

JULY 1973

20p

Pet Fish

monthly

The PRACTICAL FISHKEEPING MAGAZINE



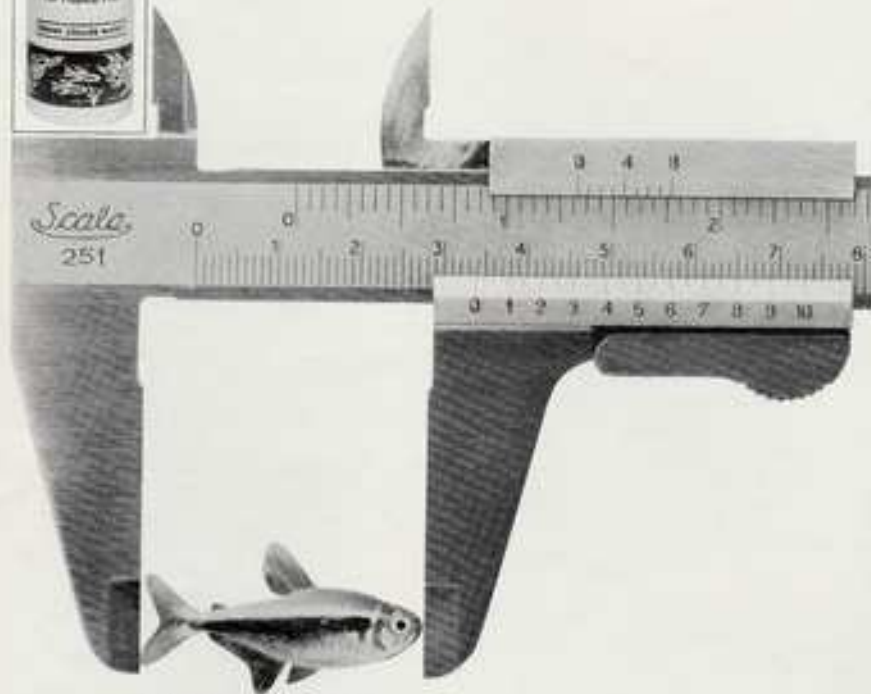
Contents include:

Egyptian Mouthbreeders
Fluctuating Temperatures
Goldfish Breeding
Spotted Leporinus

Clownfish Breeding
Rearing Tropical Fish Fry
Amazon Sword Plant
Readers' Queries Answered



Secrets of TetraMin



Healthy fish growth is guaranteed with TetraMin.

Fish growth depends not only on the frequency and quantity of feeding, but mostly on the quality of the fish food. Watch TetraMin-fed fish growing. Cheap fish food may be hazardous to the life of your fish. Continuous tests with all fish foods of the world prove that your TetraMin is the most healthy lake food you can buy. Perhaps the healthy growth of fish is the secret of TetraMin's success?

TetraMin means longer life for your fish





PetFish

Monthly 20p

Vol. 8 No. 3

July 1973

Subscription rates: £3.00 for 12 issues; £1.50 for 6 issues (U.S.A. and Canada \$7.50 for 12 issues)

Editor: Anthony Evans

Advertisements:

K. Bellenger

In This Issue

	Page
Comments and Quotes	109
Letters	110
A Mouthbrooding Cichlid	120
Fluctuations in	
Temperature	123
Is It New to You?	125
Goldfish Spawning and	
Rearing by the Amateur Breeder	126
Origins of Goldfish	
Types	127
AquaGlossary No. 11	128
Raising Tropical Fish Fry	129
Readers' Queries	
Answered	130
Guppy World	132
One of the Ever-Popular	
Anoxic Swordplants	133
Personal Comment	135
Water Hawthorn	137
A Spawning by the Spotted Leporinus	138
Aquarium Spawners of the Yellow-tailed	
Clownfish	139
Not Easy—but Here's	
How	141
Marinist's Notebook	143
Club News	144
Dates for Your Diary	150

© 1973

PetFish Publications

Editorial and Advertising Offices
554 Garratt Lane
London, SW17 0NY
Telephone 01-947 2805

Comments and Quotes

- Report on effects of quinaldine
- Ridding the sea of algae
- London's Aquarium Show '73
- Artificial coral reefs

'Drugged' Fish

OUR regular contributor Roy Fink and editorial Comments and Quotes have been highly critical of the use of chemicals, notably cyanide, for the collection of marine fishes from coral reefs. It is only fair therefore to report some findings indicating that some chemicals used by fish collectors are probably relatively innocuous.

Under the heading 'Fear of Drugged Fish is Nonsense' Dr R. J. Goldstein has reviewed the use of the organic chemical quinaldine for fish catching, in a publication entitled *ADVANCED AQUARIUMS MAGAZINE*, from the U.S.A. In particular, Dr Goldstein reports the laboratory findings of a group of pharmacologists who have published their results in *COMPARATIVE BIOCHEMISTRY AND PHYSIOLOGY* (1972: 44, 223-231). Although it is not made clear just how many species of fishes the work has been concerned with, the doses of quinaldine that produce anaesthesia in fishes in sea water have been shown to be well below the doses that cause harmful effects, that is, there seems to be a good safety margin, and the compound has been found subsequently to leave the body of the fish rapidly, and without itself being chemically changed.

Dr Goldstein's comments were particularly directed towards the suspicions that fishes collected by such methods reach the aquarist in a condition that means they will not live long in his tanks. He writes 'It is true that fishes that were collected with poisons such as bleach or rotenone are in doubtful health, but in general if you see a fish that is eating and fighting you can be pretty sure that there is nothing wrong with it. If the fish dies shortly after you buy it, the most likely cause of death is murder at the hands of the aquarist'.

Our concern in this whole matter

has been less with the likelihood of permanently harmed fishes reaching the U.K. than with the possibility of harming the ecology of the collecting areas. How many dead fish (and other animals) go towards providing one fit specimen for sale in a dealer's tank when chemicals are used for collection?

Coping With Algae

LAST month this column tried to offer slender consolation to readers troubled with pond algae by referring to the large-scale problem caused by these plants when they choked a Surrey water company's filter system. A report in *THE TIMES* last month concerned an operation to eliminate an alga that was an effort even more mind-boggling to anyone fighting (and mostly losing) a battle with algae in a ten-gallon tank or thousand-gallons pond. This struggle was to clear the sea around Bembridge in the Isle of Wight, no less, of a marine alga that had reached there from the seas of Japan.

This sea weed, known to become a pest by its rapid growth wherever it has settled itself in, is called *Sargassum muticum* and was first seen in British waters last February. It threatens oyster beds and other marine life. The Isle of Wight campaign involved collecting and destroying every scrap of the alga to be seen off the coast. What is more, the valiant anti-weed squad, a team from Portsmouth Polytechnic with students also from Liverpool, seemed to have every confidence that their efforts would be successful in eliminating the 10 feet-long bushy fronds. The trouble is that the alga has already reached its spore-producing stage. Most aquarists would suspect that the team has taken on a job that comes under the category 'Forth Bridge, painting of', but we wish them luck.

London's Aquarium Show '73

WE were pleased last month to see a letter on the subject of furnished aquaria at London's The Aquarium Show from Mr Mervyn Strange of Basingstoke AS, in the Bulletin of the Federation of British Aquatic Societies. Mr Strange was urging societies who fancy their abilities at creating furnished aquaria and aquascapes to enter the competition at this year's Show (2nd-4th November). We know that the Federation, and certainly PFM as sponsors of the Show, would also welcome greater participation in this section. Society entries are staged as part of the Tableaux section, and, although the creation of an imaginative and pleasing setting for the furnished tanks is part of the fun of this particular aspect of The Aquarium Show, there is no reason why a group of furnished tanks under a Society's banner should not of itself form a tableau display nor indeed why such

entries should not take the awards in the furnished and aquascape classes.

Tableaux displays this year, as in previous years, will be left entirely to the choice and ingenuity of entering societies—the only specification is that there should be a minimum of two aquaria (no maximum number—other than that imposed by the tableau area!) on a tableau entered in the appropriate competition classes.

Tableaux entry forms for The Aquarium Show, the sixth annual show, are being sent out this month and, with Mr Strange, at the Show, we all hope to see included 'those exciting, imaginative ideas in the tableaux, because without the people with experimental attitudes any hobby will just not expand'.

Artificial Reefs

THREE artificial reefs, complete with plastic seaweed, are being built in Port Phillip Bay. The reefs will be used to provide new 'homes' for fish.

They are designed and planned by

the Fisheries and Wildlife Department and built and financed by Esso-BHP.

The Director of the Fisheries and Wildlife Department, Mr A. D. Butcher, said today: 'Esso promised to build the reefs after the debate, over the ethane pipeline, built under the bay, last year.'

A reef already has been built off Dromana, another is being built off Mordialloc, and a third is planned for Werribee.

Mr Butcher said: 'Each reef is built in four separate parts, like the corners of a square. The first part is made of iron cubes, 10 ft. by 10 ft. by 10 ft., the second is concrete pipes, the third car tyres, tied in a special way, and the fourth part is rock from quarries.'

Each section is 200 ft. apart. Mr Butcher said: 'They are designed to give as much surface area as possible, and nooks and crannies for fish to live in. They will provide protection and food for fish. The reefs will be watched, to see how fast they are colonised. Future reefs will be designed from the best results.'

MELBOURNE POST.



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

Keeping Koi

IN his informative article on keeping koi Mr E. A. Allen (PFM, June) mentions the example of an experienced amateur breeder in Japan who 'may successfully raise only 1000 fish' from spawnings of more than 200,000 eggs. The author refers to this as a low rate of survival, which I suppose it is, but by golly, how could a non-professional cope with even this number? Mr Allen suggests that the number of 1000 applies to fish at the end of a year. If we assume these are only 2 in. in body length, that is 2000 in. of fish. 'The common rule of 2 in. of fish per sq. ft. of the pond surface area is an absolute minimum for small koi' writes Mr Allen (page 78). So our 1000 2 in. fish require as an absolute minimum 1000 sq. ft. of pond surface! That, I submit, is the equivalent of 20 of the pond surfaces available to most U.K. amateurs (bigger even than most rear gardens)—and it

obviously does not include in this the pond required for the parent breeders. It seems that the koi breeder here must own an estate or else be content with a very low total rearing figure. I am not a koi-keeper yet but if one of my Premium Bonds wins a big prize I'll certainly be thinking of becoming one.

Taunton, Somerset

J. COOPER

Fish House Circuits

PLEASE forgive the script. I'm in an airplane flying from Buffalo, New York to New York City and it is getting a bit turbulent. I want to commend you on an especially great issue, April. I'm presently in the process of making the transition between a hobbyist in New Jersey and a breeder in Florida. As well as being a large step

Continued on page 119

Unbeatable value

GUSSIE AQUARIUM AIR PUMPS

These highly-efficient pumps are quiet, powerful, durable and economical and, in the opinions of many users, better than other pumps which are more expensive — another example of the Gussie brand

value for money. Single or twin; both versions are 'trembler' pumps with long-lasting moulded diaphragms. Your fish will be safe with Gussie Aquarium Air Pumps.



Twin Pump: with two diaphragms and two outlets.

Single version Spare diaphragm kits available.

Ask at your usual retailer

ARMITAGE BROS. LTD. ARMITAGE HOUSE . COLWICK . NOTTINGHAM NG4 2BA

LET GUSSIE CARE FOR YOUR FISH

"I saw your advertisement in PFM"

PACIFIC AQUARIUMS SUPPLIES LIMITED



RETAIL

MARINES INVERTEBRATES
FRESHWATER, TROPICAL &
COLDWATER FISH

STOCKIST OF: Frozen Mysus,
Plankton and Seameat.

ALSO VERBRO AQUARIUMS
and all makes and brands of
aquarium products

They say it's the best shop in London! Visit us now.
We are sure you will agree.

1058 TRINITY COURT

Hours of Business:

WHITGIFT CENTRE

10.00 a.m. to 6.00 p.m.

PHONE

CROYDON SURREY

Closed all day Wednesday

01-688 1298

PACIFIC AQUARIUMS SUPPLIES LIMITED

4th SUCCESSFUL YEAR

in

WHOLESALING

and

IMPORTING TROPICAL FISH

SEND!!

40 GRANGE ROAD

FOR

PHONE!!

THORNTON HEATH

PRICE LIST

CALL!!

SURREY

01-653 1270

WITH A NAME LIKE THAT YOU HAVE TO BE GOOD!



PO-PO II

We don't know what made the Orion people * choose a name like PoPo for their smaller air pumps—but we do know that the PoPo I and PoPo II are unmatched for performance, value and reliability. We started selling PoPo I's

It's worth paying just a few pennies more than the cheapest pumps to get this kind of value.

PoPo I for 1 or 2 aquariums—£1.44 (inc. V.A.T.). PoPo II for up to about 4 aquariums—£1.88 (inc. V.A.T.)

