clear, they probably like the effect of underwater lighting and in winter they are not averse to supplying a little heat to offset the effects of freezing. A combined water-circulator and filter, with heating and lighting as controlled items, as a safe and unobtrusive set-up for installation close by the pond (if not actually a submersible unit), could well provide in this field the 'plug-in' approach that appears to be so popular.

However much practical aquarists may scoff at such 'instant fishkeeping' ideas, they could increase the numbers of fishkeepers and hence the volume of aquatic trade, which would undoubtedly be of benefit to all the hobby.

Space Killies

IN following the somewhat chequered career of Skylab we have been wondering what happened to the 'minnows' eggs' reported to have accompanied the crew of three. Fifty of the fish eggs were expected to be hatched in an aquarium aboard Skylab in Space. From this it seems likely that these are killifish of some kind. A Space Agency scientist, Dr Richard Simmons, has been reported in THE TIMES as saying: "We expect the minnow to swim in spirals instead of a straight line". Two spiders also taken to Skylab have already shown their adaptability to weightlessness by spinning quite normal webs in the Space station. Will the killies 'spiral' or will they, too, take to Space existence as to the manner born?

River Clean-up

FOLLOWING on from reports showing how much cleaner the river Thames at London has become perhaps we can be excused making a rather parochial note on another evolving success story in the 'clean up our rivers' campaign. Behind the offices of PFM is a park with a small river, the Wandle, that streams by us on its way to the Thames. Although senior citizens locally have recalled for us days past when it was possible to walk with pleasure along grassy banks by the Wandle, the river has been without fish for 60 years and it must be admitted that sometimes only those of strong constitutions would dare gaze into its turbid waters from the concrete embankments that today enclose much of its course.

However, upstream things are looking up. Young trout and roach have been placed in a cage in the river at Merton and after a month they are reported to have thrived and grown. Not bad when you think that 90% of the river at that point is formed by effluent from a giant sewage works. Now the Greater London Council is thinking about stocking the river with fish. It surely cannot be long now before we see the first anglers busy taking them out again.

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"I saw your advertisement in PFM"

LETTERS

continued from page 218

wood about 3 cm by 10 cm by ¾ cm on to which can be attached the fluorescent tube. This usually involves the screwing into place of two clips. The wires for the tube are led through a small hole drilled in the gutter and the whole is connected to the appropriate circuits (instructions for the circuits and attachment of the tube can be obtained from the supplier). The whole can be rendered more effective by lining with silver foil and the finished article can be stood on the glass cover of the tank and switched on.

The end result is a closed half-cylindrical housing, that can be easily moved around, that reduces the likelihood of shorting and burst tubes due to condensation and that, above all, is cheap. Although this design is not suitable for a 'show-piece' aquarium, I feel sure that it is tidy and practical enough to be of considerable interest to the practical aquarist looking for a useful piece of equipment.

Alderney, C.I. N. P. WENDER

We would strongly urge that some provision be made to prevent any possibility of such a 'wandering unit' falling into the water if breakage or displacement of the glass cover on which it rests should happen.—EDITOR.

Source of Heaters

MRS G. SCHNELL, Pasadena, Texas, asks in these columns (PFM, January) if Jaeger submersible heaters are available in the U.S.A. Combination heater/thermostat Jaegers (submersible) may be had from Nippon Goldfish Company (3109 Geary Boulevard, San Francisco, Cal. 94118), in 100, 150, and 200-watt models. The Nippon Company sends selected items by mail.

FRANK KLEPPER

San Francisco, Cal. 94121, U.S.A.

Raised Entry Fee

ON behalf of many of the aquarists who exhibited fish at a recent open show in Derbyshire. I feel I must draw attention to the increase in entry fees. It seemed very apparent that the club was only holding the show to make a clear profit, since there were no other changes made (trophy-wise). Surely the plaques cost the club very little since they are annual trophies, and, most of the other prizes are donated to the society. Does the society not realise that the cost of travelling to their show has also risen a great deal in the past 12 months? I only hope that the society can see their mistake and make amends to exhibitors who decide to go to next year's show.

Belper, Derbyshire A. JONES

Book Review

THE LIVING OCEANS. Alec Laurie. 187 pages, 165 illustrations in the text. Aldus Books, London. 1972. £2.75.

THE marine aquarist who has mastered the elementary aspects of his hobby is often tempted by his early success to cram a whole ocean of diverse living things into an altogether unsuitable and inadequate environment. Books such as THE LIVING OCEANS are invaluable in such circumstances because they provide a bird's eye view of a subject much vaster than the marinist generally sees it, and in so doing they contain a caution as well as much needed education.

Readers of Sir Alister Hardy's classic THE OPEN SEA: ITS NATURAL HISTORY will recognise the pattern of this book, but it updates this work economically and clearly, supporting the text with relevant and understandable diagrams and sketches as well as a wealth of coloured drawings and photographs. The significance of marine food chains and the interrelationship of species of life will perhaps interest the aquarist more than the chapters dealing with the physical attributes of the oceans themselves, but there is much of interest for all in this volume, though some detail has necessarily been sacrificed in the effort of spanning such a wide subject in a readable way.

This book is not, perhaps, a necessity for the aquarist, but it should be in every library and it should be read from cover to cover. The publishers have presented it in somewhat luxurious style and its dimensions (8 in. by 11 in.) are rather larger than they need be, but it is otherwise a thoroughly wholesome production, and adequately proof-read. I commend it to all who care to turn for a moment from 'how to do it' to an excursion into the wider environment surrounding their hobby.

The writer obviously cares for living things: his unhysterical message about man's responsibilities over conservation is compelling because it is restrained and simple. The avoidance of sermonising will make this palatable even to anti-conservationists because the author addresses his readers as mature adults with minds of their own.

ROY PINKS

Two Favourite American Aquatics

By K. RATAJ

Photographs by
RUDOLPH ZUKAL

Ludwigia palustris

Ludwigia palustris growing in an aquarium. With age long tufts of roots form along the stems. The tiny underwater flowers shown slightly enlarged below are of *L. palustris* var. *americana*

THIS plant, a member of the evening primrose family Oenotheraceae, and also called *Ludwigia natans*, is a very useful aquarium plant since it tolerates a wide temperature range (from 65°F to 85°F (18–28°C); and is therefore equally suitable for both coldwater and tropical aquaria.

It grows in its natural habitat, the southern parts of North America, in shallow waters as a marsh plant known as false loosestrife, so it is also suitable for use in paludaria and terraria. The leaves, which are broadly lanceolate, grow up the stem two by two, opposite each other, and are about ¾–1½ in. long (2–3 cm.) and ½ in.–¾ in. wide (1·5–2 cm.) with only inconspicuous veining. The upper surface of the leaf is a dark glossy green and the lower surface brown-red or purple. When the plant is grown immersed, tiny yellow flowers appear just where the leaves join the stem.

In the aquarium it requires a reasonable amount of light. The really decorative variety of this species is that sold in the shops as *Ludwigia mullerti* hort. (*Ludwigia palustris* var. *americana forma elongata* Fassett). Its leaves are bigger (up to 1½ in. (4 cm.)) and their lower surface is a deeper red than in the original plant.

Above: the white flowers of *Sagittaria subulata* form on long thin trailing stalks
Right: *Sagittaria subulata* var. *gracillima* growing in an aquarium

Sagittaria subulata

ANOTHER marsh plant from the U.S.A. (this time from the eastern counties) that is obliging in its requirements is *Sagittaria subulata* (water plantain family, Alismataceae). All varieties of this species grow in both hard water and in water rich in organic matter. Nor are they over-sensitive to temperature or to the quality of the substrate in which they are grown. They do, however, require good illumination. Submersed leaves are ribbon-shaped without differentiation between blade and stalk. Before the plant flowers, floating oval leaves on extremely thin, long, light green

Sagittaria subulata var. *subulata* is a low-growing form of the plant that is ideal for planting in the tank foreground when an aquarium is being furnished

stalks appear. On the stalk there are usually two to five male and one or two female flowers. Flowers are white and about ½ in. in diameter. The fruit resembles a green raspberry and contains a great number of minute seeds (achenes) moderately dentate on both the front and back side.

When growing in its natural habitat, should the water dry out *S. subulata* develops land forms. In this case the leaf blade is usually ovate, 1–2 in. long (2·5–5 cm.), on stalks that are the same length or even two to three times longer. There are three distinct varieties of this species:

Sagittaria subulata var. *subulata* (incorrectly known as *Sagittaria pusilla* or *Sagittaria minima*). This variety is suitable for planting in the foreground of an aquarium as it develops submersed leaves only 2–4 in. long (5–10 cm.) (though, rarely, to a foot in length, 30 cm.). This variety seldom flowers in the aquarium.

Sagittaria subulata var. *gracillima* (incorrectly offered under the name *Sagittaria natans*. *Sagittaria lorata* Small is merely a synonym for *S.s.* var. *gracillima*). This variety grows immensely long leaves, 12–36 in., which, when they reach the top of the tank, wind along under the water surface and form a dense thicket. It is particularly suitable for planting in the corners of the tank, where it forms a shelter for some species of fishes.

Sagittaria subulata var. *kurziana*. This is the most decorative plant in this species. Sometimes coming into the shops under the commercial name, *S. japonica*, it resembles some species of *Vallimeria*. With the same length of leaf as *S.s.* var. *gracillima*, the leaves are much wider, ½–¾ in.

In full sunlight all varieties of this species adopt a dwarf form and develop a very low 1–2 in. green lawn of grass-green, ribbon-shaped, outward curved leaf. The plant propagates easily, developing new plants from the root runners.

What's New?

'Medical Primer'

THE time is long past since the fishkeeper need watch helplessly as his fish died one by one from some unknown cause. Manufacturers have produced a wide range of remedies functioning in a way that earlier aquarists would have found little short of miraculous. But the range is now so wide as to be somewhat bewildering. **Vitakraft**, whose cures and remedies make up a fish pharmacy that includes such well-known items as Saludit and Antimaladin, have recognised this and have produced a "Medical Primer" leaflet (in colour), containing not only a full description of Vitakraft remedies but also a table of the most frequently encountered diseases, with descriptions of symptoms and indication of the appropriate remedy. A copy of the leaflet will be supplied free if a s.a.e. is sent to the distributors: John Allan Aquariums Ltd, Eastern Way, Bury St Edmunds, Suffolk IP32 7AB.

Water Testing

CONVENIENT and rapid methods for ascertaining the reaction (pH value) and hardness (both 'permanent' and 'temporary') of aquarium water samples are provided by the kits now being marketed by Tachbrook Tropicals Ltd. (244 Vauxhall Bridge Road, London S.W.1). These kits are the **pH Colormeter** (type 'FW' for freshwater and type 'S' for seawater), which utilises a comparator method involving the use of accurately standardized buffer solutions of known pH, and the **Durognost** (kit 'T' for total hardness and kit 'C' for carbonate hardness) and the **Duroval** (kit 'T' for total hardness and kit 'CT' for carbonate hardness). The Durognost method uses tablets corresponding to known values (DH) of hardness. With the Duroval liquid titrant method the result is given directly without counting of drops or making calculations.

Siphoning Safety

SIPHONING out a tank on an upper rack all too frequently reveals a critical gap between the end of the siphon tube and the bucket, which has caused many a soaked carpet! Now from Kenray (Patented) Products Ltd. is the **Kenray Syphon Set** that not only utilises the principle of the bellows to start the water running but is thoughtfully designed to give plenty of tube length. Made of high-quality clear, flexible plastic of ½ in. bore, the Syphon Set incorporates two lengths each nearly 3 ft. in length joined by a sturdy, neat, opaque plastic bellows. The water runs from one 3 ft. length to the other through a rigid channel at the base of the bellows. The manufacturer states that the bellows have been tested over 4000 times without visible signs of material fatigue. The siphon itself will deliver 60–80 gallons per hour (depending on the height of tank to outlet). The siphon is being distributed by Peterama Ltd, The Elms Estate, Church Road, Harold Wood, Romford, Essex.

Testing for Nitrites

WE regret that in our What's New? columns in the August issue the price quoted under the above heading for the Reliant Nitrite Level Test Kit (55p) is, in fact, the total retail price of the Reliant Freshwater pH Test Kit. The cost of the Nitrite Level Test Kit is £1.21 (both prices include VAT).

COLORATION IN FISHES

Pigment Colours and Colour Feeding

By IAN C. SELLICK

CHEMICAL, or pigmentary, colours cause the majority of bright colours seen in our fishes, the reds and oranges of platys and swordtails, the blacks and browns on *Corydoras* catfish, the blues, purples and reds of Siamese fighters. As the actual method by which the colour is produced is extremely complex, I will not attempt to explain it, except to mention that it is mainly due to the absorption of light-energy by the bonds between the atoms of the pigment molecules, the wavelength of light being absorbed depending on the bond length.

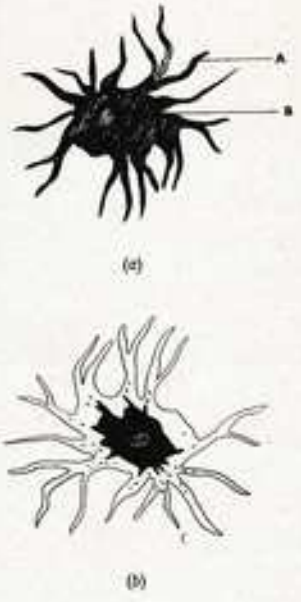
Pigmentary Colours

Black/brown. The black pigment of fish is called melanin, a chemical which absorbs all, or most, of the visible light. However, it is not always black and may be brown or even yellow in a few rare instances.

Melanin is found in the form of granules contained in 'colour cells' or chromatophores (the name melanophore being given to those containing melanin). Melanophores are the commonest type of colour cells, being found universally in all vertebrate animals to a greater or lesser extent. The cells have the ability, like most pigment-containing cells, to expand or contract and so darken or lighten the colour of the animal. In some instances, particularly in fishes using colour as a signalling system, there is very good control of the melanophores, with different patterns flashing across the body with startling rapidity. This is seen particularly in the cichlids. The change from brown to black seen as a fright reaction in many fishes is caused by an expansion of the melanophores, again a change occurring extremely rapidly.

Apart from black, melanin is responsible for many other colours, particularly brown, where slightly more dispersed melanophores against a white background produces the beautiful silky brown of the discus (*Symphysodon*), or the rough mud brown of the plecostomus. With yellow pigment in addition, the olive-brown colours of such fish as the pretty tetra (*Hemigrammus pulcher*) are produced.

Melanin production and retention in the cells of the fish is somewhat dependent on temperature, as evidenced by the case of colour change in goldfish. Young goldfish (*Carassius auratus*) are brown, becoming golden after they have grown to a certain size (about 1½ in.). This colour change only occurs at temperatures above about 18°C, and involves a decrease in the number of brown melanophores and an increase in yellow pigment cells. It is interesting that this seems to occur to any marked extent only in goldfish, although I have no doubt some other fish with a similar wide



Single pigment cells (melanophores). In (a) the pigment melanin is dispersed throughout the cell branches (A), giving a dark hue to the fish skin; B, cell nucleus. In (b) the retraction of pigment to the cell body leaves the branches pale and has a lightening effect on the skin hue

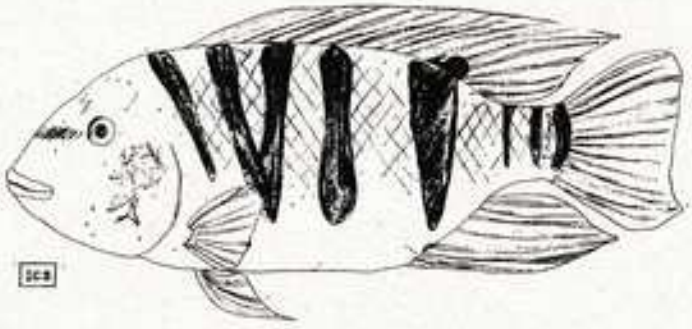
temperature-tolerance range may show this phenomenon.

In the black mollie, melanin is probably deposited in granules in cells which have no ability to regulate their density, as this fish is more or less unable to change its colour—and yet, in a fish showing a similar degree of blackness, the red-tailed black shark, there is the ability to change fairly rapidly from black to light grey, or vice versa, although generally more slowly.

Red/yellow/brown. The familiar hue of the goldfish, swordtail or platy is caused by one of a family of red pigments called carotenoids. Similar pigments also colour carrots and tomatoes—no less familiar objects.

These pigments are again found in chromatophores, called erythrophores (red) and xanthophores (yellow), but these on the whole do not expand or contract as much as the melanophores; they usually rely more on being lightened or darkened by the effect of the melanophores overlying them.