Interpet

for trouble free fish keeping!



DORKING · SURREY



PO-PO I

in September, 1972 and have received scores of favourable comments on their design and performance.

Our Managing Director visited their factory last November and is still enthusing about the Orion quality control.



*Makers of the outstandingly successful Night & Day Twin Pump—only £4.67 (inc. V.A.T.).

"I saw your advertisement in PFM"

HUTCHINSON

'SALES UNITS'

39/41 Wicker, Sheffield 3

New D.I.Y. Display Unit



Two standard sizes, to take six or eight tanks, 24" x 12" x 12" each, stand dimensions 84" high, 50" wide and 13" deep, the bottom tanks standing 6" from ground. The unit is made up from 1" square section Silver Steel built to take 6 or 8 - 24" x 12" x 12" tanks, or 1 - 48" x 12" x 12" tank on each shelf. These are of water repellent polyurethaned marine ply. All the electrical wires are contained in a wooden channel on the back. A rubber socket outlet is provided for each tank, plus an extra socket on the top board for the pumps, which also contains the control switch for fitted lighting. All the convertagears are mounted on the top board and left open to keep cool (to comply with E.E.C. regulations). The appearance is also enhanced by the use of perspex

panels which give easy access to the fish.

The prices for the units are:

MK1, 48/8/2412 open, 8 tanks, 4" legs, **£100 delivered.**

MK1, 48/6/2412 open, 6 tanks, 12" legs, **£90 delivered.**

Tanks and kits, either part or complete - extra as required, e.g.:

Unit No. 1 NU-GOLD tanks, heater stats thermometer, clips, tees, airline, clamps, filters, (box), wool, carbon, pumps for **£70 complete.**

Kit No. 2, as above with cheaper p/s P.V.C. coated tanks plus all the kit for tropical fish keeping **£50 complete.**

Six tank unit kits proportionately less in price.

All units delivered with electrical plugs, for easy installation. Deluxe units still available.

Cut out this coupon & post now with 10p P.O.
(Refundable on first purchase) for all lists.

Name _____

Address _____

Aquarist _____

HUTCHINSON
SALES UNITS LTD

Please mention PFM when writing to advertisers

Queensborough for QUALITY and VARIETY of Fish and Plants

This month, number of varieties available at both our shop and farm—299

Unusual varieties as follows:

Apistogramma cacatuoides	Gold Veilifera molly (XL)	Rasbora kalachrams
Blue Limia	Hexazona barb	" meinkeni
Butterfly	Julidochromis ornatus	" urophthalmus
Callichthys	Killies	Ramirezi (XL)
Chocolate Gourami	Mosquito fish	" gold (XL)
Clown Knife fish	Merry Widow	Stolickz barb
Ctenopoma kingsleyae	Malawi cichlid	Tilapia melanopleura
Discus (small, medium, XL)	Oscars (tiger and red)	" ruwetti
Emperor tetra	Pelmatochromis taeniata	" zilli
Girardinus metallicus	Reed fish	

SPECIAL COLLECTIONS OF PLANTS (post only from Fish Farm)

Majority of plants grown at our own farm: clean, healthy, well packed, quick delivery. Our quality is unsurpassed. Many plants available other than those advertised.

48—£2.50.	For 48" aquarium.	50 plants, including A. sword, Crypts, Vallis, etc
36-48—£1.85.	For 36-48" aquaria.	40 plants as for 48 collection
30-36—£1.10.	For 30-36" aquaria.	35 plants as for 48 collection
24-30—95p.	For 24-30" aquaria.	30 plants, including Crypt, Vallis, Cabomba, etc
18-24—75p.	For 18-24" aquaria.	25 plants, as for 24-30 collection
cw—85p.	For pond & aquaria.	15 plants incl. Crispa, hornwort, moneywort etc.

Cryptocorynes—Balanse, Blassi, Nevilli, Affinis, Pechi, Willisi, etc. 25p each

Amazon swords—30p-35p each

Gt. Hygrophila, Wistaria, Ivory Rush, Bamboo Plant, Borneo fern, Aponogeton—17p each

Vallisneria, Ambulia, Cabomba, Hygrophila, Bacopa, Ludwigia, Elodea, 6p each, 60p doz.

(Cash with order, 20p post and packing)

COLDWATER PLANTS

Oxygen: Crispa, hornwort, willow moss, moneywort, parrots feather 10p } 20p post & packing
 Floating: Water hyacinth 25p; water soldier 20p; azolla 10p; frogbit 10p }
 Marginals: Bog bean 15p; marsh marigold 15p; iris 20p; bullrush 20p } 30p post & packing
 " Bog arum 30p; Apon. distachyum (w. hawthorn) 60p; Villarsia nymphoides 35p }
 Lillies: White 75p; pink £1.25; yellow £1.45; red £2.25 }
 Snails (Stagnalis): 6p each, 60p dozen. 20p post & packing.

COLDWATER & PONDS

Our WATER GARDENS at the Fish Farm and our coldwater house at Shepherd's Bush have been extended. We carry a very extensive range of pondfish, tank fish—fancy varieties, plants, marginal plants, etc.

GOLDFISH - GOLDEN ORFE - KOI CARP - TENCH - RUDD - BRISTOL BLUE SHUBUNKINS - NYMPHS - COMETS - FANTAILS - BLACK MOORS - LIONHEADS - CELESTIALS - etc.

All in sizes from 2" up to 12". Thousands from which to choose.

FIBRE GLASS PONDS - RIGIDEX PONDS - POND LINERS - PUMPS FOUNTAINS - WATERFALLS - GARDEN ORNAMENTS, LIGHTING, etc.

Large stocks available for your selection.

TROPICAL AND COLDWATER FISH: PERSONAL CALLERS ONLY

QUEENSBOROUGH FISH FARM
 FERRY LANE, HYTHE END
 WRAYSBURY, STAINES
 Phone: Wraybury 2885

QUEENSBOROUGH FISHERIES
 111 GOLDHAWK ROAD,
 SHEPHERD'S BUSH, LONDON, W.12
 Phone: 01-743 2730

Hours of Business:

Monday, Thursday, Friday, Saturday, SUNDAY
 10 a.m.—6 p.m. Closed Tuesday and Wednesday.

Hours of Business:

Monday to Saturday 9 a.m.—5.30 p.m.
 Closed all day Thursday. Late night Friday to 7 p.m.

"I saw your advertisement in PFM"

Your fish will rise to POND PRIDE

Fish feed on the surface from this high protein, vitamin enriched, nutritionally balanced food in large pellet form.

With POND PRIDE you can watch your fish whilst they feed, note their feeding habits and even see small fry enthusiastically nibbling their way through the floating pellets.

Standard pack contains approximately 1,000 pellets —each pellet a single well balanced meal!

Obtainable in a range of containers from 28 to 3,000 grams (Mini Standard Maxi Breeders) from pet shops and garden suppliers everywhere. In case of difficulty write to:



COOPER NUTRITION PRODUCTS LTD

Speciality Division
Stepfield,
Witham Essex. CM8 3AB
Tel. Witham 3651

Please mention PFM when writing to advertisers



This is a **PLUG**—for our
NEW SAFETY-FIRST LIGHTING UNIT

The **SILVER STREAM**



Now Even Better
 Value than Before

£2.49 Plus VAT

Postage & packing 25p extra
 (Tube and plug not included)
 Please state size and
 wattage of tube

**TEN Good Reasons Why YOU should
 INSIST on a SILVER STREAM Control Unit**

- ★ Earth Provision on Mains Lead
- ★ Clips Supplied for Tube
- ★ Models Available for All Sizes of Aquarium Fluorescent Tube
- ★ One-piece Sealed V Leads
- ★ Easy to Attach to Back of Aquarium
- ★ Fluorescent Lighting Cuts Your Electricity Bill
- ★ Low Low Price
- ★ Smart Non-rusting Aluminium Case
- ★ Sealed Construction
- ★ Individual Components Removable for Easy Replacement

Bona Fide Trade Enquiries Invited

NORWOOD AQUARIUM

Phone 01-670 6908

24 KNIGHTS HILL LONDON S.E.27

"I saw your advertisement in PFM"

Make the diet balanced and varied.

Fish are quite human in one respect. They do like a varied diet. But it must be a balanced one.

The best way to make sure they get it is to give them the

best food you can. And that means Phillips Fish Foods — the result of scientific research and comprehensive trials in experimental aquaria.

Leading aquarists and fish

breeders know this. And they vary the diet with Phillips Flaked Fish Foods, Phillips Maxiflakes and Phillips Multifreeze.

Make sure your fish get these nourishing foods.



Phillips Flaked Fish Foods

A nutritious high-protein food containing liver, fish and meat meals, insects, crustaceans, vegetable matter, brewers' yeast, milk powder and cod liver oil. Rich in vitamins and minerals. 46% protein. Drum 11 1/2p, 1 1/2oz 24p, 4 1/2oz 57p, 18oz £1.73p.

Phillips Maxiflakes

Larger flakes for hand feeding the larger tropical fish. 1 1/2oz 34p, 12oz £1.57p.

Phillips Multifreeze

A 100% freeze-dried blend of seven nourishing foods for tropicals and marines. Drum .27p.

Phillips Fish Foods — the best that cost less.

PHILLIPS YEAST PRODUCTS LIMITED, PARK ROYAL ROAD, LONDON NW10 7JX.



Please mention PFM when writing to advertisers

LETTERS

continued from page 110

in life, I will now more than ever be requiring good solid fishkeeping information. I thought the article about the Dutch wholesalers and especially the one on temperature alarms for fish houses were great. I'll be assuming ownership of the Florida hatchery in July and with two fish houses (100 ft. by 25 ft. and 75 ft. by 25 ft.) and one thousand tanks I'm very concerned about fish-house keeping in general.

I thought a great deal about Mr W. B. Pearson's article and, as a result, I have made what, to me, is an improvement in his original design. I'd be very interested to learn of Mr Pearson's comments:

(1) The original system has three main parts—the operational section (T.1), the back-up system (T.2, T.3) and an alarm if the back-up system fails (T.4, T.5, relay).

(2) I've redesigned the original plans to have only two sections: an operational system and a combined back-up system and alarm. In my plans the alarm would make the owner aware that the back-up system was operational. I felt it best that I know when the main operational had failed rather than wait until the back-up system had failed in order to be appraised of the situation.

North Bergen, N.J., U.S.A.

A. D. WERBECK

Mr Werbeck sent a suggested rearrangement of the circuit presented by Mr Pearson in our April issue. His letter and the circuit diagram were shown to Mr Pearson, who writes (key letters refers to the published diagrams): While I agree that Mr Werbeck's circuit would work, I cannot agree with his claims.

(1) The way the alarm circuit is linked to the operating circuit via the relay will only indicate when T.3 becomes operative and not when T.2 becomes operative. This function is carried out by the neon indicator in the original article. As I said in the penultimate paragraph, I cannot think of a method of indicating when the low-temperature thermostat, T.2, operates.

(2) If T.1 fails in the closed position, the temperature will rise until T.3 operates and, when it does, each time it opens the alarm will ring. This will be annoying if T.1 cannot be replaced quickly for any reason. It can be argued that this can be coped with by opening switch, S, in the alarm circuit. So it could, but as a rule

alarm circuits should never be disarmed except to service them—why have them if you disarm them?

(3) Mr Werbeck says that he would like to know as soon as the back-up system comes into operation, and I wholeheartedly agree. This is why I advocated a visual inspection of the contacts of T.2 and T.3 at regular intervals. Another indicator of the operation of the back-up system is the fish house temperature. If it has suddenly gone up a couple of degrees, check T.3; if down, check T.2.

What do You Call Yours?

I AM collecting material for a book I am writing about pet names, especially interesting or unusual ones. I would be very grateful if you would allow me the hospitality of your columns to invite your readers to write to me briefly about their fish and their names.

What particularly interests me is the reason for choosing a certain name. I would also be glad to have details of the fish's breed and colour. I shall naturally acknowledge personally any information readers are kind enough to send me.

S. Wylve Court,
Park Lane,
Salisbury SP1 3NS

ADRIAN ROOM

Pen Friends Wanted

I'M a reader of PFM and I think it is great. I'm 19 years old and in the U.S. Navy—but I'm hoping to raise fish and if possible open a pet shop. I'd very much like to start 'pen pal' letters so as to learn as much as possible about the hobby and trade in other countries. Could you please publish this request in your columns.

Incidentally, we've pulled in to the Philippines and I went skin diving for the first time—it was out-of-sight. All those fish to see!

USS Coral Sea S-2,
Box 40, CUA-43,
FPO San Fran., Calif. 96001, U.S.A.

TONY FRIEDMAN

I AM a newcomer to fishkeeping and enjoy PFM. I was wondering if you ever have any letters for penfriends among the tropical and coldwater fishkeepers. I would love to write to anyone who is interested. I am sure one could exchange useful information in this way.