Visual pigments. Light-sensitive pigments are found inside the eyes of vertebrates and are usually some form of carotene derivative such as visual purple. Vitamin A is important as a constituent of this substance, and is in fact a type of carotene itself. Visual purples of various types such as rhodopsin or porphyropsin are the commonest visual pigments, although recently a new gold-



Colour pattern of a female *Tilapia guineensis* when ready to spawn. Changes in melanophores (preceding page) produce rapid changes of pattern (After Voss, in supplement to *La Pisciculture Française* no. 30)

However, fishes are, as far as we know, unable to synthesise carotenoids for themselves and must therefore have them included in the diet—so a well-balanced diet, but deficient in carotenes, will still give fish with poor red coloration. Consequently, most modern proprietary brands of food contain quite large quantities of such essential substances, especially those brands designed to promote colour. In fact, if young fish are fed almost exclusively on brine shrimp, they may become a reddish colour themselves through the uptake of the pigment. Even the brine shrimp, however, cannot manufacture its own carotenoids; it must produce them from the carotenoids contained in the algae which form its food. But before everybody goes adding carrot meal or whatever to their fish food I should point out that the uptake of carotenoids is selective and will depend on the fish's requirement rather than what colour you would like to see it!

Similar carotenoids to the red ones also cause yellow coloration in such fishes as the yellow platy, *Pseudotropheus auratus* and tiger barb. Again these must be supplied in the food, but can be made from other carotenoids; in particular, the cyprinodont *Fundulus* has been studied and found to obtain its xanthophylls from carotenoid base products.

coloured compound called crysopsin has been found in the eyes of some deep-sea fishes.

Other colours. Such colours as blue and green, if not produced purely by physical means may be produced by filtering a physical colour with a chemical one. However, it is possible that a blue pigment is found in some marine fishes, and this may be the cause of blue coloration rather than scattering; however, the granule size is such that it could be either and much work needs to be done to find out exactly what is the cause of blueness.

Albinism. This condition is due to a complete lack of all pigments in the chromatophores, or by the absence of the colour cells. It is commonly seen in the blind cave characin, the pink colour of which is due to the respiratory pigment in the blood of the skin. This pigment is called haemoglobin, and varies from light to dark red, depending on the amount of oxygen it is carrying.

Mechanisms of Colour Change

Colour change has already been mentioned above in passing and can briefly be put into two categories: (1) quick (physiological) and (2) long-term (morphological).

(1) Changes occurring quickly, due to effects of light-intensity, fright, response to signals, defence

postures etc. are reversible and usually are caused by aggregation or dispersal of pigments in the chromatophores. (2) Morphological colour change refers to long-term, usually irreversible, colour changes, such as have already been mentioned in connection with goldfish. This may be caused by temperature changes, water changes, seasonal factors, stage in growth or sex (e.g., in *Pseudotropheus auratus*: the male goes from yellow to black).

The actual mechanisms causing colour change are often extremely complex, involving both control by the nervous system and by hormones, and will not be dealt with in detail here. Suffice it to say that in general physiological changes are principally under nervous control via the eyes—response to light-intensity, colour patterns etc.; morphological changes are due to reception of some long-term stimulus causing the brain to stimulate the production of the appropriate hormone. This is only a generalisation; a more comprehensive account may be found by consulting some of the references in the list for further reading at the end of this article.

Colour Feeding

It is possible to alter the colours of fishes, usually temporarily, by including certain substances in the food. Commercial colour foods almost certainly contain excess of carotenoids to promote red coloration, a relatively long-term effect, and a melanophore-stimulating substance which causes the melanophores to expand, giving an overall darkening. If used excessively, some foods may make some fishes unnaturally dark—for instance male rosy barbs can be turned almost completely black by overfeeding with these foods.

However, compared with some so-called 'colour feeding' practised commercially in the Far East, the above methods are relatively harmless. Nowadays, fishes are fed with hormones and drugs designed to promote colour, such as methyl testosterone, a derivative of the male sex hormone (which is administered in the Far East by feeding the fish with the normal human birth-control pill!). This causes intense coloration, such as is seen in the 'blue-faced red' discus being imported. These colours wear off after a short while, leaving the fish weak, pale and often sterile from overdosing with these sex hormones, especially in potentially female fish.

Production of Light

This phenomenon (bioluminescence) has been found so far only in marine fishes, particularly deep-sea species, none of which ever falls into the hands of aquarists—so only a brief account will be given. However, about two-thirds of true deep-sea fishes show bioluminescence.

Bioluminescent organs occur in a vast variety of locations, but are generally in or just below the skin in a ventral position, or within the abdomen in *Apogon*, the cardinal fish. Another common spot is in, or around, the mouth in such fish as the deep-sea angler. Luminescence may be caused by symbiotic bacteria, by discharge of a luminous secretion, or by a biochemical reaction within the fish's tissues.

There are many theories of the function of bioluminescence, most of which are, however, conjecture, and may only apply to specific fish:
(1) the light is used as a lure to attract other animals as food;
(2) the light is used to deter other animals;
(3) the light is used for signalling, and making the fish conspicuous;
(4) the light provides an aid for vision at night;
(5) the light is used for mutual recognition in schooling, sexual recognition, attraction, or repulsion, courtship, aggression, or defence of territory;
(6) ventral light may conceal a fish by obliterating its silhouette.

As deep-sea fishes tend to be short-lived in captivity, none of these hypotheses has yet been proved.

Suggested Reading on Fish Coloration

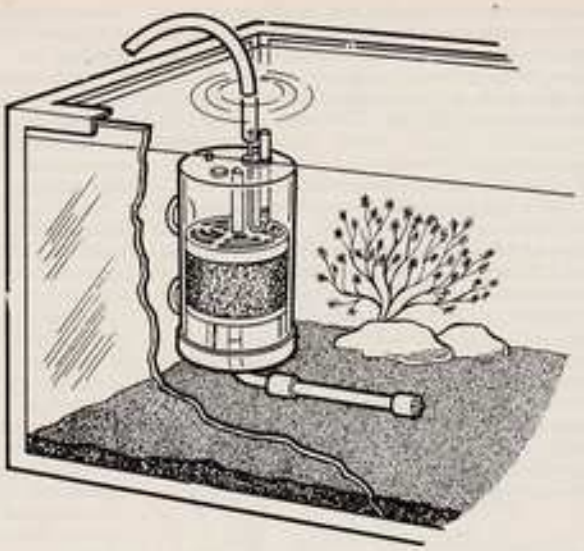
Apart from these references there is very little written about fish coloration specifically. However, further bibliographies will be found in the books and articles, which may be obtained to special order from most county libraries. Happy reading!

Denton, E. J. & Nicol, J. A. C. (1962). Why fish have silvery sides; and a method of measuring reflectivity. *J. Physiol.* **165**, 13–16
—— (1964). On the orientation of reflecting crystals in the surface of fishes. *J. Physiol.* **172**, 53–54
—— (1965). Studies of reflection of light from silvery surfaces of fishes, with special reference to the bleak, *Alburnus alburnus*. *J. Mar. Biol. Ass. U.K.* **45**, 711–738
—— (1966). A survey of reflectivity in silvery teleosts. *J. Mar. Biol. Ass. U.K.* **46**, 685–722
Fox, H. M. & Vevers, G. (1960). The nature of animal colours. Sidwick & Jackson.

Hendon Convention 1973

THE speaker at this year's Hendon Convention will be Mr W. A. Tomey from the Netherlands, whose articles on plant growth and arrangement in aquaria have appeared in PFM and proved extremely popular with readers. The date of the Convention has now been fixed for the 24th November (not the 17th as previously announced provisionally), at the Whitefields School, Clarenmont Road, London N.W.2.

Multi-Purpose Filter



FISHKEEPERS seem quite unable to resist the temptation to tinker, tamper and generally mess about with almost any item of aquatic equipment—usually to try and make it work better or do something other than what was planned by the designer. Often the result is far from what was intended, so for these less successful meddlers we bring good news in the shape of the **Kenray Multi-Purpose Filter** (Kenray Patented Products Ltd, Commercial Place, Lake Road, Portsmouth, Hants PO1 4DT). As its name suggests, it can be adapted to serve as an outside filter, inside filter and vacuum cleaner, and has its own siphon unit for good measure. The box contains a range of parts and fittings to assemble any of these items, and with a little thought and ingenuity the average fishkeeper can probably add a few refinements of his own to tailor the equipment exactly to his requirements. To keep the working parts within the confines of a very neat plastic casing, the overall height of the air lift has had to be restricted: as a result it is rather less powerful in each of its roles than the best examples of single-purpose filters. However, many people will be prepared to overlook this limitation and will, I am sure, have as much fun as myself toying around with this novel unit.

C. HARRISON

Readers' Queries Answered

Algae-Eaters

My dealer has both sucking loaches and Garra taeniata *available at the present time. I would like to get one as an algae-eater—is there anything to choose between them?*

On balance we would think the *Garra taeniata* would be the more interesting acquisition for your aquarium. It is possibly not quite so avid an algae-eater but it is the more handsome fish, with a reddish brown back and white belly divided by a striking black horizontal line and it is perfectly peaceful, without the annoying habit of the individual sucking loach to hang itself on the sides of other fishes. A very active jumper, this fish, like the flying fox, and the tank must be well covered.

Diamond Tetras

Would diamond tetras be suitable additions for my community tank? It's a 3 ft. tank and the fish in it are mostly red swordtails, with two Corydoras and a sucking loach.

Moenkhausia pittieri should be an adornment to your tank, which is an ideal size for it and contains fishes that will be highly suitable companions for it. The diamond tetra is one of those fishes that look particularly well if lighting can be arranged to fall on the tank from the front to the back, when the upper half of the body gleams a beautiful gold colour with iridescent flashes. But even with the more usual type of aquarium lighting, the fish will look well against the swordtails and give added interest to the 3 ft. aquarium since it is a very active fish and makes full use of all the available swimming space. It is not unknown for it to eat plants but provided that your tank is well-planted and the fish is provided with some scalded lettuce as an addition to its diet it should not cause any particular problem. It will reach a size of about 2 in. and will eat both dried and live foods.

Anostomus

I have been advised to get an Anostomus anostomus, *to help keep down the algae in my community*

tank. This seems rather an unusual fish and I'm a bit worried about introducing it.

This 'headstander' is certainly a devourer of algae. However, it is not a fish that can be generally recommended as an 'algae-eater' for a community tank. For one thing it is going to grow large (up to 7 in. possibly) so that the community of fish it joins must be of a similar size. It is not unknown for this fish to develop into a fin-nipper, so long-finned species such as angels may be very much bothered by it. Finally, while it certainly likes to graze on algae, it will require other, meaty, foods such as daphnia, tubifex or white worms as well for it to keep healthy.

MARINIST'S Notebook

By ROY PINKS

ONE of the first problems confronting the newcomer to marine fishkeeping is what to feed to his fishes and when. There are scores of tasty morsels like shrimp, mussel, crab meat etc. which the fancier will recommend, but the practical difficulty of conforming with the full shopping list is often that it is as awkward to accomplish as it is economically a frightener. It is probably true to say that the commoner and hardier marines like clowns and damsels and the chromis will subsist very nicely on dried food, and it is certainly a fact that you can ring the changes by including as many dried foods as you like in your cycle, as they seem to enjoy those intended for freshwater fishes as much as those designed for their specific use.

As for other foods, it is as well to experiment with as wide a range as you can manage, but do bear in mind that if you succeed in tempting a particularly fussy eater with a certain but difficult to obtain food, you may have got it 'hooked' on that, and it will be a pain rather than a pleasure to procure its future food supply. I have never found a fish that will refuse whiteworm, and, true to form, I have found that some fishes will quite ignore anything else, but at least this is an easy-to-cultivate supply, and on the evidence of several fishes in my tanks, can keep them happy and thriving over a long period.

Frozen mysis shrimp also seems to be quite popular, and as it is derived directly from the sea, may be regarded as possessing, perhaps, some of those mysterious elements which are supposed to be missing from more conventional fare. Not all fishes will take it, though. Boiled spinach is eagerly taken by fishes like tangs and the dwarf angelfish and by many others, but offer it in the form of pieces about the size of tea leaves, as at this size many of the smaller species will sample it. The absence of algal growth in the average marine tank makes such additions not merely welcome but a virtual necessity from the doctrinal nutritional point of view. Many aquarists drop in pieces of shrimp or prawn or suspend pieces of uncooked meat in the tank. My own experience of this has been that few species are really interested and merely pick at these offerings, as often as not mouthing the material before ejecting it neatly into the nearest coral fissure, where it decomposes.

Earthworm chopped into ½-in. segments, well washed and fed after soaking in water containing dissolved vitamin tablets, seems as popular an offering as any, and few fishes refuse it. By far the most consistent alternative is the adult brine shrimp, which can be raised to maturity much more easily than most aquarists suppose. Try tipping the residue of your normal brine shrimp hatchings into a small unaerated saltwater tank kept in a sunny window—I have always found the result quite magical, provided that this is kept topped up by fresh water.

The habit of offering vitamin tablets as supplement to the main diet is, I am sure, a good one, and I have found that Phillips Aquavite is the cheapest available and no less effective, so far as can be seen, than other material I have tried. It is rather difficult to say whether my fishes have benefited as a consequence of the addition of these tablets or on account of the improvement of my own fishkeeping techniques—perhaps a bit of each. I believe, in fairness, that there is adequate evidence available to support the practice, and I shall continue it until I have been proved wrong. I don't add the full dose, by any means, as I believe my fishes will do tolerably well unaided, but it is my hope that I am adding a little condition by such simple faith!

Those who scoff at the whiteworm cult—and there are quite a few—will find this fare most difficult to equal, not simply as a food, but as a source of interest for fish like the copperband and the long-nosed butterfly, who, as well as appreciating the worm as such, spend much of their time looking for escapees from the daily offering who have found temporary refuge in the coral or the aquarium floor.

EQUIPMENT MAINTENANCE

An Air Pump Overhaul

By CLIFF HARRISON

OF the relatively few makes of piston air pumps ever seen on the British market, the Hy-Flo models have achieved a particularly high reputation, but one which is understandable since the majority of their production is destined for hospital or laboratory, rather than aquatic, use. This company has been producing air pumps for many years, and apart from a modernising of the piston assembly some 12 years ago (which nearly doubled the output of each pump) the basic design has remained virtually unchanged.

The fact that there are so many of the original design to be seen, with upwards of 15 years almost continuous service, is testimony to the reliability of these pumps: yet like any other piece of precision machinery they need a little attention occasionally to ensure continued satisfaction, and whilst they usually receive the necessary few drops of oil on the vital parts each week, it is very rare to find that they are given the full service they deserve every 6 months or so.

Photos CLIFF HARRISON

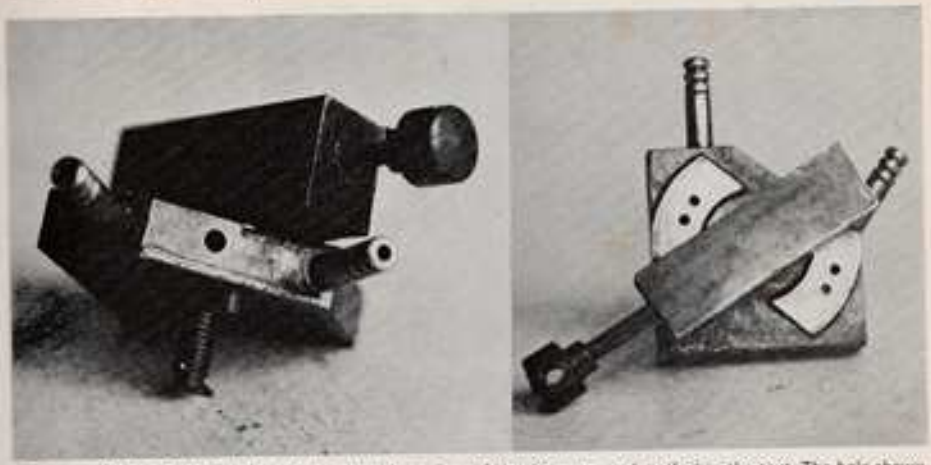
The old model C Hy-Flo pump described in the article. Abnormal wear, owing to lack of regular lubrication, had occurred

The first sign that something is amiss is likely to be a gentle 'clunk' in time with the movement of the piston: this can generally be relieved by the more frequent application of oil to the bearings, but as time goes on this proves to be a remedy of increasingly short duration. Eventually a complete overhaul of the pump is the only answer, yet regular servicing could have delayed this expense almost indefinitely.

First, let us look at the causes of excessive wear on these pumps. Obviously, lack of lubrication is a major factor: all bearing surfaces must be oiled each week—not too generously though—and care taken to prevent dust and grit being blown on to the pump, irrevocably damaging the close tolerances of the moving parts. Almost as important, and a point overlooked by most people, is to keep the pump running freely at all times, without it labouring under excessive back pressure. This back pressure can be caused by dirt and grime encrusted with oil blocking the airways of the pump; or by using too little air from the pump, restricting the volume with a clamp or valve rather than 'bleeding off' the excess into the atmosphere; or by using old, clogged air stones. All these can be rectified once the problem is identified, and the pump will also labour if heavy oil or grease is used for lubrication.