Oakhmoor,
Station Road,
Elsenhurst, nr. Bishops Cleeve,
Herts.

(MRS) R. HALSEY

A Mouthbrooding Cichlid



Hemihaplochromis multicolor

THIS mouthbrooding species was imported from its natural habitat in the River Nile in Egypt as long ago as 1902. Classified as a cichlid, it was first known as *Paratilapia multicolor*; subsequently it became *Haplochromis multicolor*, but now this name also is no longer valid.

In this article I am going to forego the task of giving a description of the fish's appearance—it would be a completely thankless job. 'Multicolor' must suffice. This Egyptian mouthbrooder grows to a size of about 3½ in. (8 cm.) and in mature specimens sex differences are clearly visible—the female is the larger, more robust fish, fuller in the belly, somewhat yellowish in colour and with dark diagonal bands on the body. The male, unlike the female, is bedecked with the lovely bright colouring that its name suggests. During spawning time, and when the light falls correctly on him, these colours are brilliantly heightened. Also, the male's anal fin is decorated with orange flecks.

These fish are happy in a medium-sized, thickly planted and well-lit tank kept at a temperature that does not fall below 68°F (20°C). They are peaceful and can be kept in a mixed community of similar sized fishes, but the tank must be supplied with plants and rockwork in which they can hide. Their diet should consist of live food.

For breeding purposes I prepare a 7-gallon (30 litres—18 in. by

By **RUDOLPH ZUKAL**

Photographs by the author

Translated by **F. MARSH**

On the facing page a picture of the male Egyptian mouthbreeder is shown. The female is dull of colour by comparison but is a larger and more robust fish.



12 in. by 12 in.) tank filled with fresh, normal, neutral tapwater at a temperature of 79 F (26°C). The tank is prepared with a base of fine, sieved sand. Care must be taken to use only a 'full' female for mating—otherwise it can be rammed and bitten by the male and even killed. So it is quite a good idea to use two females to one male. Usually the fish require 2 or 3 days in their new tank to acclimatise themselves, but during this time there will be continuous displaying on the part of the male, which includes blows made with his tail. All this time a pit is being prepared in the sand, and the female often helps in this.

The spawning itself takes place while the fish move round in a circle over the depression in the sand. Both the male and female fish mouth each other's rear ends, and the female expels some eggs that are immediately fertilised by the male. These eggs are then taken up into the female's mouth. The contact with the male's genital opening allows sperm to be taken into the female's mouth and so some of the eggs are actually fertilised in her mouth.

The end of the spawning, which may last from 1 to 2 hours, is signalled by the female's withdrawal into a corner. Her body is slimmer of course, and her enlarged throat sac full of the eggs.



Photographs on this page show phases in the pre-spawning procedure of the Egyptian mouthbreeder. Top picture: a mutual display to one another is accompanied by an exchange of blows from the tails of the pair (male left). Bottom picture: a pit is made in the gravel and as the pair move round in a circular path the pit becomes deeper.



The ♂ male (right) stretches his anal fin before the female after eggs have been laid and taken into the female's mouth. As she mouths the male's fin she takes in sperm that can fertilise eggs held in her mouth.

that she has collected can be clearly seen. As soon as the female starts looking for a hiding place the male should be removed so that the female can rest. In her distended mouth she will now be hiding 50-100 fertilised eggs, over which she passes fresh oxygen-containing water as she breathes. During the 10-14 days of the hatching period she will take no nourishment and for this reason she must be really well fed before being used for breeding so that she can stand up to this rigorous fast without damage to her health.

The young fish are about 6 mm. long when they hatch and must be given the finest possible live foods. For some days after they become free-

swimming they will retire into their mother's mouth at the slightest sign of danger, and at night. All this while, as long as she is caring for the brood, she usually eats nothing; she moves about very little, her breathing is heavy and she becomes very timid. At the end of a week after the hatching the fry are already so large that they cannot get into her mouth; and at this point it is better for the female and the young to be separated. It takes quite a little time before the female's mouth returns to its normal size, but, given plenty of varied feeding, she will be ready to spawn again 6 weeks later. The young fish are sexually mature after about 6 months.



This female is carrying eggs in her mouth and the effect on her jaw profile is clearly shown. She shows some signs of the emaciation that accompanies the brooding, since she takes no food at this time.

How to Avoid Unwanted

Fluctuations in Temperature

By CLIFF HARRISON

OUR ability to keep tropical fishes in the home is dependent on a reliable means of temperature control, with accuracy being generally of rather secondary importance. Yet hobbyists frequently complain of tank temperatures fluctuating wildly at various times of the day and night, and this problem can bring about great dissatisfaction with the well-tried-and-tested equipment that dominates the market today. Whilst accepting that these temperature fluctuations, if kept within reasonable limits, are unlikely to harm most species kept in community aquaria, we should perhaps pay some attention to the factors that can cause these changes in water temperature—either directly, or indirectly through their effect on the control equipment.

Aquarium thermostats normally include a bimetallic strip, which reacts to changes in the surrounding temperature; this strip controls the flow of current to the heater, switching it on as the water temperature falls below a previously selected value, and switching it off when the temperature rises. The complete unit is housed in some form of casing to prevent it being accidentally touched when in operation. Whilst the instrument is completely surrounded by water, then it will function properly and keep the temperature within a degree or two of that selected. However, if the thermostat is not completely immersed (and many are of such a design as to prohibit this), then the temperature of the air surrounding the instrument will also have some effect on its operation, the extent of this effect being dependent on a number of factors.

An external thermostat, for example, is clipped on to the outside of the tank, and 'senses' the temperature of the water through the aquarium glass, which is in perfect contact with the metal 'sleeve' plate of the instrument. If this plate makes less than perfect contact—perhaps the spring clip does not keep the thermostat tightly against the glass, or the glass itself is of the 'cast' variety, with the rough surface on the outside of the aquarium—then the air temperature will have a significant effect on the operation of the instrument. Similarly, the internal (glass-tubed) thermostats are often used with barely one-half of their length below the water level, and the temperature of the air surrounding the exposed portion of the tube will again affect the working of the instrument.

Having established that these fluctuations can occur even with reliable, well-made equipment, let us now look in detail at the practical consequences of this fact. First, lighting: bulbs of 60 watts and over can produce a considerable amount of heat, and if the cover is particularly tight-fitting the temperature of the water surface and the air trapped above it will soon build up to well over 100 F. If the thermostat is of the internal type, and protruding more than about 1½ in. above the water, then it will react to this warmth by switching off the heater. If the aquarium is fairly deep, situated in a cold room, and has no aeration to circulate the warm surface water, then temperature readings will vary with position of the thermometer: if the thermometer is placed near the top



Internal thermostat of non-submersible design (Kens), with the top cap removed to show the temperature control. This particular instrument is cased in a shatter-proof material, not glass, and has a metal strip for attachment to the tank frame.

of the tank it will register a temperature higher than usual, and if placed near the bottom it will show a lower temperature. The remedy here is to ensure that no more than 1 in. of the thermostat's glass tube is above the water (little more than the depth of the rubber bung in most thermostats). However, if it is of the non-submersible design with an adjusting screw on the top of the instrument, then care must be taken to ensure that its holder is securely fastened over the top edge of the aquarium. Whilst this will ensure the correct temperature of the main body of aquarium water, it will not overcome the surface heating: if sufficiently serious, the only cures are to provide aeration or filtration to circulate the water, to use



An internal thermostat removed from its glass tube for adjustment of the temperature setting screw shown by the arrow

Adjustment of the Springfield external thermostat is facilitated by the control knob on the case. A neon lamp (top) is included in this instrument, which is held against the tank glass by the spring clip shown

smaller bulbs, or, perhaps the best solution, change to fluorescent lighting, which produces virtually no heat at all.

Next, what about the effect of room temperature on thermostats, particularly those of the external type? As described earlier, these are small box-like instruments with one surface (contacting the glass) being made of metal, the remaining sides that form the body being of plastic: a knob on the outside gives an easy means of adjusting the temperature. The metal plate conducts the heat from the glass of the aquarium across a small air gap to the bimetallic strip inside the instrument, and the plastic body provides some degree of insulation from the temperature of the air surrounding the other five surfaces. However, since this insulation is not absolute, a fall in air temperature will fractionally lower the temperature inside the thermostat, and this means that the aquarium water has to rise to a slightly higher

temperature before the bimetallic strip warms up sufficiently to cut off the current to the heater.

In practice this means that the tank will tend to be 2 or 3 degrees ($^{\circ}$ F) warmer at night or in cold weather than during the day or in the summer. And although this problem is most often encountered with external thermostats, it is equally applicable to those inside thermostats that are partly out of the water and in an aquarium without a well-fitting cover above them.

Another factor that can cause a fairly sudden change in temperature is sunshine. Even in winter, a few hours of sun falling on the aquarium can raise the temperature by as much as 6' or 8 $^{\circ}$ F in a few hours: if it falls directly on to the thermostat,



however, you could find the temperature dropping to an even greater extent.

These observations are in no way intended as criticism of particular types of thermostats, but are offered rather to reassure those who have experienced similar, apparently inexplicable, fluctuations in tank temperature. In the wild, fishes often encounter far more sudden and drastic temperature changes as they swim from the shallow, sunlit river edges to the deeper, flowing centre. The only time that particularly precise temperature control is called for is in the breeding of a few difficult species, and on these occasions any of the types of thermostat mentioned may be satisfactorily used provided that the relevant cautions are observed.

Small, submersible glass-tube-encased thermostats are relatively foolproof, reliable and cheap. Whilst this last factor probably accounts for their enormous overall popularity, it is probably the first two that make them particularly valuable for newcomers to fishkeeping. They normally come ready-set to a temperature of around 75 $^{\circ}$ F, and since they cannot easily be tampered with the novice is fairly certain of getting at least one feature of the fishes' new environment to their liking. But occasionally the aquarium settles down at a temperature far removed from this 'ideal' 75 $^{\circ}$ F, and the dealer is consulted about the apparent fault in the instrument.

Almost invariably the real reason is traced to the position in which the thermostat is placed: it should be kept vertical, since this is the position in which it has been set at the particular tempera-

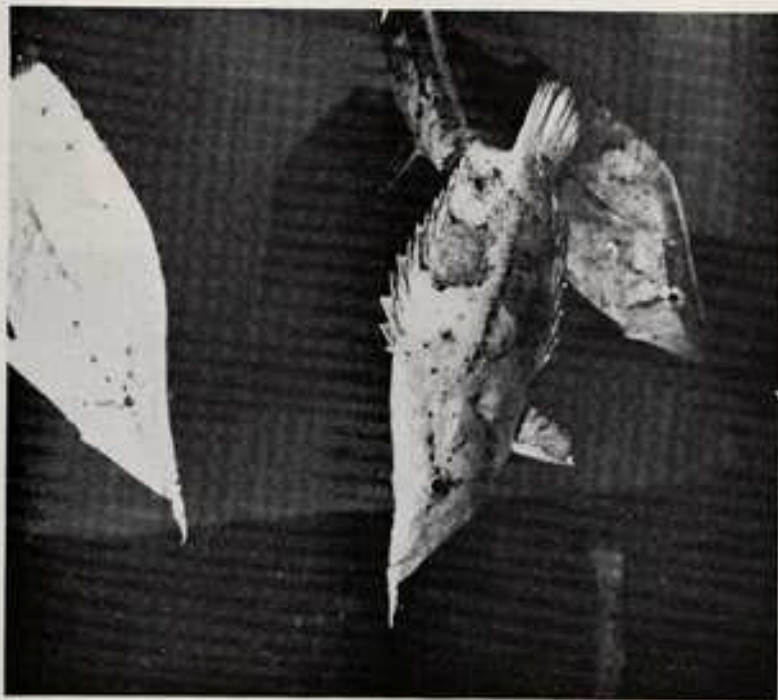
ture. Too many newcomers seem to think that it should be kept horizontal, like the heater, but it is whilst in this position that the weight of the bimetallic arm itself can affect the operation of the instrument. If the arm is uppermost, its weight will delay the opening of the contact points until a much higher water temperature is reached. If, however, the arm is underneath, then the points will spring apart more easily, and a lower temperature will be maintained. Only if the bimetallic arm is to the side of the horizontal thermostat, so that it has the same zero-weight as when vertical, will it operate correctly—but this would be an arrangement very difficult to maintain permanently in a horizontal position.

Some years ago there was a thermostat on the market that relied on this principle—swinging through a broad vertical arc—to allow the hobbyist to select the desired temperature within a broad

range. Tilting the instrument one way (pivoting on its special holder firmly fixed to the tank) would raise the temperature to the upper seventies; tilting it the other way would bring it to the lower seventies. Such an arrangement effectively overcomes the main criticism of this type of instrument—the difficulty of adjusting the temperature setting, which normally means unplugging the unit, removing the rubber bung, giving the adjusting screw a fraction of a turn one way or the other, reassembling, and plugging in. After a few hours, if the temperature has not settled down to the desired level, the process is repeated, several times if necessary (as it usually is). By using a heater-holder with two rubber suckers, hobbyists could perhaps experiment themselves with changes in the thermostat's angle from the vertical to give some variation of temperature with a minimum of fuss and bother.