The Hy-Flo model C pump that came into my hands, with a request for its general overhaul, was at least 10 years old and apparently had not been serviced in all that time. One of the major problems is the gummy residue which can form as a result of using some of the even best-known brands of light lubricating oils, found in small tins in almost every home: to avoid this trouble, and the frequent servicing needed to clean out the sticky mess left behind, the manufacturers of these pumps (Medcalf Bros.) recommend the use of Shell Vitra 27 or a proper sewing machine oil.

In the pump I examined, however, the cause of the noise was immediately apparent—wear in the brass bushes and the connecting rod amounting to about 2 thousandths of an inch. A check on the rest of the pump indicated that other wear was minimal, and it was therefore decided just to renew the bushes and connecting rod, whose lubrication had apparently been neglected for some considerable time. Usually wear occurs fairly evenly on all



Two views of the piston and valve block assembly removed from the pump as described in the text. The hole shown in the left photograph between the air tubes is one of the lubricating points. In the right photograph the paired air holes of the block are seen; clogging of these is a common cause of decrease in air output

the moving parts, and a complete factory overhaul is the only sensible answer.

In fact the makers offer just such a service, and whilst it is not particularly cheap it does mean that you get back what amounts to a virtually new pump at around a quarter of the 'new' price, with the promise of many years of further service. The electrics are not included in this overhaul, but since the motor is of the 'induction' type (causing the rotation of the centre wheel by magnetic influence), and thus lacking any moving parts, it is likely to far outlast the other working parts of the pump. In running costs, these pumps are very economical, even the largest costing little over 1p each day in electricity.

To service the pump, it must first be dismantled into its component parts: the piston and valve block assembly is removed by undoing two counter-sunk screws. When this has been done (on both sides if it is a twin pump) the units should be soaked for a short while in paraffin. Whilst still under the liquid, the piston connecting rod is moved up and down to flush all gummy deposits from the inside of the cylinders. The airways should be carefully cleaned out with a matchstick (taking care not to damage the valve seatings) and the whole lot rinsed again in clean paraffin. The unit can then be dried on a piece of clean rag, with the connecting rod being moved up and down repeatedly until all trace of paraffin is removed from the inside. Before reassembly, add a small drop of oil to the two air-holes of each cylinder to re-lubricate the bores: these holes are accessible by swinging the cylinder around on the block. Re-assembly is quite straightforward. Each part should now be oiled before switching the pump on, and it should be allowed to run for a few minutes before the airlines are connected to flush out any fumes or traces of oil in the bores or airways.

Now the air distribution system should be reviewed—why not invest in a set of valves if you have a number of tanks to supply? These are cheap (particularly the plastic variety), very easy to adjust, the setting rarely requires altering, and they can usually be screwed or taped in a convenient position to provide a 'battery' of air controls. Airstones should be checked, and any that you cannot easily blow through must be rejected. Some people soak them in vinegar, or have other favourite ways of clearing them, but this does seem a false economy in view of their low cost and infrequent replacement. The air outlets of some bottom or sub-gravel filters do also seem prone to blockage after a period of use: if they cannot be removed from the tank, try alternately sucking and blowing down the appropriate air line—this will eventually clear the obstruction with a sudden rush of air.

Enquiries about spares and servicing of Hy-Flo pumps should be addressed to: Medcalf Bros. Ltd., Cranborne Road, Potters Bar, Herts. A stamped, self-addressed envelope should be included, together with details of model type, serial number and colour of pump casing. The makers ask us to note that unfortunately deliveries of new pumps are very extended; servicing usually takes about 3 weeks.

COLDWATER SCENE

By FRANK W. ORME

September Tasks and Plans for the Months Ahead

SEPTEMBER usually sees many newcomers to the ranks of pond-keepers and it is noticeable how many gardens nowadays incorporate a pool as part of the garden design. In lots of cases the pools are very small pre-formed fibreglass mouldings, woefully inadequate for housing many fish, and certainly not suitable for wintering the fish outdoors, owing to their usual shallow depth.

If you are contemplating a pool, whether it be of concrete, fibreglass or one of the plastic pool-liners, ensure that the finished depth of water is not less than 18 in., but preferably 2 ft deep with a surface area to correspond, so that the water surface is at least twice as wide and long as the pool is deep. This deep area need not be very large, and can be arranged with a series of shelves upon which the water plants can be accommodated.

If a water fall, operated from a submersible pump, can be incorporated it will add much to the final appearance, and also oxygenates the water whilst tending to keep the water clear. My own pump is connected to a time-switch so that I do not have to worry about switching on and off. This is done automatically, operating from 10.30 a.m. until 8.00 p.m. irrespective of whether I am at home or not.

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If you have raised your young goldfish in heated conditions it is now essential that all heat should be removed so that the youngsters can become accustomed to normal fluctuating temperatures. As the water temperature falls the fish will adjust and become acclimatised to coldwater conditions. They will then be hardy enough to pass through the cold conditions of winter without mishap.

The final sorting of this season's young should now be made, if you have not already done so, so that as much extra space as possible is provided for each fish that has been selected, to make the maximum growth before the onset of the cold weather. This additional space will make all the difference to the well-being of the youngsters. It is useless to think that you can raise a large number of fish in crowded conditions. Even with aeration this just will not work. Try it and things will start to go wrong; certainly growth will be stunted. Well-grown fish require plenty of uncrowded space in order to make strong healthy growth.

Feed your fish well, little and often being the golden rule; it is surprising the amount of food that will be consumed if offered in small amounts at frequent intervals rather than in one great dollop. With correct feeding and plenty of space quite a fair amount of growth will still be made before the end of this season, and adequate reserves of fat will be built up to see the fish through their winter fast.

The adult fish in both the aquarium and pool must also be prepared for winter by giving a richer diet. Try to feed with plenty of chopped earthworm, in order to build up the essential reserves of fat that will see them safely through the coldest months of the year.

Pay attention to providing an ample and varied diet so that your fish are in a really strong healthy well-fed condition. There is then no reason, short of some mishap, why they should not emerge next spring, from their winter rest, in good condition without any outbreak of fungus.

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Preparation for next year's spawnings begins now; if the fish are given the correct and proper treatment all that should be required, in the early spring, is a gradual increase in feeding to bring the breeding pairs into condition—no artificial heat or other stimulus should be required as the natural increase in daylight and temperature will provide all the stimulus that the fish require.

This year has been a year of contrasts, judging from reports I have had from a number of goldfish breeders. Many, like myself, have been fortunate in obtaining spawnings very early in the season. Others had some difficulty and could not persuade the fish to present the longed-for spawning until quite late in the season. Many experienced fanciers blamed the mild weather of last winter for their difficulties and this could well have been the cause. I have found that unless the water temperature drops, and remains for some time at around 40°F or less, the fish will tend to remain active but have no great interest in food. The result is they use up

The author taking a rest from the chores of fish breeding on the wall of his raised pond

their reserves of fat and tend to get out of condition. Thus when spring arrives they prove much more difficult to bring into the tip-top condition necessary for a successful spawning.

Being a firm believer in goldfish being treated as coldwater fish, irrespective of the variety, they receive no gentle treatment or pampering from me. Therefore my greenhouse fishhouse is not insulated against the cold, although a fan heater is switched on as soon as ice forms upon the water surface in the aquaria. The heater is controlled by a thermostat set to switch on at just below freezing point and switch off at one degree above freezing. The idea is not to keep the fish warm but to protect my tanks against ice damage, and in a really hard winter it is quite often found that up to a quarter inch of ice will form in the aquaria. I have never lost a fish under these conditions although occasionally a fish will 'go heavy' through swimbladder trouble. Should a fish develop this complaint I am not unduly concerned, for it proves that it is unable to stand up to the rigorous conditions which I provide and would not be suitable for breeding from, in case the weakness were passed on to its offspring.

This treatment will eventually result in fish that are hardy, resistant to extremes of temperature and, even more important, resistant to many of the more common complaints that seem to affect so many goldfish. In other words a coldwater fish is produced rather than a soft delicate pet.

Having said all of that I will now add that, although last winter was very mild, there were a number of occasions when my fish were semi-dormant for periods of 2 weeks or so and this, I think, helped towards obtaining my early spawnings, although March is usually the month I expect to commence the breeding programme.

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About this time of the year in the pond larger water lily leaves will be showing signs of decay. These should be removed with as much of the stem as possible in order to allow the younger leaves, which are still developing, more light and room.

Attention should also be given to the marginal plants. The more vigorous species should be ruthlessly thinned to prevent the more slowly growing types being crowded out and thus spoiling the proper balance which you have created.

Blanket weed may have reared its ugly head and be floating, in unsightly masses, on the water surface. This can be removed with a rake or by twisting a twiggy branch in the blanket weed, which, after you have wound it around the twig, can be lifted out and removed. Take out as much as you can because it will now be dying back and if left in the pool can help to cause pollution.

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During recent weeks quite a few people have mentioned to me that, having become interested in coldwater fishkeeping, they have joined their local society only to become disgruntled when they find that the majority of members are tropical fish fanciers. They find that the club caters in the main for the interest of these hobbyists, having a programme that provides little to interest or educate the coldwater fancier. There are, of course, two specialist societies in the coldwater field, both being national organisations, who would welcome the newcomer as a member. The Goldfish Society of Great Britain has recently celebrated its twenty-fifth year since being founded in 1947 and, as the Society's title implies, caters solely for the hobbyist interested in the various varieties of fancy goldfish. For the person whose interest is in koi then the British Koi-Keepers Society is the obvious answer. If the reader is interested in further information, and I would suggest that these

organisations are worthy of your membership, then an addressed, stamped envelope with your enquiry to either Mrs H. M. Allen, secretary to the British Koi-Keepers Society, 1 Anthony Close, Peterborough, or Mrs M. Dudley, acting secretary, The Goldfish Society of Great Britain, 163 South Park Road, Wimbledon, S.W.19, will bring full details of membership, which is of course, the ideal way to obtain the specialised information and advice which those societies can offer.

DECORATING THE MARINE AQUARIUM

Concrete as a Means of Creating Aquarium 'Rockwork'

By JOHN F. SPRAQUE and GRAHAM C. ROBERTSON

WHEN an aquarist turns his attentions to decorating a marine aquarium he may consider a number of possibilities. Corals come high on the list, then perhaps a few pieces of alga-covered rock and some sea fans for the back of the tank. There is, however, another form of decoration which may be used and can play an important part in the functioning of the aquarium. This involves the use of concrete, either to cover the back and sides of the tank or as separate pieces. Before going on to discuss the respective merits of these two methods, what are the advantages of using concrete in a marine tank?

First and foremost it looks extremely natural and effective. The lime content of the concrete helps to keep the pH at a high value, even in an undergravel-filtered tank where the pH tends to drop owing to the production of acids. Rough concrete provides an excellent base for algae to grow upon (particularly thread algae, which will not grow well on glass). 'Rockwork' can be made to measure and can be used as flat backgrounds or as individual pieces of rock. In this article we will restrict ourselves to discussing the use of concrete as a background.

By having the concrete covering the back and sides, the tank can be made to lose its box appearance and a more natural effect can be produced.

Two methods can be used. Either flat sections can be made, which fit against the back glass, or the back and sides can be completely covered with a thin skin of cement.

The first method, i.e. flat sections, requires the initial use of a frame so that the section will fit the tank properly. The inside measurements of the tank must be taken, so that the frame can be constructed with, say, ½ in. less height and length than the measurements of the tank. A flat board ¾ in. thick is used as the base, and covered with a sheet of polythene to prevent the cement sticking to it. Screwed on to this are ½ in. thick wooden strips to hold the concrete in while it sets. A 2 in. deep strip at the back, a ¾ in. strip at the front and tapering strips at the sides allows for a section to be constructed with a wide base, so giving it more stability. To further increase its strength a piece of wire mesh, slightly smaller than the finished backing, is rested on glass or slate blocks placed in the frame. Care should be taken to see that in the finished product none of the mesh comes in contact with sea water.

The cement mix is made up of three parts of coarse sand to one part of cement and enough water is added to make an easily workable mixture. The cement is placed in the frame in handfuls and carefully worked through the mesh and into the corners of the frame. Care must be taken not to flatten the mesh in the process. When the frame is three-quarters full begin shaping the face, keeping in mind the finished product. A sharp tool or nail can be used to score grooves to represent rock strata, but do not score too deeply as this will weaken the structure. Once finished, cover the concrete with a sheet of polythene. This will cause it to dry slowly and so increase its strength. When completely dry, after about 5 days, remove the polythene and wooden frame and allow a further 2 or 3 days for the section to harden.

Before the concrete can be used it must be cured, but as this process is the same for the next

A natural rock formation demonstrating the parallel formation of strata lines and breaks, which should be imitated in concrete work to produce a natural impression

method to be discussed, we will leave it till later.

The second method of using concrete is to line the back and sides of the tank with a thin skin of concrete. This has the advantage of looking more complete and natural, but once applied it is virtually irremovable without breaking the glass.

The cement should be mixed as before but should not be too wet or it will slide down the glass and not hold its shape. If an undergravel filter is being used it can be built into the system and expanded polystyrene used to fill in large gaps between the airlift and the tank walls. This can then be covered with cement.

The method of applying the cement is straightforward. The glass is given a wipe with a damp sponge and then, starting from the bottom and working upwards, cement is applied to the glass. It is pressed against the glass and spread out with the back of the fingers until the overall thickness is only about ¼ in. Tools can be used if preferred but a more natural appearance is gained by using just the hands.

The cement is slowly built up along the back and sides of the tank until the top of the glass is reached. If small bumps and irregularities are left these will add to the natural appearance of the tank. It is, however, best not to score the concrete lining as it is usually not deep enough for this. If the glass is dampened first the cement (provided that it is of the correct consistency) will easily stick to a vertical pane of glass. If it is wished corals, shells, rocks etc. can be pressed into the wet cement but this is not recommended since it can make the catching of fish extremely awkward.

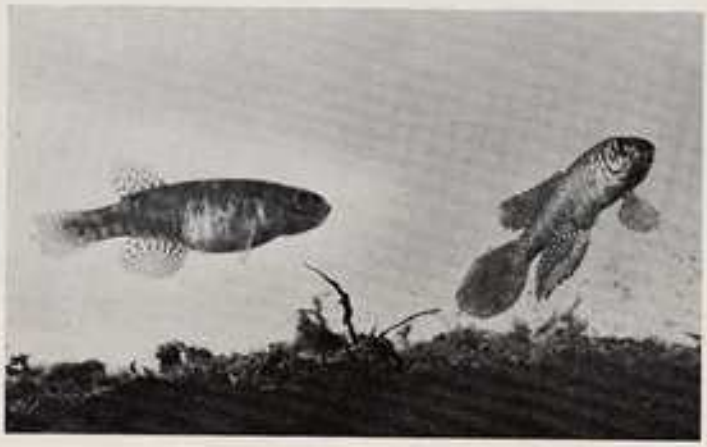
As before, the concrete should be left to dry thoroughly for about a week. The method of curing, although rather drastic, is essential to get rid of the excess of lime in the cement. If a separate backing section is used it can be placed in a large tub or in the tank it is to be used in. Fill the tank with water and add 2 fluid ounces of concentrated hydrochloric acid. (*Be very careful when handling the acid as it will burn* and any splashes should immediately be washed off under a running tap.) If concentrated acid is not available then larger quantities of dilute hydrochloric acid can be used. Test the water daily with blue litmus paper, which turns red in acid. As soon as the paper ceases to turn red add more acid to the water until the red reaction persists for some time after the addition of some acid. At this point most of the acid will have been neutralised.

The concrete should now be scrubbed and well rinsed in fresh water to remove all traces of the acid. The concrete pieces may also be stood outside for a week or two to weather. Should the pH of the water in your set-up tank be found to rise unduly the curing process can be repeated.

Although a somewhat irksome process, the use of concrete in the aquarium can create a final effect which is both pleasing to the eye and helps to keep the sea water in good condition.

Spawning of an Egglaying

Beauty from BRAZIL



Cynolebias whitei

By RUDOLPH ZUKAL

THIS lovely representative of the family Cyprinodontidae was described for the first time in the year 1942. It was named after its discoverer, Thomas D. White, who found the fish in the vicinity of Cabo Frio in Brazil. In this region of South America the climate has lost its tropical character and very great differences of temperature prevail. Ice-cold winds can blow across the pampas, cold rainfall floods the land and then in the summer the hot sun dries everything out and changes the surface of the land into a dry, cracked crust from which all living things disappear.

It is because of the exigencies of life in such a habitat that the fish's specially adapted life-pattern stems, in order that it can live at all under such conditions. *Cynolebias whitei* are found in large, very shallow swamps, ponds, water-holes and the canals in towns and villages, which are filled with water only for limited periods at certain times of the year. At other times these holes and canals become dried out apparently completely, although in fact, under the crust the mud is damp and remains so throughout the hottest summer. Various forms of life—for example, frogs, and so on, dig themselves into the mud and like that await the first drops of the first rains. The little *Cynolebias* can breathe only with the help of its gills and cannot dig itself deep into the mud. So it has had to find other means whereby the species can survive such inhospitable natural conditions.

Photographs by the author

Translated by F. MARSH

The male fish in the photograph opposite is on the right, and is seen displaying to the female just above the layer of peat on the aquarium bottom. In the adjacent photograph the female nudges the male apparently as a signal of her readiness to spawn

When the waters begin to dry up, the fish spawn, laying countless numbers of eggs. Soon afterwards, the fish themselves die from lack of oxygen. But when the destructive heat waves give way to the rains, life begins to stir in the eggs. After a short while, the brood is free-swimming and, with plentiful food, the young fish are themselves ready to reproduce after 2 to 4 months.

The male differs from the female in having greater fin development and also having the bigger, stronger body; but in any case the female has a black fleck in the middle of each side of its body. The female grows to about 2 in. and the male reaches 2¾ in. or sometimes even more. They are voracious eaters, which is only to be expected with their short life-span. They are also peace-

In this spawning the pair of *Cynolebias whitei* deposited their eggs over the gravel bottom beneath a mat of fine plant growth. The male is nearer to the camera

loving but are not really suited to a large community tank and are best kept in a small tank at not too high a temperature (64°F; 18°C).

Propagating these fish does not present as many problems as one might suppose. They are bottom-spawners and for the purpose of breeding them a small tank is prepared, with soft water and with a soft substrate, preferably peat. The fish spawn readily at a temperature of 70–75°F (22–24°C).

As soon as the female, when ready to spawn, approaches the male he spreads his fins and displays. The female fish then rams the male, who has by now taken up a perpendicular position. Pressed together, the fish swim to the bottom to spawn. At each penetration into the peat just a few eggs are laid. Altogether the spawning lasts for several hours, and with good feeding the fish will spawn again the next morning. *Cynolebias whitei* are not likely to eat the eggs and so the parents can be left in the spawning tank for a week. After this, the fish should be removed from the tank and the water carefully siphoned out. The peat containing the eggs is left to dry out slowly to the state where it remains a little damp. Then the peat is covered with glass and the tank kept in a cupboard in darkness. After 10–12 weeks, soft water, at a temperature of 70–75°F (22–24°C) is added to the tank and after 12–24 hours free-swimming fry will be seen. They must immediately be given the finest fry food. A daily addition of a little normal tapwater will slowly accustom the young fish to more normal conditions. The fish seem to grow visibly; they are hardy and are not susceptible to temperature changes.

It might be noted that the period during which the eggs can be stored may be extended for longer than the 12 weeks I mentioned—indeed possibly for as long as 6 months.

Are Fish Prices too Low?

asks CLIFF HARRISON

WHO these days, I wonder, would be prepared to pay over a pound for a young neon tetra, or half as much again for a bumble bee? How about £1.50 for a heater, or upwards of £3 for a cheap air pump? Few of us would enthuse over these prices, I fancy, yet these were the real costs of those items 20 years ago, once allowance has been made for the fall in the value of the pound since then.

Reading through the advertisements in aquatic journals of the early 1950s, one can see that many of the prices were much the same as those seen nowadays (except that they were in shillings and pence then, of course), despite the fact that the cost of living has trebled over the period. Most of the popular community fishes were advertised at 3s 6d each or more, with a very limited selection below that price. Male Siamese fighters were offered at 7s 6d and 10s, glowlight tetras at 5s, penguins at 4s 6d, and the ever-popular *Corydoras julii* was an amazing 17s 6d.

So to what do we owe the cheapness of our hobby nowadays? The answer is simple—its enormous popularity. Fishkeeping has become big business, and the economies of catering for what has developed into a world-wide market has meant a steady reduction in real costs—a reduction which, with the fierce competition existing in the hobby, has been passed on to the customer.

Gone are the days of fishes being packed into insulated metal drums to make their laborious way around the globe in slow piston-engined aircraft. The use of modern jets, together with big improvements in handling arrangements, has meant that fishes can be crowded into plastic bags, containing a minimum of water so as to save weight, and yet arrive rapidly at their destination with a minimum of casualties.

These improvements in transport have also meant the more regular importation of many unusual or delicate species which previously had been seen by most fishkeepers only as photographs or drawings in reference books. However, the popularity of these rare and more exotic fishes tended to be at the expense of many of the more popular varieties of the past: 'cultivated fishes'—platys, swordtails, mollies and the like—have perhaps been the hardest hit over the years, since their quality is directly dependent on the amount of time and effort put into their breeding and rearing.

Such fishes require years of constant devotion if a good, true-breeding strain is to be achieved, and hobbyists from the immediate post-war years will continue to recount (at every opportunity) tales of the huge, magnificently coloured specimens

Continued on page 248

by
ARPEE

Personal COMMENT

ONE of the facts of life against which I have rebelled since my earliest days of awareness is the notion that light bulbs must of necessity have the ridiculously short life which their manufacturers give them, because to do otherwise would dispossess thousands of lowly paid workers of their jobs. Despite the fact that it is economic nonsense as well as immoral, the wretched things still frustrate us by their unpredictability and fairly high cost as compared with the life-expectation of fluorescent tubes. In the domestic sphere, therefore, more and more consumers have changed from tungsten to fluorescent lighting in deference to the obvious economic appeal of the latter.

I was recently beset by that phenomenon familiar to all householders—the failure, within a few hours of each other, of several electric light bulbs around the house. The ensuing few days proved beyond doubt that there is some sort of deity watching the interests of light bulb makers, because no fewer than three fluorescent tubes also decided to withdraw their services, though in their case the customary flickering before final blackout lent a faint tone of decency to the proceedings. It so happened that I replenished the domestic fittings before those on my aquaria, and I noted with some satisfaction that a 5-ft. tube (60/80W) yielded 25p change from a £1 note.

What a difference there was when I went to my dealer to buy a Gro-Lux 20W replacement. In this case there was only 35p change out of £2! I have no doubt that the number of this type of tube actually in demand from day to day is quite small as compared with the larger domestic types, but can anybody in the lighting trade advance an explanation as to why the differential has to be so large? On the basis of fair comparisons there seems to be something quite unnecessarily wrong with a situation in which something which so clearly costs less in materials should find its way on to the market at such an inflated price. Since the main value of Gro-Lux is its aesthetic appeal it does rather seem that we are paying more than we should for the privilege. Those aquarists—particularly dealers—with long runs of aquaria seem to be turning more and more to white lighting, using conventional tubes, and when one looks closely at the relative costings it is not by any means surprising.

The Radio 4 programme 'Gardeners' Question Time' has always proved something of an oasis to me, and I seldom miss a single edition. Like thousands of other gardeners in this country I tune in each Sunday at 2 p.m. to learn a little more about how to cope with the mysteries of horticulture, and to gain some solace that I am not alone in my sufferings. Just occasionally, though, the experts come to grief, and more often than not this is when they get out of their depth on the subject of water gardening: this is hardly surprising, as there are few acknowledged masters of this particular craft, and apparently there is little call for such when 'instant pools' are the order of the day. The age of plastic has enabled every little commercial jobber to compress into a four page leaflet everything there is to know about the water garden, and it is not therefore surprising that what should be a simple matter very often isn't. And vice versa, of course.

Thus, in one correspondence edition, in which listeners' letters were dealt with, a lady had asked how to rid her water lilies of greenfly. The suggested countermeasures were to sweep them off with a brush (F. Loads), buy some orfe, which would eat them (F. Sowerbutts) and the use of vegetable-derived insecticides such as pyrethrum or nicotine in conjunction with soapy water (A. Billitt). During the programme there were irreverent allusions to the likelihood of F. Loads becoming a submerged hazard to F. Sowerbutts' flying fish, or some such flight of fancy, but I was most surprised that Arthur Billitt's statement was virtually unchallenged. Bearing in mind that the pool in question contained goldfish it struck me at the time that the use of any sort of insecticide under these conditions would be extremely risky.

True, F. Loads did reject the notion of turning to medicaments and poisons of one sort or another every time a pest appears, but I certainly expected him to suggest a perfectly safe and simple method which he has long advocated for dislodging aphids from garden plants, namely the powerful spray from a well stopped-down garden hose. By this means nothing harmful whatever would have been introduced to the pool, the addition of water would have probably helped to keep it topped up, and the fish would have swum round happily afterwards for an hour or so, snapping up the bounty. A repetition of this exercise for a few days should make a considerable difference to the well-being of those lilies completely without harm to the fish.

Whilst there could be conditions under which the very careful use of the insecticides mentioned would lead to no losses, I think it should be borne in mind that the effect of poisons on fish will vary both according to the species and to the size of the fish. One might well get away with a given concentration in relation to breeding goldfish (though I would hate to try it!), but if these goldfish had spawned and fry were present, the result might be totally dissimilar.

After the programme I walked down to the garden shed and looked at the label on a bottle of 'Py' pyrethrum insecticide, and the health warning stated quite categorically that although the mixture was harmless to humans and to most domestic animals, aquaria should be covered up if the spray were used indoors. The Gardeners' Question Time panel, quite rightly, insists on the most stringent adherence to all makers' instructions on gardening preparations, and in this case, as generally, they would have done well to have taken greater heed of their own wise counsel.

For those who may have missed the programme it is worth mentioning that it was stated that prevention is better than cure. It was the opinion of the panel that the aphids which so plague water lilies come from the thousands of eggs which have overwintered on such as fruit trees. A regular winter spraying, once annually, during the dormant period between November and the end of February, of growth likely to harbour eggs, is strongly recommended. This means almost anything woody, from roses upwards, and a tar oil wash, at a strength recommended by the manufacturer, is all that is needed.

Quarantine is a subject on which there are two very distinct schools of thought, and I find it very difficult to come down firmly on one side or the other. The considerations are very different according to whether you are a retailer or a wholesaler or a customer at the very end of the distribution line. It is good for the reputation of the former two categories for it to be known that they quarantine fish before sale, and for the average aquarist the habit seems to grow as he becomes more experienced—until certain doubts begin to set in.

The purpose of quarantine is to separate potentially sick fish from healthy ones, as, naturally, no-one in their senses would put an obviously sick fish in the same tank as fit ones. That, at least, was the dictum I grew up with, but it no longer seems to hold all-round acceptance. Time after time one sees retailers mixing new, diseased, arrivals, with healthy fish already in display tanks. Out comes a bottle of specific and a 'No Sale' notice (if you are lucky), and within a week the stock begins to move again. More and more individual fishkeepers also seem to take chances and put their latest acquisitions straight into their principal aquaria, relying on medication to put things right if necessary. By far the most feared diseases are white spot (both marine and freshwater) and oodinium—which also appears in both media but is more common in saltwater aquaria.

There was a time when freshwater 'ich' was both widespread and recurrent and the correspondence columns of the aquatic journals were full of the most sad stories as a consequence of its depredations. Not the least of the problems was the feature that several strains might be involved, certain of which had developed immunity to a range of available cures, and there were fervent hopes that something might be developed which guaranteed toxicity over the widest possible field. It may be too soon to sound over-optimistic, but it does seem that real progress has been made in this direction, and I wonder whether readers would agree with the proposition that ichthyophthiriasis (white spot disease) is now not what it used to be.

Oodinium never was much of a problem with freshwater species, though with marines it emphatically was and remains so. At the same time marine white spot seems to prove much less of a worry than its freshwater counterpart and is more easily eradicated. Both it and marine oodinium respond in greater or lesser degree to copper or copper-associated medications but so much more research needs to be made into the treatment of marine fish ailments that present advice must be regarded purely as provisional. Although there are numerous other sources of trouble for our aquarium fishes the above represents the commonest and greatest danger, and by and large the treatment is cheap and simple and can be carried out *in situ*.

It is tempting, therefore, to discount the need to quarantine new fishes purely on account of these risks. The increasing use of tranquillising drugs, which provide fishes with 'worry-free' transit, may have contributed very considerably to the lowering of outbreaks of freshwater 'ich', at any rate, which is so often attributed to the activation of the organism in correlation with the lowering of the disease-resistance of fish after a trying journey from overseas. Marine oodinium could also arise from similar causes, but is still far more prevalent than one would wish.

On the whole it seems that both freshwater 'ich' and marine oodinium, recognised early, are controllable without undue difficulty, and since movement from one environment to another so often seems to trigger off the onset of disease, many aquarists will consider that the single move

from the retailer's tank to their show tank is quite enough, and no doubt some readers will confirm that in some cases fish have appeared satisfactory whilst in quarantine, but that trouble has occurred after release to their final quarters.

There are numerous 'visible' diseases which appear on fishes that will, if we are wise, deter us from buying them at all, but if, for some reason, an unsound specimen of some much sought-after species is obtained, it is politic to keep it alone until at least 2 weeks after all signs of trouble have disappeared. The beginner is strongly advised not to accept any diseased or damaged fish, whatever advice the seller may give: such fish are only for the experts, and even they will spurn them, save in exceptional circumstances.

The aquarist with limited resources may therefore gain some little comfort from the fact that quarantine may be relaxed under certain conditions. The species in question will determine to a large extent whether the risk is high or low, and one must also weigh whether the fact of quarantining may adversely affect the fish, especially in the case of nervous, panicky species. Adults, strangely, seem to be more prone to 'quarantine sickness' than juveniles. If in any doubt the floating quarantine tank will generally serve a turn with freshwater fishes, but if you use this somewhat risky device for marines, do make sure that the container is big enough and that it has adequate aeration, otherwise the hospitalisation will be found to have proved deadlier than the notional complaint.

Ready Breeder for Beginners

Mature zebra males (left) are slimmer than females

By

JAMES DUNBAR

Photographs by the author

AS an easily kept and attractive community fish the zebra (*Brachydanio rerio*) sooner or later turns up in most people's tanks. It is also an ideal fish with which to commence breeding egglaying species. It can be brought into condition in the community tank, by feeding with flake food, tubifex and daphnia when available. Zebra fish are easily sexed, the females being deeper-bodied and heavier than the slender males.

The breeding tank I use is 18 in. by 10 in. by 10 in., the base of which is covered with marbles. Artificial hair grass is placed in clumps, to give the females somewhere to seek refuge, after spawning, from the ever-chasing males. Water is added to a depth of about 4 in.; this shallow depth is to prevent the parents from eating their eggs. The parent fish can turn so quickly that in a deep tank they would eat their own eggs before these reach the safety of the marble layer.

The temperature of the water in the breeding tank is between 68° and 70°F (20–21°C). I place five 'ripe' females in the tank and, after 2 days in

A team of four female zebras with two males in a tank prepared for breeding. The bottom is layered with glass marbles to form a trapping area for the eggs, so that the parents cannot reach them to eat them. After spawning is over the parent fish are removed from the breeding tank

which they settle into their new surroundings, on the night of the second day the males (one male to two females) are placed with the females.

Spawning usually takes place in the morning. Each male selects a female, spreads his fins and darts in front of her, eases off and butts her in the belly region. He then takes up a place close beside her and for a split second 'holds' her with his tail and dorsal fin. As the fish separate the eggs fall to the base. This behaviour continues until the females are spent.

When spawning is completed both males and females are moved back to the community tank. The eggs hatch out in 36 hours and fry become free-swimming on the seventh day. The fry can be immediately fed on fine dried food, brine shrimp and micro worms. Young zebras are quick growers, reaching 1½ in. in about 3 months.

For the beginner I can think of no other fish which requires so little attention; it is in fact the ideal fish for the beginner.

Are Fish Prices too Low?

continued from page 244

that were then available. Certainly the platys of today bear little resemblance to those of a few years ago, as a quick glance at the FBAS Standards booklet will confirm.

So what of the future of the hobby? Prices for popular items of equipment have almost certainly reached rock-bottom, and are likely to keep pace with the general cost of living trends. Other items will always be expensive in view of the limited market they have—ozonisers and automatic fish feeders are good examples. On the fish front, retailers have been able to absorb many of the increases in wholesale prices over the last few years, but this is a situation that cannot continue indefinitely. For the importers freight costs are a major item, representing even more than the asking price of the fish in Singapore.

There are around a dozen and a half firms regularly importing fish in quantity, and one of the largest reckons to deal with over a million fish each year. As new sources of fishes are discovered and commercially exploited—as was the case with the Lake Malawi cichlids—so more and more of the old favourites, from times when variety was severely restricted, get forgotten.