Is it New to You?

An occasional import photographed
by CLIFF HARRISON



Changeable colour patterns are a feature of the leaf fish (*Monacirrhus polyacanthus*) as is its head-down resting position. A carnivorous species requiring a diet of small fish

COLDWATER SCENE



By FRANK W. ORME

Goldfish Spawning and Rearing by the Amateur Breeder

DURING the coming months I shall be writing about coldwater subjects applicable to each month. Although the articles are intended to help the novice it is my hope that the more experienced reader will also find them of interest. This month's article outlines the technique of coldwater fish breeding, hatching and sorting the possibles from the non-starter fry, together with subsequent feeding.

Essential to obtaining a successful spawning is light. It makes no difference whether you keep goldfish in a pool, in tanks in a fish house, or within an aquarium in the home—all must be in a position that gives plenty of light and which, preferably, can be reached by the early morning sun. During recent months I have visited a number of fish houses where the intending breeder has complained of difficulty in getting the fish to spawn. In almost every case the fish house has turned out to be a converted shed which severely restricted the light. The solution is to replace the roof with a clear material such as corrugated clear plastic sheeting. My advice, if you are thinking of a fish

house, is that a greenhouse should be purchased; size for size greenhouses are cheaper than sheds and much more suitable for the purpose.

The next very obvious essential in fish breeding is a true breeding pair. If viewed from above a ripe female will be noticeably plump, very often having a lop-sided appearance that is due to being swollen, by ova, on one side more than the other. The male, when in breeding condition, will have small white pimples known as tubercles upon his gill plates and on the first rays of the pectoral fins (the front pair of fins).

To condition the fish is a fairly simple matter. Separate the sexes, if possible in separate tanks, bearing in mind my remarks about the need for light. Feed them well on a varied diet, which should include live food and chopped earthworm. If conditions are right the pair will come into breeding condition within a short time, and the spawning tank can then be prepared.

A tank with a surface area of not less than 24 in. by 12 in. must be thoroughly cleaned. Ideally, an aquarium with a larger surface area

Where the goldfish fry lurk in a pond—around and beneath the water-lily pads, where live foods are plentiful and shade and shelter are given



Photo: J. ELIAS

should be used if you have one. Clean fresh water should be run in to a depth of not more than 12 in.

At both ends of the tank suspend nylon wool spawning mops, or well-cleaned fine-leaved aquatic plants, to form a dense but not impenetrable spawning area. The tank can now be left for a day to settle down, after which the male can be introduced, followed by a female a day later, during the evening just before dusk. Should the male show interest and start to chase the female you can hope for a spawning the following morning.

The act of spawning cannot be mistaken. The male will relentlessly chase the female in a most frantic manner into the spawning areas, where she will release small showers of eggs. By midday an inspection should reveal many eggs, each about the size of a pinhead, and this being the case the parents must be removed before they start to eat the eggs.

A thermostat and heater must now be installed to raise the temperature to 70-75°F, which will give a 4 day hatch. Do not worry at the appearance of white infertile eggs with fungus on them; the fungus will not attack the fertile spawn and if fertilisation has taken place many tiny glass-like alevins will soon be seen adhering to the aquarium glass and spawning medium. After 1 or 2 days the alevins will be swimming freely and must be fed. Newly hatched brine shrimp is an excellent first food and should be given in liberal quantities until the fry reach a size of about half an inch, at which stage they can have a first sorting ('culling') by the following method.

Place clean water, at the same temperature as the breeding tank, into a white bowl. Carefully catch a few fry and put them into the bowl of water. For this transfer I use a large plastic fine-mesh flour sieve, which causes no damage to the small fish.

If sorting single-tail fry, all that can be done is to remove any deformed or mis-shapen fish. The same applies to twin-tails; however, with these, having

removed any deformed fry all single-tailed fry should also be taken out. The twin tail will show up quite clearly against the white of the bowl. Next a close inspection must be made and any fish which do not have a split or divided tail must be removed so that you are left only with fry that have a true twin tail and are worth growing on. Continue in this method until all the fry in the aquarium have been sorted. Do not be tempted to keep any but the best; a poor fish will not improve but it will take food and space that could be utilised by better fish.

Food and space are now of prime importance if the fry are to maintain a steady healthy rate of growth. The whole object of culling is to ensure that food and space are not wasted upon worthless fish.

Having sorted the fry, clean out the tank and refill it with fresh water to the original temperature of 70-75°F. After removal of the spawning medium and all debris the fry can be carefully floated back into the aquarium. Do not worry about using water direct from the mains—it very rarely has any ill-effect, and in fact a regular partial change of water helps to promote steady growth.

The ideal to aim at now is to feed little and often so that the stomachs of the fry are kept almost at bursting point. Micro worm, well mashed whiteworm and sifted daphnia are excellent foods at this stage. Adjust the size of food to the fish's rate of growth; in other words progress from mashed whiteworm to finely chopped and finally full size whiteworm. Do not be too hasty in making the transition, as it is possible for a young fish to suffer jaw damage or even choke if it attempts to swallow a worm that is too large for it.

When a spawning has taken place in the pond the plants with eggs attached can be removed and hatched under the controlled conditions of an aquarium, after which the treatment of the fry is exactly as outlined for tank-spawned fish.

Origins of Goldfish Types

By FRANK W. ORME

ABOUT a thousand years ago a discernant Chinese noticed fish of a lighter colour than the normal olive green of the wild carp. When these specimens were caught and bred the young were found to inherit the lighter colour, and to pass the factor on to their progeny. After many generations, with the infinite patterns of their race the Chinese eventually evolved a strain of fish which gave rise to the common

goldfish.

From these early strains other sports, or mutations, arose which were separated and interbred until the new feature was fixed. To a greater or lesser degree, these new strains differed in body shape, finnage and colour. By breeding various types together other forms were created, which over the years became totally different from the wild ancestor.

This process of selective breeding has continued to the present day. The majority of the bizarre forms of goldfish now in existence are due, in no small measure, to the skill and patience of the Chinese breeder, supplemented at a later stage, around 400 years ago, by the Japanese.

Without doubt the goldfish has a greater variety of form, and tendency to deviate from the normal, than any other species of animal. Nevertheless, were it not for the continued attention of man and the application of selective breeding techniques the goldfish would revert to the wild type of fish in a compar-

tively short time. It is said that over a hundred different varieties of goldfish exist, many of which have not yet reached western shores.

In a booklet entitled CHINESE GOLDFISH, issued a few years ago by the 'China National Produce Export Corporation', coloured photographs, giving both the English and Chinese variety names, show metallic orandas (Hung kao t'io), nacreous veiltails (Wu hua wen yu), metallic lionheads (Shi tzu t'ou), phoenix (Wu hua tan feng)—this is nacreous veiltail without a dorsal fin), metallic bubble-eyes (Hung shui p'ao yen), pom-poms (Shih tzu kun hsiu chiu), metallic pearlscales (Hung poi chen chu lin). Part of the text reads as follows:

... the fish has flourished into numerous types of which the more popular are:

Wu hua	Floral
Kao t'ou	High-head
Lung ching	Dragon-eyes
Jung ch'iou	Brocaded ball
Tui hsiueh	Heaps of snow
Hung ting	Red cap
Hsia ma t'ou fan sai	Frog head and puffy gills
Wang t'ien tai ch'iou	Sky-gazing playing ball
Tan geng	Pinky phoenix
Shui p'ao yen	Watery puffed eyes
Tan chung fan sai	Egg-like puffy gills
Yen wei	Swallow, long sweeping tail
Chen chu lin	Scales with pearl-like beads

The Wu hua is further divided into two classes, one of which has green spots on red base and the other red spots on blue base, both reflecting some five kinds of floral colours ...

The common goldfish is known in China as the Chin yu, and in Japan as Kingyo. Other Japanese names for fancy goldfish varieties are Ryukin (veiltail), Ranchu (lionhead) and Demekin (blackmoor).

The Americans soon established the first fish farm after introduction of the goldfish into the U.S.A. during the 1880s. Approximately 150 years earlier than this the goldfish arrived in England.

Of the many varieties of fancy goldfish the most popular with British fanciers are the common, Bristol shubunkin, fantail, blackmoor, veiltail, oranda, lionhead,

pearlscale, pom-pom and bubble-eye. The celestial is also often seen. The Bristol shubunkin was developed by aquarists in the city after which it was named. The Americans are credited with developing the comet, and the fantail has been greatly improved by the English aquarist Mr Arthur Boarder, who has spent years creating a hardy quick-colouring strain.

It was with the aim of improving the goldfish that the Goldfish Society of Great Britain was formed,

at the instigation of Capt. L. C. Betts. Through the work of this Society, and other aquarists, it is now generally agreed that British stock is as good as, and in many cases superior to, any oriental bred fish of the same variety.

Certainly a great deal more is now known about the goldfish. Although the various scale groups will interbreed, on no account should the different varieties be crossed. It should be every breeder's aim to produce pure strains of goldfish.

AquaGLOSSARY

No. 11

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

Anom, anomal (Greek): unusual. Pronounced 'a-nom, a-nom-al' (as anomalous). Used in the trivial names of the dwarf cichlid *Nannacara anomala* ('nan-ah-kar-ah a-nom-al-ah') and the golden pencil fish *Nannostomus anomalus* ('nan-nos-stom-uss a-nom-al-uss') to denote possession of features in these fishes thought to be unusual when they were first named (absence of adipose fin in the pencil fish).

Cheiro, chiro (Greek): hand. Pronounced 'ki-roh'. For example, the generic name of the cardinal tetra, *Cheirodon axelrodi* ('ki-roh-don ax-el-rod-eye'), refers to the hand-like appearance of the teeth, each with five cusps on the edge (*odont*, Greek: tooth).

Cteno (Greek): comb. Pronounced 'ten-noh'. In the generic names *Ctenopoma* ('ten-oh-poh-mah') refer to the rough (comb-edged) scales and gill cover respectively in these fishes (*poma*, Greek: cover).

Mega (Greek): large. Pronounced 'meg-ah'. For example, in the scientific name of the black phantom tetra *Megalomphodus megalopterus* ('meg-ah-lam-foh-duss meg-ah-loh-terr-uss') this root occurs in both generic and trivial names (*megalopterus*, literally large fin; *ptero*, Greek: wing, fin). The green dwarf wrasse *Doratonatus megalepis* ('dor-ah-toh-nah-tuss meg-ah-lep-iss') has large scales (*lepis*, Greek: scale).

Phallos (Greek): penis. Pronounced 'fal-loss'. Conspicuous gonopodium features are responsible for the generic names of the livebearing fishes *Phallichthys* ('fal-lik-thiss'), *Phalloceros* ('fal-low-ker-ross') and *Phalloptychus* ('fal-lop-tik-uss'). These names include the suffixes *ichthy* (Greek: fish), *cero* (Greek: horn) and *ptych* (Greek: fold).

Stigma (Greek): point, mark. Pronounced 'stig-mah'. For example, *Barbus stigma* ('bar-buss stig-mah') has conspicuous dark marks. In the bleeding heart tetra *Hyphessobrycon rubrostigma* ('hy-fess-oh-bry-kon roob-roh-stig-mah') the blood-red spot is described in the trivial name (*rubro*, Latin: red). The marine green wrasse *Thalassoma umbrostigma* ('thah-lah-soh-mah umb-roh-stig-mah') has an umbrella-shaped mark (*umbro*, Latin: shade).

Raising Tropical Fish Fry

By J. LEE

THE ambition to breed a favourite egg-laying tropical fish or even to spawn many different species of egg-layers is one that affects nearly all fishkeepers at one time or another. A good many fishkeepers have achieved the wonderful sight of a tank full of wriggling fry. But, after the initial pleasure of being able to say 'Well, I've done it at last', only a week or two may elapse before bitter disappointment is experienced at the loss of the whole batch of fry. Spawning the fish is only the first step—the hardest task lies ahead with the feeding and rearing of those minute baby fish from the size of a pin head up to a 2-3 in. adult stage.

The principles of rearing these tiny splinters are basic to the majority of species—the fry must be fed with a sufficient quantity of the correct food for their age and size and be given partial water changes.

As important as feeding with the correct food is giving it in the correct quantities. Although a very careful fishkeeper may underfeed his fry and lose a brood through starvation, I think myself that in nine cases out of ten it is the other way round and that overfeeding, and the resultant water pollution, is the culprit that accounts for innumerable lost batches of fry. The fatal mistake is often made at the point where the embryos leave the egg. As soon as the fry are spotted food is squeezed into the tank. But this is a vital time lapse for the weak and tiny fish; they need the next few days to rest and gather strength and they carry their own yolk sacs to supply them with all the food they require for from 4 to 6 days after they become free of the egg. First feeding should be started only after the yolk sac has been depleted.