Are we perhaps becoming lazy, and inappreciative of the enormous selection of rare and unusual fishes that is to be found in the larger aquatic stores? Are prices, of stock at least, far too low? A general increase in prices, or shortage in the wild, might well encourage the home breeding of good quality fishes again. It certainly seems that for many people much of the fun and the challenge has gone out of fishkeeping in the last decade or so. What do you think?

Aqua GLOSSARY

No. 13

A PFM guide to the meanings and accepted pronunciation of the scientific names of aquarium subjects, arranged by word-roots in alphabetical order

Crypto, Krypto (Greek): hidden. Pronounced 'kript-oh'. In the water plant genus *Cryptocoryne* ('kript-oh-**kor**-rin-eh') the name indicates the concealed club-like group of stamens (*coryne*, Greek: club). The glass catfish (*Kryptopterus bicirrhis;* 'krip-top-**terr**-uss by-**kir**-riss') has a generic name meaning literally 'hidden fin'.

Gastro (Greek): stomach, belly. Pronounced '**gas**-troe'. For example, the generic name of the stickleback (*Gasterosteus aculeatus*: 'gas-ter-**ros**-tee-uss ah-kew-lee-**ah**-tuss') means literally 'bony belly' (*osteo*, Greek: bone). In the hatchet fishes the hatchet-blade shape of the ventral surface gives rise to the generic name *Gasteropelecus* ('gas-ter-oh-pel-**ee**-kuss') (*pelekus*, Greek: axe). The American red-belly dace (*Chrosomus erythrogaster*; 'krow-**soh**-muss air-rith-row-**gas**-ter') at spawning time is described by its trivial name (*erythro*, Greek: red).

Linea (Latin): line. Pronounced 'lin-**nee**-ah'. For example, fishes having longitudinal stripes (lines) that feature in the trivial name are *Aplocheilus lineatus* ('ap-loh-**ky**-luss lin-ee-**ah**-tuss'), *Neotoca bilineata* ('nee-oh-**toh**-kar bi-lin-nee-**ah**-tah') and *Rasbora trilineata* ('ras-**bor**-ah try-lin-nee-**ah**-tah'). The seven-spot barb *Barbus lineomaculatus* ('bar-buss lin-nee-oh-mack-yew-**lah**-tuss') has the spots very close together, forming a line.

Noto (Greek) back. Pronounced 'no-toh'. The generic name of the knife fishes (*Notopterus;* 'no-top-**terr**-uss') means literally 'back fin'. The spiny dorsal fin of *Notacanthus* ('no-tah-**kan**-thuss') is referred to in this generic name (*acantho*, Greek: spiny).

Pleuro (Greek): rib, side. Pronounced '**ploo**-roe'. For example, the trivial names of the porthole fish (*Poecilistes pleurospilus*; 'pee-kill-**iss**-tees ploo-roe-**spy**-luss') and of the chequered dwarf cichlid (*Apistogramma pleurotaenia*; 'ap-**iss**-toh-gram-mah ploo-roh-**tee**-nee-ah') describe the markings on the sides of the fishes (a row of spots on the former species and a ribbon-like band on the latter species; *spilo*, Greek: spot, *taenia*, Greek: head band or ribbon).

Urus (Latin): tail. Pronounced 'ur-uss'. In the trivial names of the marine species *Chaetodon xanthurus* ('**kite**-oh-don zan-**thur**-uss') and *Zebrasoma xanthurus* (zebra-**soh**-mah zan-**thur**-uss') the yellow tails of the fishes are indicated (*xantho*, Greek: yellow). The tail of the damsel fish (*Pomacentrus taeniurus*; 'poh-mah-**sent**-russ tee-nee-**ur**-uss') has two ribbons of colour as shown in the trivial name (*taeni*, Greek: band, ribbon). *Acanthurus* ('ah-kan-**thur**-uss') is the generic name of the marine tangs or surgeon fish (*acantho*, Greek: spiny).

Club News

FBAS Basic Show Class Letters: **A,** furnished aquaria and aquascape; **B,** Barb; **C,** characin; **D,** cichlid; **E,** labyrinth; **F,** egglaying toothcarps; **G,** tropical catfish; **H,** Corydoras and Brochis; **J,** rasbora; **K,** danio and W.C.M.M.; **L,** loach; **M,** a.o.s. tropical egglayer; **N,** pairs of fish; **O,** guppy male; **P,** guppy female; **Q,** swordtail; **R,** platy; **S,** mollie; **T,** a.o.s. livebearer; **U,** singletailed goldfish; **V,** twintailed goldfish; **W,** a.o.s. coldwater; **X,** breeders classes; **Y,** marine fish; **Z,** plants.

DESPITE a downpour on the day of the Show, **SANDGROUNDERS' AS** third Open Show this year was their most successful and largest yet. Visitors and exhibitors from all over the north of England saw Howard Kendall, captain of Everton FC and Footballer of the Year, presenting the following trophies: Steve Hooton trophy, best breeders, Mr E. Leadbetter, who also received the Fish Pad trophy for exhibitor with most points and the Sandgrounders trophy for best livebearer; Oceanarium trophy for best aov, Mr R. Francis; V. V. Pedlar shield for best marine, Mr R. Black; Stephen Howard trophy, best coldwater exhibit, L & P. Graham; Chairman's trophy for best characin, Mr P. Whelan; Peter Ground trophy, best cichlid, Mr H. Ormesher; Holland Motors trophy for best fish in show, Mr E. Ormesher; Stephen Hughes trophy, best anabantid, Mr A. Gregory. Detailed results were:

Guppys: 1, Mr P. Hall (Runcorn, 73); 2, Mr E. Leadbetter (Fleetwood, 72); 3, Mr G. Williamson (Hyde, 71). Swordtails: 1 & 2, Mr R. Black (Fleetwood, 72, 73); 3, Mr S. Clarke (Altrincham, 70). Platys: 1, Mr C. Norton (Sandgrounders, 76); 2, Mr W. D. Haddow (Hyde, 74); 3, Mr R. W. Carter (Merseyside, 72). Mollies: 1, Mr E. Leadbetter (section winner, 77); 2, J. & B. Hall (Altrincham, 76); 3, Mr R. W. Carter (74).

Anabantids, small: 1, Mr S. Clarke (73); 2, R. & C. White (Leigh, 70); 3, Mr K. J. Payne (Merseyside, 68). Large: 1, Mr A. Gregory (Nelson, 78, section winner); 2, Mr J. Beardman (Leigh, 74); 3, Mr K. Welsh (Independent, 70). Siamese Fighters: 1, Mr S. Clarke (73); 2, Mr & Mrs Toyne (Sheaf Valley, 70); 3, Mr A. Waterhouse (SG, 66). Cichlids, small: 1, L. & P. Graham (E. Lancs, 76); 2, Mr P. Whelan (Blackburn, 74); 3, Mr & Mrs Toyne (74). Large: 1, Mr D.

Grogan (Accrington, 77); 2, Mr E. Leadbetter (75); 3, Mr Wilkinson, 74). Rift Valley cichlids: 1, Mr H. Ormesher (SG, 70, section winner); 2, Mr C. Norton (76); 3, Mr S. Hooton (SG, 74). Angels: 1, Mr E. Leadbetter (76); 2, Mr & Mrs Toyne (75); 3, Mr A. Gregory (73). Characins, small: 1, Mr M. Lennox (Belle Vue, 77); 2, Mr P. Whelan (73); 3, Mr A. Waterhouse (74). Large: 1 & 2, Mr P. Whelan (78, 75); 3, Mr R. Walker (Morecambe Bay, 73). Barbs, small: 1, Mr S. Wright (SG, 76, section winner); 2, Mr & Mrs Birdsall (Airsborough, 75); 3, Mr S. Clarke (72). Large: 1, Mr E. Leadbetter, 75); 2, Mr R. A. Barton (Horsham, 74); 3, Mr B. Sumner (SG, 70).

Rasboras: 1 & 2, Mr E. Leadbetter (75, 74); 3, Mr & Mrs W. Smith (Ossett, 74). Minnows: 1 & 2, Mr & Mrs Toyne (71, 69); 3, Mr & Mrs W. Smith (68). Danios: 1 & 3, Mr D. Whiteside (BKA, 76 section winner, 73); 2, Mr M. Titterington (Hyde, 73). Killifish: 1, Mr P. M. Goodwin (BKA, 77); 2 & 3, Mr P. K. Brown (BKA, 73, 72). Small catfish: 1 & 2, P. & M. Batchelor (Lowne, 73, 72); 3, Mr B. W. Carter (Merseyside, 70). Any Catfish: 1, Mr E. Leadbetter (75, section winner); 2, Mr D. Armour (Ellesmere Port, 76); 3, P. & M. Batchelor (70). Loaches: 1, Mr R. I. Payne (73); 2, Mr A. Weedon, (74); 3, P. & M. Batchelor (72). Sharks: 1, Mr J. S. Hall (77, section winner); 2, Mr T. Hampton (Merseyside, 75); 3, Mr D. Whiteside, 72). Flying foxes: 1, Mr S. Clarke (69); 2 & 3, Mr J. Hall (Runcorn, 68, 67). Pairs, livebearers: 1, Mr P. Whelan (76, section winner); 2, Mr & Mrs Toyne (73); 3, Mr & Mrs Birdsall (Airsborough, 71). Egglayers: 1, Mr J. S. Hall (73); 2, R. & C. White (Leigh, 71); 3, Mr B. Sumner (SG, 70). Breeders, livebearers: 1, Mr A. Waterhouse (74); 2, Mr E. Leadbetter (71); 3, Mr S. Hooton (70). Egglayers: 1, Mr E. Leadbetter (75, section winner); 2, Mr D. Whiteside (73); 3, Mr R. Clift (SG, 72). any Tropical: 1, Mr R. Francis (Loyne, 79); 2, Mr J. S. Hall (77); 3, Mr R. Whiteside (70).

Common goldfish: 1, Miss June Baxter (N. Goldfish, 73); 2, Mr & Mrs B. G. Holroyd (Morecambe Bay, 72); 3, Mr J. S. Hall (72). Fancy goldfish: 1, Mr A. Baxter (N. Goldfish, 75); 2, Mr C. Whitney (Accrington, 74); 3, Mrs Harvey (Merseyside, 73). any Coldwater: 1, L. & P. Graham (E. Lancs, 77, section winner); 2, Mr J. S. Hall (75); 3, Mr S. Walsh (Accrington, 74). Junior livebearers: 1 & 2, S. Clarke (74, 73); 3, Master D. Roberts (Oldham, 74). Junior egglayers: 1, I. Armour (Ellesmere Port, 76, section winner); 2, L. D. Watkins (Greenwood, 73); 3, S. Lennox (Belle Vue, 74). Ladies: 1, Mrs E. Ormesher (SG, 80); 2, Mrs Walker (Morecambe Bay, 76); 3, Miss Crabtree (Airebrough, 74). Marines: 1, 2 & 3, Mr R. Black (Fleetwood, 72).

Those interested in joining the Society, with its regular lectures, films and slides, table shows, auctions and quizzes should contact secretary Mr S. Hooton, 81 Radnor Drive, Southport, Lancs: phone 24743 (0704).

THE new meeting place of **SHREWSBURY & DAS**—the Castle Hotel, Coleham, Shrewsbury—has proved to be very successful. Two slide/tape shows have been projected and narrated there by Mr Ed Harvey; one, a Fish Quiz, included some beautiful slides of fish and in particular of some large and flamboyant catfish that are the property of the noted American aquarist, Mr Brad Walker. The second lecture was Diane Schofield's 'So You Want to be an Aquarist'. Trips are being arranged to the Midland Open Show and to BAF at Belle Vue. Member Mr W. G. Jones has again been presented with the Society Shield for Aquarist of the Year.

RESULTS of the **BILLINGHAM AS** Open Show are as follows:

any Sword: 1, Mr & Mrs Coates (S.Shields, 80+); 2 & 3, Mr & Mrs Somerby (Mt Pleasant, 70, 77½). Small characins: 1, Mr & Mrs Coates; 2 & 3, Mr P. T. Robinson (Mt Pleasant, 69, 68). Tighters: 1, Mr A. Cuchin (Castleford, 76); 2, Mr B. Cooper (Peterlee 73½); 3, Mr & Mrs G. Brown (Half Moon, 69). Livebearers: 1, Mr S. J. W. Mowbury (Mt Pleasant, 78); 2, Mr B. Cooper (73); 3, Mr S. Smith (Peterlee, 70). Small barbs: 1 & 2, Mr D. Nagle (Redcar, 68, 67½); 3, Mr & Mrs Wells (Doncaster, 65). *Corydoras & Brochis*: 1, Mr & Mrs Wells (73); 2, Mr J. Chamberlain (Hartlepool, 72); 3, Mr & Mrs Attwell (BAS, 70). any Guppy: 1 & 3, Mr Gillespie (Castleford, 78, 73½); 2, Mr L. Smith (Castleford, 74). Juniors: 1, J. Chamberlain (Hartlepool, 67); 2, T. Roper (BAS, 66); 3, Master A. Thompson (Half Moon, 64). ELTC: 1, Mr & Mrs Milne (Doncaster, 63); 2, Mr L. Smith (64); 3, Mr A. Cuchin (61). any Coldwater: 1, 2 & 3, Mr B. Edwards (Half Moon, 78, 75, 73). any Tropical: 1, Mr S. Smith (77); 2, Mr Wainwright (Hartlepool, 73½); 3, Mr B.Slade (BAS, 73). Rift Valley cichlids: 1, Mr R. Atherton (Hartlepool, 71½); 2, Mr P. Cove (Half Moon, 65); 3, Mr & Mrs A. Saunders (SAS, 64). Large characins: 1, Mr & Mrs Watford (Cleveland, 80+); 2, Mr J. Furness (Castleford, 77); 3, Mr R. Rodway (Peterlee, 67). Large barbs: 1, A. & L.

SHOW '73

Old Hall, Vincent Square, London SW1

Friday **2nd November**

Saturday **3rd November**

Sunday **4th November**

SPECIAL FURNISHED AQUARIUM COMPETITION—FOR AQUATIC RETAILERS ONLY

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1973 Supreme Championship Fish Contest (F.B.A.S.)

Last year's winner (right) Mr R. Isley (Basingstoke)

Barnett (Castleford, 76); 2, Mr R. Atherton (79); 3, Mr J. Beavers (Hartlepool, 69). Angels: 1, Mr J. Rayel (Hartlepool, 79); 2, Mr A. Crossley (BAS, 68); 3, Mr P. Wright (Houghton, 67). see Labyrinth: 1, Mr R. Smith (76); 2, Mr D. Sudron (BAS, 73); 3, Mr & Mrs Milne (73). Egglayers, pairs: 1, Mr R. Cooper (74); 2, Mr A. Cachin (73); 3, Mrs Wills (Half Moon, 72). see Cichlids: 1, Mr H. Garthwaite (Ind., 73); 2, Mr & Mrs A. Saunders (71); 3, Mr J. Beavers (71). Loach: 1, Mr & Mrs Walker (BAS, 79); 2, Mr J. Ryan (BAS, 59); 3, Mr Wandsworth (Half Moon, 69). Barbarus, danios & minnows: 1, Mr & Mrs Attwell (BAS, 77); 2, Mr B. Cooper (74); 3, A. & L. Barnett (79). Large cichlids: 1, Mr Wainwright (78); 2, Mr P. Newton (74); 3, Mr D. Sudron (65). Breeders, egglayers: 1 & 2, Mr L. Smith (79, 74); 3, Mr A. Cachin (75). Furnished set: 1, Mrs Wills (75); 2 & 3, Mr & Mrs Saunders (74, 70). see Plant: 1, Mr B. Cooper (72); 2, Mr J. Beavers (68); 3, Mrs Unwin (BAS, 67). Breeders, livebearers: 1, Mr & Mrs Somerby (79); 2, Mr J. Furness (74); 3, Mr L. Smith (74). see Mollie: 1 Mr B. Cooper (80 ?); 2, Mr J. Beavers (73); 3, Mr P. Cove (Half Moon, 72). Small cichlids: 1, Mr R. Wrightson (BAS, 76); 2, Mr L. Smith (74); 3, Mr G. Brown (Mr Pheasant 74). Sharks & ffring fours: 1, Mr S. Greenley (Half-Moon, 80 +); 2, Mr G. Brown (72); 3, Mr L. R. Thompson (Radcar, 70).

THE best fish in show award and the award for best tropical fish at the **ROMFORD & BEACONTREE AS** Open Show were made to an *Ophicephalus obscurus* entered by Mrs Sybil Hedges of Bethnal Green AS (gold pin and diploma). Mr J. Linale entered the best coldwater fish. FBAS judges Mr E. R. Nicoll, Mr R. S. Wigg and Mr C. Creed (tropical) and the judge for the coldwater fishes, Mr W. L. Wilson, awarded the following places:

A: Mr F. Jacobs (Beresford, hook tokay); 2, Mr H. G. Berger (Ilford); 3, Mr D. L. Shipman (Ilford). **B**: 1, Mr J. M. London (Thurrock, Sybil Hedges' trophy, *Elassoma* barb); 2, Mr D. E. Byfield (Beresford, ruby); 3, Mr H. C. Jones (Thurrock, *Hyperopisus*). **C**: 1, Mr B. Peacock (Thurrock, John Mills trophy, *Abramites microcephalus*); 2, Mr R. Argent (L. London, pulcher); 3, Mrs M. J. Wall (Thurrock, *Hasemania marginata*). **D**: 1, Mr D. E. Byfield (Kent Cup, *C. ornatus*); 2, Mr R. A. Jones (Beresford, zonei); 3, Mr W. Rowe (Ilford, *P. bellenzi*). **E**: 1, Mrs S. Hedges (*C. longifinger*); 2, Mr J. M. London (*corydoras*); 3, Mr R. Sampson (Leytonstone & Stratford, dwarf gouramis). **F**: 1, Mr J. M. London (Beresford & Beacontree Cup, *A. ocellatus*); 2, Mr L. B. Baker (London, *A. boliviensis*); 3, Mr R. Argent (*triggerfishes*). **G**: 1, Mrs S. Hedges (*Nandus nandus*); 2 & 3, Mr R. L. Wright (Thurrock, *Pterophyllum*, Mikrogeos *paraybae*). **H**: 1, Mr P. O'Bryan (Thurrock, *C. burtoni*); 2, Mr R. A. Jones (*C. meeki*); 3, Mr D. E. Byfield (*C. aureus*).

J: 1, Mr D. Bundy (B. Green, *B. jacksoni*); 2, Mr P. O'Bryan (Darlington); 3, Mr J. M. London (*H. bimpei*). **K**: 1, Mr P. O'Bryan (pearl danio); 2, Mr & Mrs G. Tolladay (Chingford, zebra); 3, Mrs M. J. Wall (Thurrock, *B. tyrio*). **M**: 1, Mrs S. Hedges (*G. obscurus*, best fish in show); 2, Mr J. M. London (Australian rainbow); 3, Mrs S. Hedges (*Notopterus chitala*).

Q: 1, Mr P. O'Bryan (black); 2, Mr F. A. Pirron (Chingford, red-eyed red); 3, Mr J. M. London (veiltail). **R**: 1 & 2, Mr P. O'Bryan (blue, red); 3, Mr J. M. London. **S**: 1, Mr R. Wall (Thurrock, green sailfin); 2, Mr J. M. London (black); 3, Mr R. L. Wright (Thurrock, liberty). **T**: 1, Mr F. Vicker (L. London, *Girardinus metallicus*); 2 & 3, Mr J. M. London (blue lionis, *G. metallicus*).

U: 1, Mrs S. Hedges; 2, Mr I. Fleming (GSGB); 3, Mary Linale. **V**: 1, Mr J. Linale (veiltail); 2 & 3, Mr A. B. Lawman (GSGB, orandas). **W**: 1 & 2, Mrs S. Hedges (*Leporus gibbus*, koi); 3, Mr H. G. Berger (koi). **X**-less: 1 & 2, Mr W. Baker (*P. sexfolva*, blue platy); 3, Mr M. J. Wall (*P. reticulatus*). **Z**: 1 & 3, Mr H. C. Jones; 2, Mr P. O'Bryan.

Junior, tropical: 1, Trudy Hedges (*C. undulatus*); 2, W. Wright (*Girra mentalis*); 3, Lynn Jones (fighter). Coldwater: 1 & 3, Trudy Hedges (*Leporus gibbus*, shubunkin); 2, Mary Linale (common goldfish). Inter-club Cup: 1, Thurrock (941); 2, Romford (44); 3, B. Green (36); 4, E. London (29); 5, Ilford (20); 6, GSGB & Chingford (8).

67 exhibitors from all over the south of England journeyed to Salisbury for the **SALISBURY & DAS** Open Show. 15 clubs were represented from an area stretching from Yeovil to Portsmouth, Weymouth to Newbury and including Basingstoke and Bracknell. The fish of the show award was won by the Jack Dempsey cichlid entered by Mr D. Tucker, a Salisbury member; the standard of fish entered was generally very high. Details of the results are:

Club furnished aquaria, tropical: 1, Salisbury Barbs; 2, Mr J. H. Jackson (Basingstoke); 3, Mr L. G. Little (Bracknell); 4, Mr A. Barron (Weymouth). *Hyphessobrycon*, etc.: 1, Mr R. A. Jones (Basingstoke); 2, Mr F. Grace (Salisbury); 3, Mr A. C. Tull (Salisbury). Characins, any: 1, Mr P. J. Legg (Newbury); 2, Mr G. R. Foote (Newbury); 3, Mr F. Grace. Angels: 1, Mr D. Tucker (Salisbury); 2, Mr R. K. Willey; 3, Mr M. R. Tull. Dwarf cichlids: 1 & 2, Mr F. Wills (Portsmouth); 3, Mr T. Morris (Salisbury). Rift Valley cichlids: 1, Mr D. Kerr (Salisbury); 2, Mr J. Brown (Didcot); 3, Mr K. Rees (Gosport). Cichlids any: 1 & 3, Mr D. Tucker; 2, Mr S. Freemantle (Gosport). Siamese fighters: 1, Mr A. Tracy (Gosport); 2, Mr P. Mackie (Havant); 3, Mr M. J. Shoesmith (Salisbury). Labyrinths any: 1, Mrs V. J. Lloyd (Newbury); 2, Mr G.

Castle (Trowbridge); 2, Mr J. H. Jackson (Basingstoke).

Rollers: 1, Mrs V. J. Lloyd; 2, Mr J. H. Jackson; 3, Mr F. Grant. Tropical catfish: 1, Mr B. A. Jones; 2, Mr J. Dickinson; 3, Mr J. H. Jackson. Corydoras & Brochis: 1 & 2, Mr K. E. Taylor (Havant); 3, Mr D. Eidlestein (Salisbury). Rasboras: 1, Mr K. Jones; 2, Mr D. Tucker; 3, Mr & Mrs Medway. Danios & minnows: 1 & 3, Mr G. Castle; 2, Mr J. H. Jackson. Loaches & botias: 1, Mrs V. J. Lloyd; 2, Mr J. Dickinson; 3, Mrs P. Newbury. Tropical egglayers, one: 1, Mr L. G. Little; 2, Mr T. Blanchard (Salisbury); 3, Mr W. West. Spawn pairs: 1, Mr G. E. Dixon; 2, Mrs P. Carter; 3, Mr & Mrs Medway. Male guppy: 1, Mrs P. Newbury; 2, Mrs I. Mewitt (Amesbury); 3, Mr C. Betts. Swordtails: 1, Mr D. Kerr; 2, Mr P. Ronald (Basingstoke); 3, Mr K. Holmes (Havant). Platys: 1, Mr R. F. Adams; 2 & 3, Mr L. G. Little. Mollies: 1, Mr K. Holmes; 2, Mr A. E. Weare (Southampton). Livebearers any: 1 & 2, Mr M. Mendelsohn (Southampton); 3, Mr G. Castle.

Single-tailed goldfish and London shubunkins: 1, Mr R. Little; 2, Mr R. F. Adams; 3, Mr G. J. Axe (Yeovil). Bristol shubunkins and comets: 1, Mr G. J. Axe; 2 & 3, Mr R. F. Adams. 3v Twin-tail goldfish: 1, Miss S. Jackson. Koi carp: 1, Mr E. Binstead (Portsmouth); 2 & 3, Mr T. Cleo. Centrarchidae: 1 & 2, Mr E. Binstead. 2ov Coldwater: 1, 2 & 3, Mr V. Hunt (Havant). Breeders, tropical egglayer: 1, Mr & Mrs Medway; 2, Mr F. Willis; 3, Mr G. E. Dixon. Tropical livebearers: 1 & 2, Mr L. G. Little; 3, Mr P. Ronald. Coldwater: 1, Mr G. J. Axe. Rooted plants: 1 & 2, Mr T. Duffrey (Bracknell); 3, Mr V. Hunt. Floating plants: 1 & 2, Mr R. F. Adams.

A record-breaking 485 entries, high attendance figures and an outstanding trade display of tropical fish and flowering shrubs by Aqua Flora helped to make the **LLANTWIT MAJOR AS** fifteenth Open Show an enormous success. Best fish in Show was a *Platy variatus* entered by Mr C. Turner. Mr & Mrs W. P. Johnson won the FBAS Championship trophy, Class U. The highest pointed Llantwit Major entry was a giant danio belonging to Mr W. Limbrick. Mr A. G. Walter (Port Talbot) received a special award. Judges Mr C. A. T. Brown, Mr G. Churchill, Mr G. James, Mr P. Jordan, Mr C. Lewis, Mr B. Light, Mr E. Myer and Mr J. Wheeler made the following awards:

(B, Bath; BC, Bishops Cleeve; C, Cardiff; LM, Llantwit Major; N, Newport; PT, Port Talbot; R, Rhondda; RAD, Roath & District Tropical Fish Association; S, Swansea; T, Taunton).

Barbs: 1, Mr L. Hillyard (B); 2 & 3, Mr W. Limbrick (LM). Characins: 1, Mr R. Hoare (R); 2, Mr C. Harding (RAD); 3, Mr A. Hillyard. Siamese fighters: 1, Mr C. Turner (C); 2, Mr R. Perkins (PT); 3, Mr C. Phillpott (S). H & HC: 1, Mr M. Wilkie (B); 2, Mr W. Sims (N); 3, Mr J. Iliffe. Cichlids: 1, Mr J. Rice (PT); 2, Mr C. Morrison (PT); 3, Mr W. Gorvett (RAD). Angels: 1, Miss J. Perkin (S); 2, Mr K. Player; 3, Mr R. Perkins. Dwarf cichlids: 1, Mr C. Turner; 2, Mr J. A. Thomson (LM); 3, Mr R. Hoare. Labyrinths: 1, Mr J. Iliffe; 2, Mr W. Gibbon (N); 3, Mr G. Castle. Egglaying toothcarps: 1, Mr C. E. Morrison; 2 & 3, Mr M. Williams (R). Tropical catfish: 1, Mr W. Limbrick; 2, Mr C. Turner; 3, Mr M. Wilkie. *Corydoras & Brochis*: 1 & 2, Mr M. Quennell; 3, Mr M. Williams.

Junior tropical: 1, Susan Morrison (PT); 2, C. Harry (B); 3, K. Thomas. Rasboras: 1, Mr R. Hoare; 2, Mr C. Earnshaw (T); 3, Mr C. Harding. Danios & minnows: 1, Mr L. Limbrick; 2 & 3, Mr J. J. Edwards (LM). Loach: 1, Mr M. Wilkie; 2, Mr C. Turner; 3, Master P. Glover (LM). 20v Tropical egglayer: 1, Mr S. Nelson (LM); 2, Mr H. C. Chick; 3, Mr J. A. Thomson. Pairs of fish: 1, Mr W. Sims; 2, Master P. Glover; 3, Mr C. Castle. Male guppy: 1, Mr H. Chick; 2, Mr P. A. Player; 3, Mr P. J. Greenwood (BC). Female guppy: 1, Mr W. Burton (T); 2 & 3, Mr J. Cleo. Swordtail: 1, Mr C. Turner; 2, Mr P. Johnson; 3, Mr G. Harry. Platy: 1 & 2, Mr C. Turner; 3, Mr G. Gibbon. Mollies: 1 & 2, Mr J. R. Rice; 3, Master P. Glover.

Breeders, egglayer: 1 & 3, Mr C. Harding; 2, Mr C. Turner. Livebearers: 1, Mr W. Gibbon; 2, Mr R. S. Wigg (LM); 3, Mr K. Player. Goldfish: 1 & 2, Mr & Mrs W. P. Johnson. Shubunkins: 1 & 2, Mrs Perkins (PT); 3, Mr P. Johnson. 20v Coldwater: 1 & 2, Mr R. Davis; 3, Mr P. Johnson. Furnished aquaria, individual: 1, Mr A. Thomson; 2, Mr P. Glover; 3, Mr R. S. Wigg. Junior: 1, Master John Edwards.

FEDERATION NEWS

Championship Show Results and Forthcoming Shows

Championship Class Show Results

Croydon	**Cb**	Mr L. J. Brazier (Sudbury)
Riverside	**Da**	Mr John Batts (Ealing)
Corby	**Db**	Mr W. Hickman (Dudley)
Southend, Leigh	**Dc**	Mr D. M. Dare (Independent)
Kettering	**Dz**	Mr J. H. Dainty (Kettering)
Vauxhall Motors	**Ea**	Mr A. Taylor (Sudbury)
Half Moon	**Ez**	Mr D. Keighley (Stockton)
Roehampton	**G**	Mr D. Lambourne (Roehampton)
Independent	**H**	Mr W. D. Wright (E. Dulwich)
Port Talbot	**J**	Mr E. Earnshaw (Taunton)
Medway	**L**	Mr J. Parker (N. Kent)
Havant	**Mz**	Mr R. Ilsley (Basingstoke)
Dunmow	**P**	Mr A. P. Taylor (Sudbury)
Basingstoke	**T**	Mr A. Lushby (Mid-Herts)
Llantwit Major	**U**	Mr & Mrs W. P. Johnson
Uxbridge	**Xo–p**	Mr R. Newman (Uxbridge)
Portsmouth	**Xo-p**	Mrs J. Lamboll (Portsmouth)
Yeovil	**Xu–w**	Mr D. S. Langdon (Yeovil)

Forthcoming Championship Class Shows

2nd September	Bethnal Green AS	**Cz**	
2nd September	Wellingborough AS	**O**	Guppy, male
8th September	Reading–Didcot–Bracknell	**K**	Danios & minnows
9th September	Harlow AS	**Q**	Swordtails
9th September	Newbury AS	**Bz**	
15th September	Hounslow & DAS	**R**	Platys
23rd September	Torbay AS	**W**	Native & foreign
23rd September	North Kent AS	**Xb–m**	Breeders
6th October	E. London A & PA		
7th October	Ealing AS	**S**	Mollies
28th October	Newcastle Guppy & L/BS		

***Winners of Federation Championship Trophies in classes for single fish automatically become eligible for the Supreme Championship Trophy Competition (to be staged at The AQUARIUM SHOW '73 at the Royal Horticultural Society's Old Hall, London, S.W.1, 2nd–4th, November). Six awards are made at this Competition.**

OWING to circumstances beyond their control, HUCKNALL & BULWELL AS will now be holding their annual Open Show on 23rd September (not the 30th). Original rules and times still hold.

MRS B. BOOKER of Morecambe Bay entered the best fish (a *Tilapia galilaea*) at the **OLDHAM & DAS** Open Show. Detailed results were:

Guppys: 1, 2 & 3, Mr & Mrs L. Smith (Castleford). Mollies: 1, Mr & Mrs Perkin (Macclesfield); 2 & 3, Mr C. Beckenham (Oldham). Swordtails: 1 & 3, Mr C. Beckenham; 2, Mr J. Brown (Hyde). Platys: B. & C. White (Leigh); 2, Mr & Mrs Copley (Doncaster); 3, Mr M. Lennox (Belle Vue). aov Livebearers: 1, Master D. Marshallsea (Oldham); 2, Mr J. S. Hall (Aireborough); 3, Mr J. Furness (Castleford).

Anabantids: 1, Mr M. Lennox; 2, Mr & Mrs Gullane (Buxton); 3, Mr J. Boardman (Leigh). Fighters: 1 & 3, Mr L. Ratcliffe (Leigh); 2, Mr S. Clarke (Airborough). Barbs, small: 1, Mr & Mrs Daines (Doncaster); 2, Mr & Mrs Gullane; 3, Mr J. Furness. Large: 1, Mr B. Booker (M. Bay); 2, Mr T. Smith (Sheffield); 3, Mr & Mrs B. Marshallsea (Oldham). Cichlids, dwarf: 1, Mr & Mrs Gullane; 2, Mr & Mrs Copley; 3, Mrs J. Twigg (Oldham). Large: 1, Mrs B. Booker; 2, Mr D. Grogan (Accrington); 3, Mr F. Mulls (Merseyside). Angels: 1, Mr Carolan (B. Vue); 2, Mr A. Axon (Ashton); 3, Mr S. Elson (Independent). Characins, small: 1, Mr N. Lennox; 2, D. & M. Laycock (Sheffield); 3, Mr & Mrs Thorn (Northwich). Large: 1, Mr T. Smith; 2, Mr & Mrs Daines; 3, Mr & Mrs Gabe (Chesterfield). Rasboras: 1, Mr B. Booker; 2, Mr & Mrs B. Marshallsea; 3, Mr A. Bennett (Castleford). Danios & minnows: 1 & 2, Mr D. Whiteside (BKA); 3, Mr T. Smith. Sharks: 1, Mr J. S. Hall; 2, Mr J. Johnson; 3, Mr & Mrs Boone (Chesterfield). Puffers: 1, Mr R. Mallalieu (Oswen); 2, Mr F. Mulls; 3, Mr C. Goodman (Oldham). Toothcarps: 1 & 2, Mr T. Bimbar (Northwich); 3, Mr T. Smith. *Corydoras*: 1, Mr F. Mulls; 2, Mr & Mrs Wells (Doncaster); 3, Mr & Mrs B. Marshallsea. aov Catfish: 1, Mr J. S. Hall; 2, Mr & Mrs Gabe; 3, Mr & Mrs Copley. Loaches: 1, Mr & Mrs B. Marshallsea; 2, Mr D. Grogan (Accrington); 3, Mr C. Beckenham (Oldham).