At this stage it is vital that the fry receive the correct food to start them off to a healthy life. For the next few days they can be given *Euglena*, or green water which is full of tiny animal life, or cultured Infusoria, which can be easily produced by any of a number of methods. One method is to let a large goldfish bowl of tap water stand for 2 or 3 days and then add to it dried banana skins, potato peelings, dried hay or—what is possibly the best material of all—add to the bowl two large crushed lettuce leaves that have been boiled to break up the membranes, plus a small amount of

green water or previous Infusoria mixture just to get the culture going. After a few days a thick cloud formed by the microscopic life will be seen if a jar full of the mixture is held under a strong light (a dirty or smelly culture must be discarded, however, as it will only pollute the tank).

The Infusoria or green water can be given at first at the rate of a few drops per day. If no drip feed is available a useful way to introduce the food into the tank is by the method I use myself—from a hypodermic syringe, which acts as a miniature pump. A substitute for Infusoria is Liquifry for egg-layers, and possibly one of the richest foods in protein—the yolk of a hard-boiled egg given twice a day squeezed through a fine cheese muslin or very fine nylon material.

After careful feeding during the first week to ensure that no clouding occurs in the tank, slight, partial water changes should now be started. These, plus good feeding, should induce the fry to make rapid growth. Quite a number of species are large enough at birth to take newly hatched brine shrimps right away (many killies and cichlids are included in this category). Indeed it is good practice to get very tiny fry on to brine shrimps as soon as their mouths and minute stomachs can cope with them. I usually start them off on a few shrimps 3 days after the free-swimming stage, and once the baby fish taste their first meal of brine shrimps their stomachs will always be bulging red with them. (The brine shrimps should be rinsed in fresh water before being introduced into the tank.) After 2 weeks or so of being fed twice a day on brine shrimps the fry can be weaned very gradually on to micro worms over a period of a few days and also on to a meal of mixed fine dried foods.

Once the fry begin to take shape and gain a tint of colour, after 4 or 5 weeks, the feeding programme should be increased if possible to accommodate three or four small meals a day. By now the fry should be able to take a good feed every 2 days of Grindal worms and tiny crushed snails. Another fine food at this stage is potted salmon and shrimp paste. A small pellet attached to a piece of cotton can be dangled half way down inside the tank and the fry will pick it clean. Small white worms, chopped very fine with a

razor blade, and very fine sifted daphnia will also be greedily taken.

A fine dried food that can be obtained from pet shops can be made from large slab dog food, which contains a high protein content of meat and liver and can be scraped and powdered down very fine.

After 6 or 8 weeks the young fish are now beginning to look like replicas of their parents. Larger, graded daphnia can be given, with white worms, tubifex worms and small crushed or shredded earthworms. Sifted Bemax health food and Farex baby cereal can also be given (Farex should be soaked first and made into a paste or porridge). Tasty meals can be made from boiled fish chopped up very fine, and a little green food such as small tender shredded peas or a tiny pinch of crushed spinach will be appreciated.

Dried daphnia can be obtained by collecting up the fresh, dead fleas netted out from a haul you may have brought home and dried right away in a hot temperature (be warned, this is a very smelly process but nevertheless makes an effective food). Small, shredded blood worms,

collected from leaves, twigs and the mud around a pond, make an excellent meal.

Once the fish are 4-6 months old, with all their markings and colouring, a larger variety of foods can be given such as mosquito larvae, freeze-dried tubifex or brine shrimp. I find, with my fishes, that Shredded Wheat ground down finely is accepted and another nourishing food that can be given, though not too often, is very finely grated cheese.

I am, of course, a great believer in the value of live foods and I make sure that my stock have at least two feeds a week of daphnia, and two or three feeds of white worms, tubifex or Grindal worms and ghost larvae. Now and again the odd feed can be given of small, clean earthworms.

There is really no end to the foods that can be given to fish. One thing is quite certain—the larger the variety of foods that can be given, whether dried or live, the better and healthier one's stock will be. The right food at the right stage, plenty of swimming space, clean tank conditions and frequent small partial water changes are the keys to success in rearing tropical fish fry.

Readers' Queries Answered



Dangers from Plastics

I have recently read, admittedly in connection with brewing home-made beer, that some plastic containers are unsuitable for use as the plastic may give off toxic chemicals, and in fact bright yellow polythene buckets (I myself use such a bucket for holding water for my goldfish tank) are particularly mentioned as not being suitable for use. Since such a lot of plastic is used in connection with our hobby are the same dangers likely to arise?

It is advisable to be aware that not all plastic are non-toxic to fish, although it is of course unlikely that any of the plastic used for aquarium equipment or, indeed, for small tanks themselves, would be in any way harmful. Some industrial plastics do contain potentially toxic substances; these are particularly likely to be released when alcohol is brought into contact

with them (as would be the case in home beer- and wine-making) but hot water used in them could also become contaminated. So if you proposed to use any plastic tubing or containers not manufactured for aquarium use it is advisable to wash them thoroughly and treat them with hot water before bringing them into contact with water to be used for fish.

Oscar in Trouble

We have an Oscar 10 in. overall length in a 30½ in. by 12 in. by 15 in. tank (75°F) by himself. He is approximately 1 year old and we've had him since 1 in. long. The tank is bare but for a few rocks and has a power filter which seems to provide adequate aeration. Occasionally he seems to be irritated by something that causes him to quiver and sometimes reverse from side to side for a few moments; quite often he damages

himself against the rocks by darting away for no apparent reason. Other than scars he receives from these 'fits' the only outward signs are clusters of oxygen bubbles that seem to cling to a form of slime that appears to come from his body. He eats well and has live or lean meat as well as pellets daily.

You have very well described the symptoms induced by excess acid or alkali in the water (the symptoms being the same for either). The irritant action of excess of acid or alkali leads to heavy mucus production and darting, convulsive movements and may result in death. In most aquaria, dissolved solids tend to increase and the water becomes more alkaline with time; it may well be that if you were to test the pH you would find that this was so (a reading of 8-9 would be too alkaline and over 9 excessively alkaline). Although you have a power filter working it will probably not be correcting water alkalinity unless indeed you are using the appropriate resin. Partial water changes are the answer and you should be changing a quarter of the water in your tank perhaps once a month. Under the circumstances it would be advisable to change a third of the water at once, and another third in about 2 weeks' time.

It is also possible (since you do not list such foods) that the oscar's diet might be improved. Live foods and lean meat are excellent foods, but at the size it has now attained most live foods would seem to be rather too small and it should be receiving live food in the form of whole live fishes, such as small guppies or goldfish. It is the most natural way of supplying the minerals that it would be obtaining in the wild by the same means, and it is important that such food should be supplied once or twice a week (do make certain that the stock of live fish to be fed is your own and therefore healthy). Earthworms should also be included if possible and a certain amount of green vegetable matter in the form of floating plant, boiled spinach or seeded lettuce.

Electric Fish; pH Effects

At the last meeting of our Society we held an Any Questions night, but there were two questions to which no one knew the answers. Could you answer them please? (1) How do you discharge an electric cat fish or an electric eel? (2) How does the wrong pH factor kill fish—does it poison them or does it burn their gills as they breathe?

Question 1: It is assumed that the question means by 'discharge' an electric fish, 'cause the fish to generate electric discharges'. The fish usually generate continuous small discharges as part of a direction-finding mechanism as in the gymnotids and roostmyrids, but 'stunning' shocks are most commonly produced by the presence of small live fishes of prey species. Such larger discharges also occur when the fish is touched or suddenly alarmed. Prodding the fish with a rod provokes a discharge for defensive purposes. If the question was designed to determine what would fully discharge or exhaust the ability of an electric fish to produce shocks, the answer is: long-continued application of a stimulus such as the above. The electric organ, in most instances a modified muscle, can be fatigued to a point where a rest period is necessary before it can become operative again.

Question 2: All animals have chemical mechanisms to maintain their internal body fluids (e.g. the blood) at a steady and constant

reaction or 'pH value'. This reaction is usually close to neutral, often about pH 7.4. Disturbance of this by either increasing acidity or alkalinity rapidly proves fatal because essential tissue activities like heart contractions and brain cell function then cease. The properties of proteins, which are all-important constituents of living cells, are altered by changes in pH so that this probably accounts for the drastic effects of such changes. Several disorders in humans (kidney failure, for example) can lead to blood pH changes which then are responsible for death. Unlike land animals, the fish (and its eggs) is particularly vulnerable to pH change because even small changes in the water it lives in might come to alter the animal's internal pH. Gross pH changes in water can, as you suggest, harm body surface cells including the gills, just as acid or alkali poured on human skin will cause tissue damage, but generally it is the upset in metabolism or internal functioning that can result from continual exposure to a water pH removed from the usually tolerated range of about pH 6.0 to 8.0 (depending on species) that concerns us in fishkeeping. In breeding, of course, since the fish egg is even more sensitive to deviations from the normal, the pH factor receives particular emphasis.

However, pH of water changes because of substances dissolved in it, and it is necessary to be aware, in considering this whole problem, that the substance changing the water pH might have an independent action of its own. It would be possible to have two water samples, each at say about pH 8.0, one alkaline because of sodium bicarbonate in it, and the other alkaline because there was sodium cyanide in it. Needless to say, the rapidly fatal effect on a fish of the cyanide solution would not be due to the pH in this instance.

Goldfish Aquarium

I have six goldfish which measure (without tails) 16 inches. My tank holds 12 gallons and measures 12 in. by 12 in. by 24 in. It has filters and fluorescent lighting equipment. (a) Is it overcrowded? (b) Is it possible that these fish might breed?

For six goldfish of the size that you quote a tank measuring 36 in.

in length (and at least 12 in. by 12 in.) would be more suitable. Goldfish are heavy-bodied creatures and need an adequate supply of oxygen. The time-honoured rule of goldfish keeping—1 in. of fish body to 24 sq. in. of water surface—should be strictly adhered to. The fish are in no danger at present, particularly as filtration is being used, and will probably be quite healthy for another 12 months, but as their size increases attention must be paid to their condition, particularly during the summer months, as any increase in water temperature may then cause them discomfort.

Fish have a habit of breaking all the rules and it is not impossible, though unlikely, that the fish could breed naturally in this tank. However, even with the provision of optimum conditions goldfish cannot always be induced to breed in a tank. Optimum conditions would include using a mature male and female fish (i.e. at least 3 in. long) in your tank, well planted with elodea and hornwort to give cover for the eggs. The female fish must be rounded, with bulging sides. Both fish can be placed in the breeding tank in spring or early summer and separated by a sheet of glass for at least a week. The water in the tank should be at least 65°F (10°C) and some daylight allowed to reach the front glass. For this pre-spawning week the fish are fed frequently on small quantities of chopped earthworm. Then, during a sunny spell of weather, the partition can be removed one evening and the water dropped to a depth of only 6 in. Spawning could then well take place early the next morning. Once the eggs are laid the adult fishes must be removed.

Opaline Gourami

I have three opaline gouramis, of which one is a female full of eggs. I have acquired a tank to breed them in but I cannot find many references to 'opaline' and I would be thankful if you could give me some advice on their breeding habits.

The opaline (or Cosby) gourami is a colour variant of the blue gourami that is itself a sub-species (sumatranus) of the three-spot gourami, *Trichogaster trichopterus*. In 1952, April, 1971 there was an article and photographs from R.

Zukal's breeding series describing the breeding of this bubble-nester. A 24 in. tank is required for breeding and the pair of fish should be of good and well-matched size (over 3 in. or at least a year old). The tank should be furnished with floating plants or bunches of a soft-leaved plant such as *Myriophyllum*, both for the male to utilize in his nest-building and to afford the female some protection if the pre-spawning 'play' should become too rough. The tank should be filled with tap water at a temperature of at least 80°F (26°C). The pair, having been previously well conditioned, can be placed in the breeding tank together, but the female must be removed once the eggs are laid and the male itself removed once the young fish leave the nest, since the parental instinct is short-lived and the fry may be eaten. Opaline fry are quite hardy but it is as well to follow the practice for all anabantid fry—keeping the tank well covered to prevent draughts and cold air reaching the fry during the critical time when they are developing their labyrinth auxiliary organ. The fry need not be reared in a great depth of water (9 inches is sufficient) provided that the air above the surface is warm.

Pond Blanket Weed

I would be grateful if you could give me any advice on ridding my garden pond of blanket weed. I frequently spend a whole day clearing this weed from the pond by twisting it round a stick and removing it with a net. However, within 3 weeks or so, it is back as badly as ever. The pond has been in existence for nearly 3 years and until the last 9 months was clear of blanket weed. Should I use a chemical preparation to kill off the weed? The fish and plants are healthy, so I am dubious about disturbing the good 'balance'.

The only consolation to be derived from the appearance of blanket weed is that it is usually the sign of a very healthy pond for this plant to flourish there. However, the danger is that the large masses that form can subsequently die later in the summer and cause massive pollution. Therefore it has to be removed. It is interesting that the problem with this alga should have started in your pond suddenly

9 months ago. Possibly some change took place then, such as the lopping of a tree that may have given some shade to the pool, or even over-heavy pruning of the pond plants last spring.

The chemical cures available are made by highly reputable manufacturers of aquatic remedies and their use is recommended by many of the larger water-gardening establishments. Even the manufacturers of these cures usually recommend that heavy growths of blanket weed should be removed before application of the remedy, to avoid the

subsequent forgoation of large quantities of decaying algae.

Once the blanket weed has been destroyed, steps should be taken to control its future reappearance by cutting down the light reaching the water. More submerged plants could be introduced, more pool edge plantings made of tall aquatics, placed particularly to obtain maximum shade, and more floating aquatics introduced (or those that produce surface leaves). It is interesting, though, to note that sometimes the pest diminishes naturally as rapidly as it can appear.



GUPPY

World

By PETER UNWIN

The letter was postmarked: Harrogate, that well-known watering place lying at the geographical centre of our islands. Therefore it seemed appropriate that this plea from a Yorkshire reader should concern the water in his newly set-up guppy tanks:

'Have just installed a new tank and have left the water standing for a week. Is this long enough to create the "aged" condition so often recommended as suitable for guppies?'

Like so many, my correspondent was confusing the words 'aged' and 'old'. Letting the water lie fallow before introducing any guppies will allow the chlorine to escape and this admittedly will make it safer for the fish; it will also become 'old' in age—but not 'aged'!

Aged or mature water has been used with fish and plants and has become changed by the biological and chemical processes in the aquarium. Next time you set up an aquarium try a 50 : 50 mix of 'aged'

water from another tank and water drawn from the supply.



'Once a guppy breeder finds the correct amount of salt and water for his saline mix, he should obtain from three to four times the live shrimp as eggs and, measured by volume.' That quote from a prominent and experienced guppy hobbyist should cause quite a few readers to raise their eyebrows. Do you get such a yield from your hatchings?

With the amounts of salt recommended for brine shrimp mixes ranging from as little as two to as much as five tablespoonfuls per gallon; with every type of salt recommended except the table variety; with such suggested additives as Epsom salts, lye, sodium bicarbon-

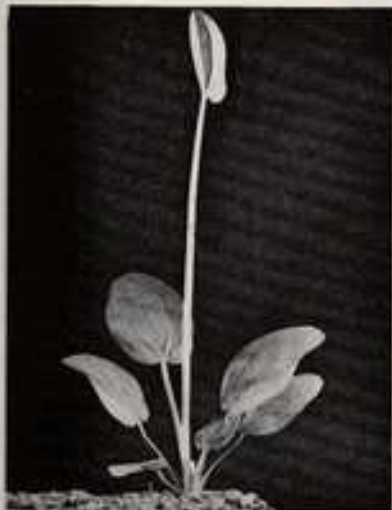
Continued on page 134



One of the Ever-Popular Amazon Swordplants

By KAREL RATAJ

Photographs by the author



Submerged forms of *E. cordifolius* are shown in the photographs. The lower picture on this page shows a plant that is developing a floating leaf, which can be seen to be of a different shape from the submerged foliage

KNOWN also to aquarists under the now invalid name *Echinodorus radicans* (Nutt.) Engelm, this plant belongs to the water plantain family (Alismataceae) and comes from the warm countries of South America, its distribution penetrating into Mexico. *Echinodorus cordifolius* is one of the few non-tropical species growing as far as the bounds of the temperate zone. It can consequently be cultivated even in garden ponds.

The plant develops a thick rhizome with a dense root network. On the roots oblong tubercles are formed, which are obviously food reserve organs. In more northern areas of habitation this plant drops its leaves for the winter. From the rhizome scanty leaves 16-20 in. (40-70 cm) long, grow up above the water surface. The petiole (stalk) of each is substantially longer than the blade, which is 6-8 in. (15-20 cm) long and 4-6 in. (10-15 cm) wide, ovately cordate (heart-shaped; about half as long again than the width), with usually seven, rarely nine veins. The base of the blade is broadly cordate.

The flower stalk is racemose (simple), at first erect, soon creeping laterally, with flowers 8 to 10 lines (20-25 mm) in diameter. Flowers are white, self-fertile and readily form seeds that are clustered together in a globular, echinate (spiky) fruit. Seeds of *E. cordifolius* can germinate immediately they are ripe. In the nodes of the floral stalk, leaves and roots of new plantlets develop at the same time as the flowers.

In the aquarium the submerged plants differ substantially from emergently growing natural specimens. The petioles of the submerged leaves are much shorter and usually are equal in length to the blade, which is moderately undulate at the margins and has an apex more rounded than that

of the emerged leaves. Before the emerged leaves have developed, floating leaves, up to 8 in. (20 cm) long and 6 in. (15 cm) wide, sometimes round, blunt at the top, are formed, entirely shading the tank.

E. cordifolius is cultivated in moderate, indirect illumination in an aquarium with a poor bottom medium (sand) in order to be kept permanently in submersed growth. The temperature of the water is not important, and the plant develops in temperatures from 59° to 86°F (15-30°C). Submersed plants usually have four to five well-developed, large, light green leaves with red-brown veins, often with brown, irregular spots.

Vegetatively *E. cordifolius* is propagated from the 'bud plants' arising on the flower stalks, or from seeds. The seedlings are pre-cultivated in shallow dishes in emerged culture. Grown in this way the development of the plants is much quicker than if they are kept in deep water all the time after germination.



Close-up view of the flower of *Echinodorus cordifolius*. White in colour, the blooms form on a stalk that also develops young plants ('bud plants').

This plant is bearing the fruits from which ripe seeds can be obtained and used for germination immediately.

Guppy World

continued from page 132

ate and even rusty nails, it is no small wonder that aquarists produce such widely varying yields of newly hatched shrimp.

But, back to that original claim--was our informant joking or do our readers really obtain such percentages? If they do then this is a clear case of the tale dogging the wag!

Adding lye to the brine shrimp hatching mix is one of those practical

suggestions that has arrived over here via U.S. breeders. Yet how many add it without really knowing why? This additive is simply to make the pH of the mix more alkaline, a condition that softens the shrimp eggs and results in increased amounts of fresh nauplii.

But please go easy with this strong alkali—a pinch is sufficient. The ideal reading for the brine is around

pH 8.5; much above this will kill off the shrimp.

If your local water supply is neutral or slightly acid a very good buffering solution can be made by adding one teaspoon each of bicarbonate of soda and sodium carbonate (washing soda) to each gallon of saline solution.

When shrimp are left in the hatching mix for long their waste products quickly turn it acid, so do check the pH if you have experienced a falling off in the numbers of freshly hatched shrimp.



by
ARPEE

Personal COMMENT

UNTIL I took up marine aquarium keeping I was content to leave undergravel filters to those who had some special reason for using them, and I still regard them as being of little real value in freshwater tanks. In the course of the past 2 years, however, I have come to acknowledge their use in saltwater aquaria, and considering that the models were, with one exception, rather crudely made by my own inexperienced hands, they have risen handsomely to the challenge which confronted them. My earliest problems centred around judging whether or not the throughput of air was sufficient for the task, and I had to experiment with a number of pumps until I found one which not only turned things over decently, but also provided that degree of turbulence which the marinist somehow feels is a necessary part of the show.

The pump actually chosen was a two-outlet model, and apart from a little spares trouble some time ago, now resolved, it has performed better than its price would have suggested. Until recently it seemed that the only matter which really required vigilance was the serviceability of the diaphragms and the status of the trembler arms. In both cases there was some degree of early warning of impending failure in the form of an appreciable drop in output, and disaster was averted by the insertion of the necessary replacements. The only points which otherwise would seem to need periodic attention were the condition of the airstones and the tightness of air-line connections.

A puzzling circumstance recently arose and I have spent some time trying to rationalise it. The fact that a local dealer had lent a new air pump to a customer apparently having similar trouble underlines the fact that we seldom suffer quite alone, and suggests that it might be of interest to detail the problem.

In my particular configuration, there are three airlifts in one marine tank and two in a smaller one situated directly below it. All are driven from the one twin-outlet pump. Until recently all five outlets produced similar outputs of air bubbles and water; when the air line is disconnected for short periods, as when feeding with dry food, the output to the upper tank is initially abnormally high after

reconnection, but soon settles when the pressure in the lower tank reaches the correct level for normal working. One day I noticed that the left-hand outlet in the upper tank was barely dribbling, and I did an immediate check on diaphragms, connections etc. As these were in order I removed the airstones and replaced two of them because they broke during inspection. When the system was reconnected there was a tremendous throughput from the left-hand outlet, but with customary juggling of air taps etc. I achieved uniformity from each of the five pipes. It all seemed just fine.

However, on the following morning the left-hand tube was only just functioning, but after first disconnecting the main supply and then reconnecting it, back came the torrent. I found, over a period of a few days, that this immense turbulence from the left-hand outlet sometimes lasted for only an hour, sometimes all day, but ultimately it reverted to practically nothing at all. The odd thing was that the other outlets appeared to be unaffected by all this. I even changed pumps, but this made no difference. I am now working on the assumption that complete replacement of all the airstones may rectify the matter, but readers may care to bring their own experience to bear on the issue, as I cannot think the situation is unique. I have had my own share of the quirks and funninesses of air pumps for a number of years and have usually found that the problem has been to get air to a place which it resolutely avoids. This is the first time I have found an outlet deteriorating so rapidly sometimes, and so gradually at others, without benefit to the others. There are, incidentally, no cracks or leaks in the system that I can find, and I have searched pretty thoroughly. Quite a puzzle.



Mr Lightwood of Eastbourne, who has had experience of working in a pet shop, thinks I am sometimes a bit hard on certain members of the trade because I criticise their customer orientation (Letters; PFM April). He will appreciate, I am sure, that such strictures as one makes in print must be selective, and my ire is principally directed at those who, being in full possession of all the available facts, nevertheless fail to use their native wit at the right time. Any fool can sell a fish to another fool, but it is considerably more skilful to gain a permanent customer; my hope always is that greater care may be cultivated by all concerned in this direction, wherever and whenever possible.

The real-life sketch drawn by Mr Lightwood of the average dealer's lot on a busy Saturday was most evocative and reminds me of some notes I once made on the subject of customers, which, on

account of their libellous content, never saw the light of day. I am sure that a reading of the unexpurgated version of that particular paper would have reassured the most sensitive pet shop assistant that I had not failed to notice that the extent to which the customer is actually right is far less than one is often led to believe.

It strikes me that the pet trade is faced with two problems which are peculiar to its very nature. The first is that the time spent discussing possible purchases with customers is much higher than elsewhere. One buys an electric light bulb without more than a passing thought, and the retailer only returns to the scene if the wretched thing fails shortly after purchase. With livestock the customer seems to think he has the right of perpetual and free after-sales service. Right is one thing and goodwill is quite another, and the extent to which buyer and seller give and take is the measure of good sense on both sides. Although I note that one enterprise is now charging 50p for advice on fish-keeping problems I hope that few will feel it necessary to emulate the habit, which was no doubt encouraged by the notion that banks should send their customers a bill every time they pass the time of day with their local branch managers.

Nevertheless, I think that aquarists should consider in greater detail how they can get the best deal for their money, and possibly clubs could get together with local retailers to thrash out the possibilities of changed habits, taking into account the actual problems on both sides of the counter. In some cases it might be possible for staggered hours to be arranged for mutual benefit, and in particular this would help where the purchasing of fish (as opposed to other articles) is concerned. Few people buy fish in the lunch hour unless they have the afternoon off, and if the shop closes before you leave work, you have to face that Saturday morning hell which removes the pleasure from what should be one of the more enjoyable events of the whole week.

If a retailer opened half an hour later and remained open as compensation it might be found worthwhile to encourage potential buyers to telephone orders in during the afternoon. The fish could be netted and bagged during what is often a slack time, ready for collection during that last half hour when last-minute callers all too frequently expect the retailer to greet them with dewy-eyed enthusiasm after a trying day. Thus, those who have dropped in for simple off-the-shelf purchases like tins of food, a new net or tubifex, are spared the agonies of shifting from one foot to the other whilst the dealer attempts to catch a particular pair of zebrias from a large tank containing several hundred fish. The situation is so very familiar and so unnecessary, and a little more thought all round could work wonders.