Breeders, livebearers: 1, Mr J. Furness; 2, Mr & Mrs Daines; 3, Mr R. Knowles (Northwich). Egglayers: 1, Mr S. Wolstenholme (Heywood); 2 & 3, Mr & Mrs L. Smith. Plain, egglayers: 1, B. & C. White; 2, Mr & Mrs Wells; 3, Mr & Mrs Daines. Livebearers: 1, Mr J. S. Hall; 2, Mr S. Clarke; 3, Mr & Mrs Daines. aov Tropical: 1, Mrs Hall (Aireborough); 2, Mr A. Bennett; 3, Mr C. Beckenham. Fancy goldfish: 1, Mr C. H. Whitney (Accrington); 2, Mr S. Walsh (Accrington); 3, Mr J. S. Hall. Common goldfish: 1 & 2, Mr J. S. Hall; 3, Mr & Mrs J. Beverley (B. Vue). aov Coldwater: 1 & 3, Mr J. S. Hall; 2, L. & P. Graham. Mini-jars: 1 & 2, Mr R. Birchwood (Oldham); 3, Mr Carolan. Plants, rooted: 1, 2 & 3, Mr & Mrs Milne (Doncaster). Plants, cuttings: Mr & Mrs Milne.

A pencil fish owned by Mr D. M. Laycock of Sheffield AS was the best fish in the **ALFRETON AS** Open Show out of 595 fish benched in 17 sections by 30 societies. The Society Rose Bowl was won by Aireborough AS (apologies for Sherwood AS).

Guppys (males): 1, Mr & Mrs Milne (section winner, Doncaster); 2, Mr W. Blundell (Rossington); 3, Mr D. M. Laycock (Sheffield). Guppys (females): 1, Mr D. M. Laycock; 2, Miss M. Thickbroom (Castleford); 3, Mr M. E. R. Holmes (Derby Regent). Platys: 1, Mr P. H. Mighalls (section winner, Hucknall & Bulwell); 2, Mr J. S. Hall (Aireboro); 3, Mr & Mrs Copley (Doncaster). Swordtails: 1, Mr M. Darrington (Alfreton); 2, Susan Clarke (Aireboro); 3, Mr B. Jeffs (Jones & Shipman AFS). Mollies: 1, Mr J. Igoe (Sherwood); 2, Mr T. Smith (Sheffield); 3, Mr & Mrs Stephenson (Sherwood). Livebearers, aov: 1 & 3, Mr & Mrs Toyne (Shoaf Valley); 2, Mrs C. Heap (Keighley).

Barbs, small: 1, Mr & Mrs M. Patterson (Grantham); 2, Mrs Cohen (Pontefract); 3, Mr Carr (Doncaster). Large: 1 & 2, Mr D. Sewell (Section winner, Sherwood); 3, Mrs B. Cohen. Characins, small: 1, Mr D. M. Laycock (section winner); 2, Mr D. Sewell; 3, Mr M. Allsop (no society). Large: 1, Miss M. Thickbroom; 2, Mr D. Sewell; 3, Mr & Mrs Stephenson (Sherwood). Killifish: 1, Mr T. Smith (section winner); 2, Miss A. Hill (no soc.); 3, Mr Carr (Doncaster). Minnows & danios: 1, Mr G. Malpass (Castleford); 2, Mr & Mrs Cohen; 3, Mrs L. C. Heap. Sharks & loaches: 1, Mr W. Blundell (section winner, Rossington); 2, Mr & Mrs Shipman (Grantham); 3, Mr J. S. Hall. Rasboras: 1, Mr R. Harlow (Derby Regent); 2, Mr G. Malpass; 3, Mr & Mrs Paterson (Grantham). Cichlids, dwarf: 1, Mr H. Kuhn (Lincoln); 2, Mr & Mrs Sellers (Lincoln); 3, Mr & Mrs Toyne. Large: 1, Mr D. Sewell (section winner); 2, Mr & Mrs Harfield (Gainsborough); 3, Mr & Mrs Gabe (Chesterfield). Angels: 1, Mr & Mrs Bailey (Sherwood); 2 & 3, Mr D. Sewell.

Corydoras: 1, Mr & Mrs Bailey (section winner, Sherwood); 2, Mr W. Downing; 3, Mr F. H. Mighalls. aov Catfish: 1 & 2, Mr & Mrs Copley; 3, Mr J. S. Hall. Loaches: 1, Mr K. Barrett; 2, Mr & Mrs Toyne; 3, Mr K. Thomas (Lucas AS). Siamese fighters: 1, Susan Clarke; 2, Mr & Mrs Cohen; 3, Mr & Mrs Birdsall (Aireboro). aov Anabantids: 1, Mr & Mrs Sellers (section winner); 2, Miss A. Hill; 3, Mr K. Barrett. Tropical freshwater: 1, Miss M. Thickbroom (section winner); 2, Mr J. S. Hall; 3, Clarke Bros. (N. Staffs). Tropical marine: 1 & 2, Mr J. Igoe. Pairs, egglayers: Mr & Mrs Axon (section winner, Guiseborough); 2, Mrs Ball; 3, Mr K. Barrett. Livebearers: 1 & 3, Mr E. Parkes (Shoaf Valley); 2, Mr & Mrs Toyne.

Junior egglayers: 1, Master R. Downing (section winner, Sherwood); 2, Mr P. Smith (Sheffield); 3, Miss M. Thickbroom (Castleford). Livebearers: 1, Susan Clarke (section winner); 2, K. & N. Parkes (Shoaf Valley); 3, Susan Clarke. Goldfish & comets: 1 & 2, Mr J. S. Hall; 3, Mr R. Harrison (Raleigh). Shubunkins: 1 & 2, Mr H. Brakes (Jones & Shipman); 3, Mr J. S. Hall. Fancy goldfish: 1 & 3, Mr J. S. Hall (section winner); 2, Mr R. Harrison (Raleigh). aov Coldwater: 1 & 3, Mr J. S. Hall; 2, Clarke Bros. (N. Staffs). Breeders egglayers: 1, Mr & Mrs Thomas (section winner, Pewsetters); 2 & 3, Mr A. Lane (D. Regent). Livebearers: 1 & 2, Mr & Mrs Toyne; 3, Mr & Mrs Daines (Doncaster). Breeders, coldwater: 1, 2 & 3, Mr J. S. Hall. Novice: 1, Mrs Hall (section winner); 2, Mr A. Fraser (Rossington); 3, Mr J. C. Wagstaff (no soc.). Furnished aquarium: 1, Mr J. S. Hall; 2, Mr B. Rowe (Alfreton). Mini-jars: 1 & 2, Mr R. Harlow (section winner, D. Regent); 3, Mr & Mrs Gabe. Plants: 1, Mr J. Wright (Alfreton); 2, Mr & Mrs Milne (Doncaster); 3, Mr & Mrs Cohen (Pontefract).

In Brief . . .

. . . A NEW society recently formed in Caithness (**CAITHNESS AS**) would be pleased to hear from other societies regarding shows etc. Please contact secretary Miss J. Smith, 19 Brims Road, Thurso, Caithness. Meetings are held first Tuesday of month, 7.30 p.m. New members and visitors welcome.

. . . ENTRANTS in the table show at the July meeting of **COVENTRY P & AS** particularly appreciated the trouble judge Mr Phil Jinks took to give a thorough report on each of the fishes benched. There was a very enthusiastic 'turn-out' for this table show. Earlier, members and visitors watched a slide lecture on killies by the American Killifish Association and members were surprised to learn that only four people present actually kept killifish.

. . . **LEAMINGTON & DAS** members enjoyed the lecture by Mr Fraser of Kingfish Aquatics on garden pools, siting, stocking, planting etc. The best fish on the show bench at this meeting was a climbing perch entered by Mr C. Chamberlain. A trip to Chester Zoo is planned for this month and members have already enjoyed an evening picnic at a local farm.

. . . IN July members of **SUFFOLK A & PA** were entertained by an informative and entertaining talk by Mr W. Card, club president, on the journey of the tropical fish from its natural habitat to the retailers' tank, and the costs involved. The club also journeyed to London to visit the aquatic exhibition at Alexandra Palace, and it was unanimously agreed that everyone had a good time. New members always welcome.

. . . FOUNDER of the **BRITISH KOI KEEPERS SOCIETY**, Mr K. D. Fawcett, was elected honorary president with life membership at the recent AGM. To supplement

THE GOLDFISH SOCIETY OF GREAT BRITAIN are holding their Open Show on 22nd September at The Adult School, Sutton, Surrey. Show schedules from Mrs P. Whittington, Pisces Lodge, Ringley Park Avenue, Reigate, Surrey.

the regular issue of Newsletters, local sections have now been formed in the Home Counties, Midlands and Northern areas to facilitate discussion between members.

. . . MR R. Skipper, famous for his success with discus, delighted members of **HASTINGS & ST LEONARDS AS** with his lecture, illustrated with slides on the spawning, rearing and feeding of discus and the importance of the pH of the water. About 40 members and families travelled to Dorking to see the Interpet establishment and factory and went on to the Walton-on-the-Hill fish farm to see the tanks of anemones, marine and freshwater fishes. The Society is holding its first Open Show in September.

. . . A TALK on fish photography by Mr K. Ferris was a great success with members of **SLOUGH & DAS**. Mr Ferris demonstrated how to set up a photographic tank to ensure the fish is correctly placed and followed this with a slide show of fish photographed by himself and Mr R. Knight. Mr B. Withers won the advanced class in the table show, Mr G. Williams in the novice class and Mr A. Kitley in that for characins. At the next meeting on 19th September Mr R. Armstrong will talk on killies (7.30 p.m. Friends Meeting House, Ragstone Road, Slough).

. . . **NEW FOREST AS** members have been holding lively discussions on ways to improve meetings, now held at the Lymington Community Association, and the suggestion that meetings should be held twice a month will be reconsidered at the end of the year. Members have enjoyed an illustrated talk on keeping and breeding the smaller barbs by Mr C. Knapp. In the table show for a.o.v. coldwater and a.o.v. twinstall young Mr N. L. Percy took all cards.

. . . THE next meeting of the NORTHERN SECTION of the **BRITISH KOI KEEPERS' SOCIETY** will be held on Sunday, 16th September in Manchester. At the last meeting in July, held in Southport, a large number of members was present. Full details (s.a.e. please) from Section secretary, Mr W. R. Seal, 7 Highlands Road, Offerton, Stockport, Cheshire.

. . . AT the July meeting of **THE GOLDFISH SOCIETY OF GREAT BRITAIN** members enjoyed a talk by Mr J. Linale describing how he bred a calico celestial. Later Mr Jim Bundell outlined his own and members' studies on the connection between fish spawning and moon phases.

. . . A VIEW behind the scenes at Skegness Marineland Aquarium was the highlight of a thoroughly enjoyable day trip embarked on by members of **HORSFORTH & DAS**. A slide lecture by Mr Shepardson of Hull showing marines, zebras and Siamese fighters proved very interesting.

. . . SCHEDULED for the September meeting of **WEYMOUTH AS** (2nd Tuesday of the month at Ratcliff Hall, Queen's Road, Radipole Spa, Weymouth, visitors and new members welcome), is a slide show 'Bettas by the Bucketful'. The Society have decided to hold a club show on 9th September that will be opened to the public at about 3 p.m. Mr D. Kelly was elected show manager.

. . . A QUIZ on all aspects of fish-keeping between two teams of members of **ILFORD & DA & PS**

THE BRITISH KILLIFISH ASSOCIATION announce with regret that ever-increasing costs have necessitated an increase in subscription rates. For the current fiscal year, (1st September 1973 to 31st August 1974) the subscription for inland members will be £3.00 and for overseas members £4.50. For further information regarding membership please contact the registrar, Mr P. L. Brown, Rushen, Elm Grove, Eccleston Park, Prescot, Lancs (s.a.e. please).

CORBY & DAS secretary Mr R. E. Tyler extends a special welcome to all BKKS members in the area to attend the meeting of his Society on Wednesday, 5th September, when Mrs Hilda Allen, general secretary of the British Koi Keepers Society, will be giving a talk on koi-keeping illustrated with slides. The meeting is to be held at The Nag's Head, High Street, Corby at 7.30 p.m. and any further details may be obtained from Mr Tyler at 30 High Street, Rothwell, Kettering, Northants.

Meetings and Changes of Officers

BOREHAM WOOD & DAS. Secretary, Mr J. Cutmore (11 Bevan House, Ripon Way, Borehamwood, WD6 2HT; phone 01-953 9763); assistant show secretary, Mr D. Hounsell (phone: 01-953 2546); P.R.O., Mr Frank Long.

BRITISH KILLIFISH ASSOCIATION. Chairman, Mr J. Jeremy; vice-chairman, Mr D. Ellis; treasurer, Mr B. Tate; secretary, Mr W. Davison (2 Shaw Road, Tyldesley, Staffs. DY4 7QA); technical editor, Mr A. Wright; species controller, Mr N. Hulme-Vickerstaff; services secretary, Mr P. Bolton; newsletter editor, Mr R. Heap; post & despatch, Mr J. Harris; registrar, Mr P. Brown (Rushen, Elm Grove, Eccleston Park, Prescot, Lancs.).

BRITISH KOI KEEPERS' SOCIETY. Chairman, Mr E. A. Allen; general secretary, Mrs H. M. Allen (1 Anthony Close, Peterborough, PE1 3XU; phone 0733 62907); treasurer and Newsletter editor, Mr M. G. Wasmsley; show secretary, Mr R. Cutts.

BRITISH KOI KEEPERS' SOCIETY. NORTHERN SECTION. Secretary, Mr W. R. Seal (7 Highlands Road, Offerton, Stockport, Cheshire).

CAITHNESS AS. New Society. Secretary, Miss J. Smith (19 Brims Road, Thurso, Caithness). Meetings: 1st Thursday of month, 7.30 p.m., the Committee Room, The Town Hall, Thurso.

HEMEL HEMPSTEAD AS. Chairman, Mr A. Tuffs; vice-chairman, Mr A. Dibley; treasurer, Mr G. Whirby; secretary, Mrs A. Graham (7 Alfricks Road, Hemel Hempstead, Herts HP3 9JD; assistant, Mr Ray Holliday; show secretary, Mr Eric Burr; assistant, Mrs Jan Collins; social secretary, Mrs Mary Whitby; press officer, Mr Vic Mills; librarian, Mr S. Collins; catering, Mrs Ann Tuffs; junior representative, Mr David Whitby.

HORSFORTH AS. Secretary, Mr P. J. Smith (19 Wynford Rise, Leeds 18; Leeds 587814. Meetings: 1st Tuesday in month, the Green Room, New Civic Hall, Pudsey.

HUCKNALL & BULWELL AS. New show secretary: Mr G. P. Swannick, Aqualand, 12 Ridgewood Drive, Rosewell Estate, Chilwell, Notts.

PLYMOUTH AS. New secretary. Mr J. Randle (69 Durham Avenue, St Judes Plymouth, Devon, PL4 8SB).

RHONDDA AS. Chairman, Mr G. Mason; secretary, Mr D. Richards (2 Sherwood Street, Llwynypia, Rhondda, Glam.); treasurer, Mr E. Dates; show secretary, Mr E. Oakley (17 Crowsbay Street, Penygraig, Rhondda, Glamorgan); assistant, Mr G. Hartry.

SHREWSBURY & DAS. Change of venue to: The Castle Hotel, Coleham, Shrewsbury, 2nd and 3rd Thursday in month, 8.00 p.m.

SLOUGH & DAS. Meetings: Friends Meeting House, Ragstone Road, Slough 7.30 p.m.

STOCKTON-ON-TEES AS. Chairman, Mr D. Keithley; secretary, Mr C. W. Buck (22 Danby Grove, Thornaby, Teesside, TS17 8BX; phone Stockton 61840); treasurer, Mr L. Owens; show secretary, Mr B. Pipkin. Meetings: 1st & 3rd Monday, Tilery Inn, Maritime Place, Stockton. New members welcome.