As to consultation and advice I think there is everything to be gained by continuing the conventional understanding that this is free and 'part of the service', especially as, in the dialogue which flows, there is usually a two-way exchange of information. The retailer may therefore in some cases learn more than he would readily admit. Saturdays are scarcely the time for this, and perhaps some other time could be put aside for the activity. If, for example, a retailer remained open for two 'late evenings' per week it might be possible for him to get extra help in the shop just for those periods—there must be plenty of aquarists keen to earn an extra few pounds—and during these sessions at least one assistant could keep sales traffic moving. It would be important to display in the shop quite clearly how the system worked, with hints as to how either side could help the other. Full discussion with the local clubs would, of course, help immeasurably.

There will be those who will scoff and say this won't work and who prefer the muddle which all too often submerges constructive thought. I hope that such complacency will not prevail because otherwise the day will come when some enterprise tears into the pet trade as we know it and rationalises it. The vision, to some, of a hobby fish supermarket, is simply a spectre to me, but this is probably what we shall get if we let others do our thinking for us.



I am, perhaps unreasonably, quite unimpressed by innovations which have no advantages over the articles they are intended to supersede. In particular I have in mind the almost unique collection of garden sprays in my shed, all of which bear Design Centre Awards, but which are functionally quite sterile.

I recently bought an all-glass tank encased in a plastic frame, the top of which has a 1 in. strengthening bar placed just in the very position which suggests to the uninitiated that it is a carrying handle for use when the tank is empty. The manufacturers, being aware that this brittle bar will simply snap if the tank is actually picked up at that point, place a warning label on the strip stating that it is not intended for this purpose. Users of this tank will find that the label comes unstuck after about a week, and on the basis that most folk are lazy, a high proportion of these tanks will bear no warning if ever they change hands. Now, bearing in mind that this range of aquaria has attracted a Design Centre Award, the question may well be asked whether a little more thought might have been directed at this very untidy feature. At not much extra cost a warning could have been embossed on this strap—one notices that the make and type

are embossed on the cover at both ends in bold sans lettering, so it can hardly be argued that there is any technical difficulty.

The fact that the cover costs not so much less than the tank itself suggests that the makers have gone all out for cheapness at the expense of utility, and this seems such a pity when the overall product has such immediate appeal and falls within a price range that most can afford. The further question might be whether this strap is really necessary: from the point of view of accident prevention it would have been preferable to omit it altogether—it is also a great nuisance when trying to net swiftly moving fish. I strongly suspect that the answer to this would be that in time the frame might, unweakened, tend to buckle away from the inner shell. If this is so it would surely be worthwhile to

spend more money on a stronger, thicker, frame, which would not require such inconvenient and inelegant buttressing. I am very pleased with many features of this purchase, but I do not rate it as more than a useful cheap tank.

Design Centre Awards should, in my view, be reserved for very special things, and this tank is not one of them, though it could be if the practical aspects were given the weighting which is their due. Perhaps, in order to restore the balance, the various consumer groups should get together and establish a Function Centre from which appropriate awards could be made to deserving subjects. If evolution were fair, which it seldom is, we might end up with a Design and Function Centre Award, which is unlikely so long as the consumer is rated on his pocket rather than his intelligence.

Water Hawthorn

A long-flowering plant
for the garden pond



The pattern of floating leaves formed by water hawthorn on the pond surface

By

JAMES BARRIE

Photograph by

W. J. HOWES

the open ponds in Edinburgh's Royal Botanic Gardens. It is now found all over the country, being naturalised to some extent in parts of southern England.

Pure white, sweet-scented flowers with contrasting black centres are borne clear of the water on twin spikes (hence the trivial name *ditachya*) between April and October—in mild weather, intermittently from March to December, while glossy green, frequently tinged purplish-brown, lanceolate-oval leaves measuring about $1\frac{1}{2}$ in. across by 3 in. long, rise on slim stems and fan out over the surface. In my own pond, it is usually the first plant to flower and the last to fade.

A. ditachya flourishes in sunlight or shade at depths less than a foot up to 3 ft., but optimum conditions prevail in a heavy loam at a depth

—The water hawthorn belongs to the single-genus family *Apernaceae*, which ranges from India and Ceylon through South-east Asia to Sumatra, Madagascar and South Africa. Amongst its relatives are several aquatic stem-pieces, notably *Sparganium angustifolium*, *A. stratum* and *A. boscianum*. *A. ditachya* was first recorded successfully in this country—St. Noel Humphreys, writing about 120 years ago, called it "one of the most desirable plants for the aquarium"—but passing time,

not to mention the tireless efforts of many enthusiasts, has endowed us with a wealth of more suitable material for our modern enclosed tanks. Nevertheless, pondkeepers can still enjoy this lovely perennial in a setting that does it justice.

Imported from the Cape of Good Hope in 1788 for cultivation at Kew, the plant soon made itself at home in our more demanding climate. By mid-nineteenth century it was thriving in locations as far apart as the Aquarium at Regent's Park Zoo and

around 12 in. in a sunny position. Because of its free-seeding habit, confinement of the small inch-thick tuberous rhizome, with care being taken not to restrict growth, is advisable. Plastic baskets, medium and large sizes, sold by aquatic dealers are ideal. Removal of the old flowerheads also helps to prevent willy-nilly seeding. Eventually the enlarged tuber must be divided and replanted; this should be done in spring, with subsequent immersion gradual, increasing the depth as the plant develops. Although propagation can be by seed, division of the tuber is the usual method.

A rest period of 2 or 3 months, when the foliage dies or is cut back,

encourages strong growth the following season. Shallow plantings of less than 12 in. are best protected in severe weather since an exposed rootstock quickly succumbs to frost and ice. Pests are not generally a problem, but aphids and *Chironomus* larvae have been known to damage leaves by nibbling away the living tissue until only the skeleton remains. Insecticides are unnecessary; a well-aimed jet of water and a shoal of hungry fishes are very effective!

Two cultivated varieties, one with pink and one with larger flowers, are available. A half-hardy species, *A. brassicae*, does well in milder districts at depths around 9 in. It has small creamy, verging on yellow,

flowers standing high out of the water and some think it even more attractive than *A. distachya*. Other species, unfortunately, cannot be grown successfully out-of-doors in this country.

In South Africa the plant is called the water onion (little onion), referring to the edible rootstock, which is said to resemble asparagus when roasted. The flowers, too, can be eaten and the early Cape settlers, as well as the natives, are reported to have used the plant as a pickle and asparagus substitute. In THE GARDENER'S CHRONICLE in 1936, Clarence Elliott detailed a reasonably palatable looking recipe for those anxious to test the culinary possibilities!

BREEDER'S RECORD

Spawning by Spotted Leporinus

By P. M. BACKSHALL

THE genus *Leporinus* appears to be one about which we all have a great deal to learn, and I hope that these notes may be of help to others keeping the spotted leporinus (*Leporinus maculatus*).

I was given two of these fish by a friend who, having housed them for a couple of months and had no sign of breeding, gave up the idea and wanted the space for something that would breed. The fish were about 3 in. in length and there was no apparent difference to indicate whether or not they were a true pair.

They were housed in a 24 in. by 12 in. by 12 in. tank, the base of which was covered with an half inch of fine gravel. A couple of handfuls of *Cobosha* were floated in the tank to afford some cover. No filtration was used; I did, however, put a fine airstone into the tank and this was in use 24 hours a day. Lighting was supplied by a 40 watt pearl bulb suspended 6 in. above the tank; this was switched on at 8 am. until 6 p.m.

The fish were not fed for the first 36 hours. After this two brands of dried foods were offered; no particular interest appeared to be taken of this diet (this in itself is

not conclusive as the fish tend to feed in the lower regions of the tank). Tubifex was offered and this had to be removed. It was, however, very noticeable that the *Cobosha* was taking a good deal of punishment. With these observations to hand my next try was frozen peas that had stood in a cup of boiling water for about an hour. These were taken eagerly. It would seem that this species lives on a vegetarian diet.

The fish had been together for just over 3 weeks when I noticed that one (the shorter of the two, if there was anything to choose between them) showed a pronounced roundness, and on closer inspection traces of dull red were visible at the pectoral and anal regions of the larger fish. Here was good cause to observe more closely. Three days went by and about 24 eggs were found in an area of about 4 in. (you will appreciate the difficulty in counting eggs on a gravel base!).

What to do next? I decided on removal of the parents. They were put into a 48 in. community tank, which contained nothing larger in size than themselves. Two days later both were found dead in the tank, one rather badly bitten.

The eggs were left in the 24 in.

tank and air pressure was increased to ensure good circulation. After 48 hours no fry were seen to be sticking to the front glass. I siphoned the remaining eggs into a jam jar and floated this in the tank; there were, however, signs of fungus and nothing came of them. Whether I would have had more success by leaving the parents with the eggs or not I do not know.

The fry were fed on Infusoria for the first 4 days, and then with finely powdered dry food. The tank was, of course, kept in *Cobosha* as the parents eat it so readily. Within the first 2 weeks I lost four of the young fish. The remaining six did well and reached a length of 2 in. over a period of 5 months. During the sixth month I decided to let a very experienced aquarist friend, who had been watching their progress with interest, have a couple. On the Saturday morning when I was to take them to him I went ready to catch them and found two tanks of dead fish. A heater had failed.

It is my intention to try again with this interesting species. I am at present keeping *Leporinus* *avena*, another species which I think has not been bred in this country.

Aquarium Spawnings by the Yellow-tailed Clownfish

By **BILL WINGATE**

Photographs by **ROY SKIPPER**

Four specimens of the yellow-tailed clownfish were imported by a colleague in the trade in October 1972 and two of these were accommodated in a 220 litre Gem aquarium. The other two were wild, and no attempt was made to sex the two that we retained. Their aquarium was already established with invertebrates, and for the first few months two seahorses shared the tank.

When purchased, the clowns were about half their present size (they now measure approximately 9 cm). They soon became very fearless individuals and very possessive of their territory, which was virtually the whole tank.

On 20th January 1973, owing to a breakdown in

the undergravel filtration system, the whole of the contents of the tank were re-established in an identical adjoining set-up. This is maintained by undergravel filtration of proprietary make, covered with coral (oolite) sand to an average depth of 2 in. and furnished with living rocks, rocks with fan worms, tube worms, living corals and polyps, and two small hermit crabs. Animals such as clams, scallops and spider crabs have been attacked and consumed by the clowns. The seahorses were steadily weakened and eventually died in early March, having been with us for 7 months.

There is also some Welsh slate in the tank and



General view of the aquarium in which the spawnings occurred on the slate seen at the centre



Eggs were laid by the yellow-tailed clownfish on a flat piece of Welsh slate, the same site being used for each of the several spawnings observed. In the top photograph on this page a magnified view of the egg cluster reveals the 'eyed' eggs, a few white (infertile) ova also being visible. In the lower picture the male is seen attending to the eggs, a task continuously undertaken by both parents

the fish have always cleaned patches of this—here they eventually spawned. The tank is exposed to the public in a very busy shop and the clowns are quite unconcerned—even when actually spawning—with movement and sometimes considerable noise nearby. Four 8 watt fluorescent Warm White tubes were used 12 in. above the aquarium cover glasses.

Three or four anemones have always been present—their favourite is a *Stoichactis* (?), which is their present home. They have chosen to spawn by a different type with very short tentacles. Their diet has been varied, to include frozen mysids shrimp, artemia, mussel and prawn, also flake foods, freeze-dried whole shrimps and tablet foods. Vitamins were always added to food, and Biomarin was added to the water at 2-week intervals. They care for the anemones diligently in the usual way.

After vigorous cleaning of the slate they have spawned on the following dates: 2nd April at 2 p.m., pH 7.9; 18th April at 1 p.m., pH 7.9; 30th April at 2 p.m., pH 8.0; 14th May at noon, pH 8.1; 25th May at 2 p.m., pH 7.9. Concentrations of nitrites were nil to 'slight'. Temp. 22–23°C. Sp. gr. 1.021–1.023 (German seawater mix).

Eggs developed over period of 9–11 days, during which time parents took meticulous care of the spawn—especially the male. Infertile eggs

(about 1–2% are white after a few days) are removed by the parents. The spawning motion is best described as 'troughing' over the slate by the female, who is followed in a leisurely fashion by the male. A small ovipositor was visible.

Fry hatched over a period of 12–18 hours—mostly at night, and appeared to be free-swimming at once. Parents do not seem to eat them—nor do the anemones. The parents are very fearless and vigorously attack the hand of their keeper during glass-cleaning etc.

Just before hatching of the eggs, the parents rub themselves deeply in the anemone and then swim directly to the egg patch and hover closely above it—are they transferring some sort of immunity?

Fry were not seen further after the first few hours and it is not known what happens to them. Owing to circumstances of earning a living it has not been possible so far to experiment. However, the last spawning occurred on a slate placed on top of the usual one and it is hoped to transfer this to a separate tank about 24 hours before the eggs are due to hatch.