TROWBRIDGE & DA & PS. New secretary. Mrs P. Pearse (69 Alfred Street, Westbury, Wilts); show secretary, Mr S. Huntley; Newsletter editor, Mr G. Castle.

proved very entertaining when it was held in July at the usual club venue of Fullwell Cross Library. Mr H. Berger took 1st and 2nd places in the 8v single tail goldfish class in the table show, Mr M. Shadrack 1st and 2nd in 8v barb, and Mr W. Rowe 1st and 2nd in 8v mollie.

. . . **TONBRIDGE & DAS** members enjoyed a talk by Mr D. Soper on breeding guppys at their July meeting. Judge Mr R. Mayne from Gillingham, Kent assessed the table show entries as: H, 1, Mrs I. Bellingham; 2, Mrs B. Purchard; 3, Mrs D. Mathieson. o.p. guppys: 1, Mrs B. Purchard; 2, Mrs I. Bellingham; 3, Mrs B. Purchard.

. . . THE **DORCHESTER & DAS** annual inter-club show with WEYMOUTH & DAS proved to be a close contest, with Weymouth winning by 884 points to 873 (tropical: 1, Mrs P. Carter, W.; 2 & 3, Mr D. Norman, D.; coldwater: 1 & 2, Mr J. White, W.; 3, Mr G. Fox). Members and guests also enjoyed a most interesting talk and slide show on marine life by Mr Hawthorne, a marine biologist at Hardye's School, Dorchester and a 'Ladies Night' table show. Mrs Jefferies, wife of the judge, Mr J. Jefferies of Bournemouth, presented the Ladies trophy—a silver goblet—to Mrs J. Worth who took 1st & 2nd places (3rd, Mrs M. Fox).

. . . CLASS S (mollies) of the FBAS Championship is being competed for at the **EALING & DAS** Open Show to be held on 7th October at the Hanwell Community Centre, Cuckoo Lane, Greenford, Middlesex. Since this is one of the last opportunities for fishkeepers to take part in this Championship before the finals at this year's Aquarium Show those interested in entering should contact show secretary Mr John Batts, 99A Valetta Road, Acton, London, W.3 for schedules.

. . . THE retiring members of **RHONDDA AS** committee were given a warm vote of thanks at the AGM. These were: Mr G. Pinkham, (a founder member of the club) concerned with committee work for 8 years; Mr M. Williams, show secretary for 5 years; Mr Picton, assistant show secretary for 1 year; treasurer, Mr D. Embling. As usual it was an exciting if often argumentative meeting. Again, for the 4th year in succession, Mr M. Williams won the shield for the highest number of points for the year.

. . . RECENT activities of **WREXHAM TFS** have included a slide show, a talk on 'Holiday Preparations' by Mr E. Jones, a talk on cichlids by Mr J. M. D'Arcy, and a very enjoyable Criss-Cross Quiz organised by Mr R. Mathers. The Summer Shield winner was Mr E. Jones. Table show results have been: cichlids: 1 & 3, Mr D'Arcy; 2, Mr T. Pound. Botias: 1, Mr Pound; 2, Mr E. Jones; 3, Mr D'Arcy. Furnished jars: 1, Mr E. Jones. 20v Catfish, Mr D'Arcy.

. . . AN audience of 42, the largest since **SOUTHAMPTON AS** was revitalised last year, heard a talk by Mr R. Mosley of Hythe, area representative of Armitage Bros. Ltd. Mr Mosley described the technique and importance of correct feeding, mentioning that, ideally, fish should be fed five to six times per day, which brought visions of sleepwalking round the fish tanks to some of the audience. The fish show was judged by Mr C. Lennox of Salisbury, who complimented the Society on the quality and quantity of fish on display.

. . . NEARING the half-way mark with five table shows held out of the 12 making up the 1973/74 Points Cup trophy competition of the BIRMINGHAM SECTION of the **FGA**, Mr & Mrs D. Phillimore are in the lead with 141 points (Mr K. Lee, 81; Mr G. Steadman, 74; Mr & Mrs Burnell, 50; Mr A. Charlton, 49; Mr W. Bishop, 45; Mr W. Myers, 41; Mr J. Eskith, 40; Mr D. R. Beacham, 37; Mrs J. Croft, 28).

Dates for Your Diary

1st September. **FBAS Assembly.** Conway Hall, Red Lion Square, London, WC1, 2.30 p.m.

2nd September. **WELLINGBOROUGH & DAS** Open Show. Queensway Centre, Goldsmith Road, Wellingborough. Schedules: Mr D. Sc. Birchenor, 12A George Street, Wellingborough, Northants. phone Wellingboro' 3742.

2nd September. **THORNE AS** Open Show. Details: Mr B. Banks, 75 Marshland Road, Moorlands, nr. Doncaster.

2nd September. **BETHNAL GREEN AS** Open Show, Bethnal Green Institute, 229 Bethnal Green Road, London, E.2. FBAS Supreme Championship Trophy Class Cx (large characins). Schedules: Mrs Sybil Hedges, 130 Ashburton Avenue, Seven Kings, Ilford, Essex IG3 9E (phone: 01-500 3230).

2nd September. **LUCAS AQUARIUM & POOL SOCIETY** Open Show. Spring Road, Birmingham. Schedules: Mr K. Thomas, 11 Alston Road, Solihull, Warks.

8th September. Combined **BRACKNELL AS, DIDCOT AS & READING & DAS** Open Show, White Knights, Shinfield Road, Reading. Details: Mr John Horsey, 4 Rickmans Close, Woodley, Berks. (phone: Reading 669217).

8th September. **MIDLAND ASSOCIATION OF AQUARISTS SOCIETIES.** Delegates Meeting. Room 3, Digbeth Civic Hall, Birmingham.

9th September. **HOYLAKE AS** Open Show. The YMCA, Hoylake. Details: Mr E. Rowlands, 3 Haig Avenue, Moreton, Wirral, Cheshire.

9th September. **HARLOW AS** Open Show. Moot House, Harlow. Schedules: Mr S. Jordan, 48 Whitewaits, Harlow, Essex.

9th September. **NEWBURY & DAS** Open Show. Plaza, Market Place, Newbury, Berks. Schedules: Mr G. Foster, c/o 58 Jubilee Road, Newbury, Berks.

9th September. **NUNEATON AS** Open Show.

11th September. **GAINSBOROUGH & DAS** 'Mini' Open Show. Blues Club, Gainsborough. Schedules: Mr W. D. Gilding, 28 Retford Road, Woodbeck, Notts.

14th–15th September. **BRISTOL AQUARISTS SOCIETY** Open Show. Details: Mr E. N. Bowden, 51 Stoneleigh Walk, Knowle, Bristol, BS4 2RL.

15th September. **MID-HERTS AS** Open Show. Birklands Annexe, London Road, St Albans. Schedules: Mr A. Lusby, 824 Riverside Road, St Albans.

15th September. **HOUNSLOW & DAS** Open Show, The Youth Centre, Cecil Road, Hounslow, Middlesex. Schedules: Mr H. Pratt, 23 Woodlawn Drive, Feltham, Middlesex (phone: 01-984 0923).

16th September. **SOUTH LEEDS AS** 121 Open Show. Hunslet Moor Primary School, Dewsbury Road. Details: Mr D. Foster, 49 Tempest Road, Beeston, Leeds 11.

16th September. **WEST CUMBERLAND AC** 3rd Open Show. Civic Hall, Whitehaven, Cumberland. Details: Mr J. Parker, 2 Southey Avenue, Oregill, Egremont, Cumberland.

16th September. **HASTINGS & ST LEONARDS AS** 1st Open Show. Concordia Hall, Church Road, St Leonards. Schedules: Mr T. Adams, 17 Lower South Road, St Leonards-on-Sea, TN37 6RH.

16th September. **BUXTON & DAS** Open Show. The Pavilion Gardens, Buxton. Schedules: Mr A. Holland, 8 Midland Terrace, New Mills, via Stockport, Cheshire.

22nd September. **RHONDDA AS** 5th Open Show. Central Hall, Tonypandy, Rhondda. Benching 9.00–13.30. Schedules: Mr M. Williams, 122 Top Treharne, Treharne, Rhondda, Glam. Excellent car-parking.

22nd September. **GSGB** 25th Anniversary Show. Adult Education School, Sutton, Surrey.

23rd September. **TORBAY AS** Open Show. Torquay Town Hall. Schedules: Mr J. R. Davis, 8 Barewell Close, St Marychurch, Torquay, Devon.

22nd September. **New date. HUCKNALL & BULWELL AS** Open Show. Bulwell Youth Club, Coventry Road, Bulwell, Nottingham. Benching 12 noon–2.00 p.m. Schedules: Mr J. Sutcliffe, 273 Wicklow Court, Basford, Nottingham.

23rd September. **New date. STONE AS** Open Show. Walton Community Centre, Walton, Stone. Details: Mr K. W. Evans, 42 Friars Avenue, Walton, Stone.

23rd September. **CASTLEFORD AS** 1st Open Show. Pontefract Road Boys' Modern School, Pontefract Road, Castleford. Enquiries: Mrs J. E. Asquith, 32 Lower Oxford Street, Castleford, Yorks WF10 4AE.

29th September. **Date change. WESTON-SUPER-MARE & D TFC** Open Show. The Town Hall, Weston-super-Mare. Details: Mr J. Clarke, St Judes, North Street, Cheddar.

30th September. **HETTON COUNTRY AS** Open Show. Hetton Community Association Centre, South Market Street, Hetton. Schedules: Mr R. Riley, 32 The Meadows, West Rainton, Houghton-Le-Spring, Co. Durham, DH5 6MP.

30th September. **CHESTERFIELD & DAS** Open Show. Clay Cross Social Centre, Chesterfield Road, Clay Cross, nr. Chesterfield, Derbys. Exit 29 off M1, follow signs 4 miles to Show. Spacious venue on A61. Benching 12 noon–2.15 p.m. Schedules: Mr D. Stone, 237 North Wingfield Road, Grassmoor, Chesterfield, Derbys. S42 5ER (phone: Staveley 4773).

30th September. **NORTHAMPTON & DAS** Open Show. The Drill Hall, Northampton. Schedules: Mr G. Allatt, 80 Chiltern Avenue, Northampton.

30th September. **GOODYERS-END AS** 1st Open Show. The St. Johns Ambulance Hall, Holbrooks, Coventry.

30th September. **IRISH TROPICAL FISH SOCIETY** 2nd Open Show. The Mansion House, Dawson St., Dublin 2. Schedules: Mr J. P. Nalesnik, Kilgobbin, Sandyford, Co. Dublin, Ireland.

6th October. **EAST LONDON A & PA** Open Breeders Show. Schedules: Mr F. Vicker, 13 Irons Way, Collier Row, Romford, Essex.

7th October. **EALING & DAS** Open Show. Hanwell Community Centre, Cuckoo Lane, Greenford, Middlesex. Schedules: Mr John Butts, 92A Valerie Road, Acton, London, W.3. FBAS Trophy Class II.

7th October. **HINCKLEY & DAS** Open Show. Heathfield High School, Belle Vue Road, Earl Shilton, Leicester. Details: Mr T. Saunders, 29 Browning Drive, Leics.

13th–14th October. **FNAS BRITISH AQUARISTS FESTIVAL** at Belle Vue Gardens, Manchester.

13th October. **ANSON AC** Open Show. Sydney Memorial Hall, Willesden High Road, London, N.W.10. Schedules: Mr D. Oliver, 192 Doyle Gardens, Harlesden, London, N.W.10.

21st October. **SHERWOOD AS** Open Show. Thoresby Miners Welfare Hall, Edwinstowe, nr Ollerton, Mansfield, Notts. Schedules: Mr J. Igoe, 25 Marples Avenue, Mansfield-Woodhouse, Notts, NG19 9EY (phone: Mansfield 32249).

28th October. **DONCASTER & DAS** Open Show. Brodsworth Miners Welfare Hall, Welfare Road, Woodlands, nr. Doncaster.

2nd–4th November. London's Sixth Annual Exhibition of Fishkeeping: **The AQUARIUM SHOW '73** at the Royal Horticultural Society's Old Hall, Vincent Square, London SW1. Enquiries to Show Organiser, PFSL, 334 Garratt Lane, London SW17 0NY.

3rd November. **GSGB** Quarterly Meeting. Conway Hall, Red Lion Square, Holborn, London, WC1, 2.30 p.m.

4th November. **MIXENDEN TFS** Open Show. Venue and details later.

11th November. **HARTLEPOOL AS** Open Show. Longscar Hall, Seaton Carew. Details: Mr J. Watson, 42 Sydenham Road, Hartlepool, Co. Durham, TS26 9BW.

11th November. **WALTHAMSTOW & DAS** Open Show. Details to be announced.

17th November. **KINGSTON & DAS/ SOUTH PARK AQUATIC STUDY SOCIETY** combined Open Show. T.A. Centre, Surbiton Road, Kingston, Surrey. Schedules: Mr D. J. Markay, c/o 51 Mount Road, New Malden, Surrey (phone: day, 01-872 0632; night, 01-942 3021).

17th November. **GSGB** 25th Anniversary Dinner Dance. Details: Mr A. Lawman, 68 Gordon Road, Enfield, Middlesex.

24th November. **1973 HENDON CONGRESS.**

1st December. **FBAS Assembly.** Conway Hall, Red Lion Square London WC1 2.30 p.m.

2nd December. **HORSFORTH AS** 4th Open Show. New Civic Hall, Stanningley, Pudsey.

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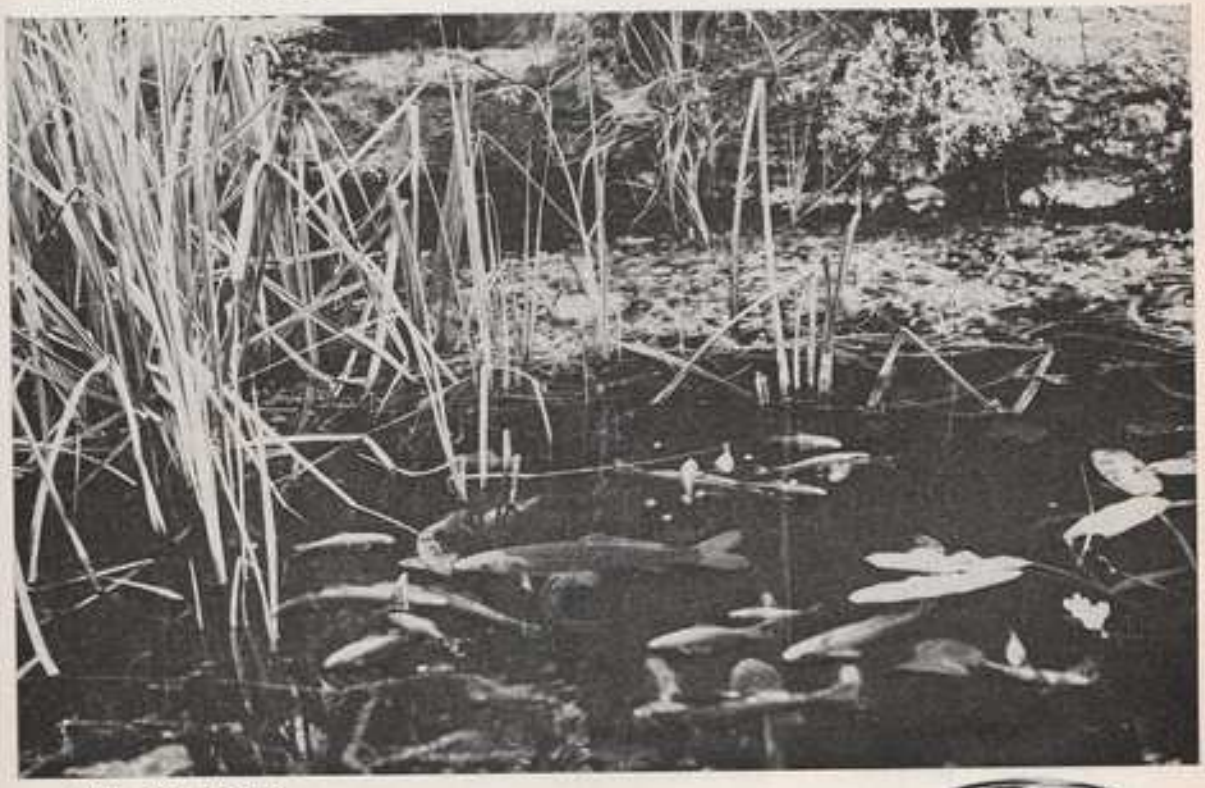

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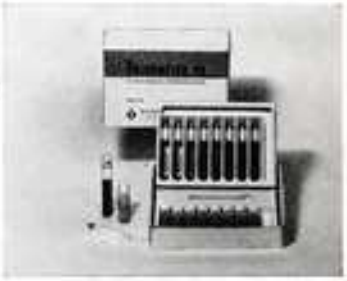

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