Mrs Pat Smith was responsible for the care and maintenance of all the marines at Wingates of Winchester, and her special interest has been in the 'invertebrate tank'.

BOOK REVIEW

Not Easy—but Here's How

By A. FRASER-BRUNNER

PET LIBRARY MARINE AQUARIUM GUIDE. By Frank de Graaf. Illustrated, colour and black and white. Translated by Dr Joseph Spiekerman. The Pet Library Ltd, London and New York. £2.00.

WITH the great upsurge of interest in marine aquaria during the last decade or so, we have had a number of publications on the subject, of varying size and quality and ranging from cheap ones jumping on the bandwagon to large expensive productions for the specialist. But now we have a book that should be of immense value to anyone even contemplating taking the hazardous step from freshwater to marine and of great help to those already involved, written by someone who really knows, beautifully illustrated and published at a price that would scarcely buy a decent piece of coral for the tank.

Frank de Graaf is Curator of the Artis Aquarium of the Royal Zoological Society in Amsterdam. He has been running marine aquariums for a long time with considerable success, but he does not tell you that it is easy. 'A saltwater aquarium is certainly not much more difficult to maintain than a freshwater one.' (Note the 'much'!) 'It does, however, require a different technique, and therein lies the problem.' The book is about the problem and an outstanding thing about it is its honesty. Unlike some other books it does not try to blind us with technical jargon to convince us that had we the author's erudition we would have no trouble at all. This author is a trained scientist who is able to explain intelligibly the basic needs of the marine aquarium, to point out the problems and to prescribe solutions to them where they are known. He does not hide the fact that there are difficulties that can easily be disastrous or that there are

factors as yet but vaguely understood. He explains simply, clearly and methodically the chemical and physical processes that must be maintained in order to succeed and stresses the necessity for constant vigilance on the part of the aquarist.

Frank de Graaf is also a practical aquarist who has kept tanks of all shapes and sizes and tried to maintain a great variety of marine creatures. If he has found a species difficult or failed to keep it he makes this clear and if he says something is easy to keep you can be sure it is so, provided that your tank is a going concern.

The fact is that a marine tank requires faith, hope, clarity, a good deal of time and patience and a ready supply of cash. It is likely to cause more frustration and heartbreak among aquarists than any other part of the hobby. Consider the statement on page 269 about the cleaner shrimp and banded coral shrimp, which 'have survived for as long as three years'. This is a rare thing; usually we are lucky if anything lives as long as one year.

Remember too that the possibility of breeding tropical marine species is almost negligible. It has been done with a few sedentary species such as clownfish, though even there very few have reached maturity. For the rest, most of which have planktonic larvae, the problems are beyond the powers of the ordinary aquarist at present. The device described in the March issue of PETFISH MONTHLY by Houde and Ramsay is a hopeful beginning in tackling this very important question in fish farms and public aquaria.

The growth in popularity of marine tanks is alarming in view of our inability to breed the stock. It means that throughout the tropics the reefs are being plundered, often by ruthless methods such as poisoning and explosions. For every fish that appears for sale on the market a great number have died, and of the fish the hobbyist buys only a few will live as long as a year. Replacements come only from further pillage of the sea. I am not quoting de Graaf now, for he does not touch on this question. These are my own views, based on many years' acquaintance with marine life. Before World War II I was keeping tropical marines in London, along with some other foolhardy pioneers. Even by modern standards we were surprisingly successful. At the first BAF at Manchester, way back in 1951, I predicted enthusiastically that the next phase in the development of the aquarium hobby must be the marine tank. It seemed far-sighted at the time, but it was not far-seeing enough and I reproach myself for not recognising the disastrous effects of bringing stock out of the sea, to die in captivity without reproducing—that same process that has brought orang-utans and other animals to the verge of extinction. Not that my opinion would have made any difference. Rapid air transport, polythene bags, polystyrene

boxes, the spread of the hobby to tropical areas, mass publications, all combined to make this situation inevitable and we must make the best of it.

It is all very well for we fortunate few who are able to see the reefs themselves, but those living in Birmingham or Preston want a glimpse of them, too, if only surviving for a week or two in a 36 by 15.

This book helps us, more than any I know, to make the best of it. Everything that an aquarist can be told about establishing a marine tank and about its possible inhabitants is to be found here in the simplest terms.

One of the biggest difficulties about keeping marines is that they are so quarrelsome. Many of them are violently territorial and it is often possible to keep only one of a species—very disappointing with some of the prettier ones such as chaetodonts, which would look so effective in a shoal. I believe I was the first to remark on the territorial habits of chaetodonts, based on observations in the sea, in a scientific paper long ago. A single specimen usually inhabits an area a few yards square and leaves it only for pairing. Some species go in like this all the time, but this is only within the *Rhabdophora* group, which I think is a distinct genus anyway. Of this family, I have seen only the ribbon-fish (*Hemiocha*) in schools. It is possible to keep several chaetodonts together, each of a different kind, provided conditions are correct, but as soon as two of a kind are put together there is trouble. In other cases one has to be careful of the behaviour of large species against smaller ones or even sometimes the other way about, as when a damselfish will systematically eat away the fins of a batfish. Many things in the sea are poisonous, too, and so dangerous in one way or another. Some of the sea cucumbers (*holothurians*) have a skin secretion that can kill other animals in the tank; a prick from a catfish or scorpionfish spine can be agonising and the attractive cone shell can kill you. Some of the anemones are fine for clownfish but can eliminate some of the other species. All very interesting and instructive, but costly. However, if you insist, here is the book to lessen your worries. There is a good chapter on territoriality and aggression.

All the main groups of fishes and invertebrates that are likely to come the way of the aquarist are listed and commented upon by the author. The names are correct and it is difficult to fault any of the information. An exception is the statement that 'mushroom corals form colonies which lie unattached about the sea bottom'. These corals (*Fungia*) are not colonial; a single large polyp builds its calcareous sheath to a diameter of several inches; it is a beautiful thing when the polyp is expanded and will live quite well in a good aquarium.

Not all the species are illustrated in such a

compact book, but practically all the important things are shown in exquisite photographs, mostly in colour, by A. van den Nieuwenhuizen, who is in the top flight of the world's aquarium photographers. The pictures are beautifully printed and these alone make the book well worth the money. It

is a good book to have even though you never actually dabble in seawater, which is corrosive stuff anyway.

What will the next great step in the hobby be, I wonder? Maybe some pioneer will start breeding green swordtails.

MARINIST'S Notebook

WHEN I set up my small marine tank of clowns and anemones it was with the purpose of trying to see at first hand whether their co-existence was beneficial, quite apart from being merely compatible. I am sure it will take me a very long time to form any real judgement on this particular aspect, but it is most interesting to note how unwise it is to be dogmatic about anything. In particular I refer to Len McCourt's letter in the May issue of PFM, in which, unwittingly, I think, he misleads. He states that the anemone can be recommended as the first inmate of the marine system, and, *inter alia*, that anemones should be fed via the mouth with any one of several types of food.

From his letter it is clear that he has an intimate knowledge of these wonderful creatures, but I am sure that he would join with me in asking the intending purchaser of anemones whether he is likely to put them into tanks containing fish, or simply into dedicated invertebrate collections. I hear of numerous cases where anemones and other invertebrates are cast willy nilly into community aquaria, wherein there ultimately comes the time when one fish or another rips into an anemone and either kills it or reduces it to a pathetic looking travesty of what it ought to be. I regret that many are often sold in the knowledge that this might happen and I would hope for more frankness here on the part of some dealers. I have evidence that, not so far from where I live, there is a tank in which butterflies and anemones are living in harmony, but how much is this luck and how much is it judgement?

The beginner will be best advised to keep his anemones in a separate invertebrate tank, in which their full beauty can be revealed, or at the very most, associate only those fish which are known to live in community with them. In general terms this means just clowns (there are others, but this formula is a safe one). As to feeding, there is no doubt that Mr McCourt's feeding instructions are valid enough in respect of unaccompanied anemones, but when there are fish in the same tank there seems to be something of a problem, at least, under certain circumstances.

By ROY PINKS

I have found that in cases where the food offered to the tank is favoured by the clownfish it will rob the anemone of any pieces it gets, even when it seems to be safely ensconced in the mouth. In other circumstances I have seen the clown lodge food in the tentacles of the anemone, though whether this is for convenience or otherwise I do not know. It seems reasonably certain that any whiteworm I offer will be eaten by the clowns and will be taken from the anemones. Earthworm is less favoured by the clowns and will be taken to the anemone when the fish are replete. I have not observed whether my anemones get away with these deposits, or whether they are subsequently removed—I suspect the latter, and but for the fact that I release brine shrimp fairly liberally every few days, I fancy the anemones would by now be having a pretty thin time.

Since writing my earlier notes I have acquired two more anemones—these are the sand type, which bury themselves, often completely, though their tentacles are generally visible for most of their length. It seems that one can accommodate quite a number of anemones in one tank, and furthermore that some of the notions as to their fragility are very much overdone. For example, it is now widely accepted that it is quite in order to transport them in a plastic bag without any water in it, having first lifted them carefully from their native element. Having seen this practised quite successfully it is clear that it is not necessary to keep them totally submerged at all times, as was once thought necessary. I certainly share Mr McCourt's enthusiasm for these fascinating animals, which, in their way, are visually more stimulating than many marine fishes. At this stage of my own experience I would certainly agree that they are no trouble at all, and if I have a sick one I haven't so far become aware of it. This, as compared with my marine fishes past and present, is rather more than a mere tribute.



FRAS Basic Show Class Letters:

A, furnished aquaria and aquascapes; B, Barb; C, characin; D, cichlid; E, labyrinth; F, egg-laying tooth-carp; G, tropical catfish; H, Corydoras and Brochis; J, rasbora; K, danio and W.C.M.M.; L, loach; M, a.o.s. tropical egg-layer; 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.

WEYMOUTH AS 4th Open Show was a great success with over 500 fish entered in a total of 30 classes. The Mayor and Mayoress of Weymouth presented the trophies. Major trophy winners were: Hatton Cup and Gold Pin for best fish in show, Mr B. Bisson; Our Dog Shop Cup for best tropical entry, Mr B. Bisson; Marden Bowl for best cichlid, Mr B. Bisson; Bennet Cup for best coldwater entry, Mr R. Davis; Bond Cup for best breeders, Mr C. Turner; Rosneath Cup for best catfish, Mr M. Cleall; Jones Cup for best livebearer, Mr C. Turner; Preston Aquaria trophy for best sexed pair, Mr K. Forrester; Worth trophy for best junior entry, A. Press. GSLS Cup for highest entered class winner, Mr M. Medway. Details of the results are:

Ad: 1, Mr V. Worth (Weymouth); 2, Mr D. Madin (Weymouth); 3, Mr J. Furrer (Weymouth); Adv: 1, Mr D. Christopher (Dorchester); Ry: 1, Mr A. Press (Bath); 2, Mr P. Taylor (Weymouth); 3, D. & J. Jackson (Basingstoke); B: 1, Mr B. Bisson (Basingstoke); 2, Mr J. H. Jackson (Basingstoke); 3, Mr B. Hart (Weymouth); C: 1, Mr M. Medway (Weymouth); 2, Mrs P. Carter (Weymouth); 3, Mr R. Christopher (Dorchester); D: 1 & 2, Mr K. Forrester (Weymouth); 3, Mr W. Woodbury; Da: 2, Mr B. Bisson; 3, Mr R. Christopher; 3, Mr B. Bisson; 3, Mr C. Turner (Cardiff); E: 1, Mr B. Bisson; 2, Mr J. Jackson; 3, Mr A. Worth; Ex: 1, Mr J. Morgan (Basingstoke); 2, Mr R. Press (Bath); 3, Mr T. Taylor (Basingstoke); G: 1, Mr M. Cleall (Dorchester); 2 & 3, Mr B. Jones (Basingstoke); H: 1 & 2, Mr D. Newman; 3, Mr F. Orman (Farnham); J: 1, Mr R. Christopher; 2, Mr M. Medway; 3, Mr B. Bisson; K: 1, Mr J. Jackson; 2, Mr J. Edwards; 3, Mr M. Cleall; L: 1, Mr M. Fox (Dorchester); 2, Mr R. Christopher; 3, Mr B. Bisson; M: 1, Mr J. Jackson; 2, Mr A. Worth; 3, Mr E. Press; N: 1, Mr K. Forrester; 2, Mr B. Christopher; 3, Mr R. E. Gale (Poole).

O: 1, Mr J. Morgan; 2, Mr R. Christopher; 3, Mr L. Bellamy (Poole); P: 1, Mr K. Forrester; 2, Mr R. Larcombe (Bath); 3, Mrs M. Kelly (Weymouth); Q: 1, Mr C. Turner; 2, Mr B. Bisson; 3, Mr L. Hunt (Worthing); R: 1, Mr C. Turner; 2, Mr B. Bisson; 3, Mr B. Oulson (Basingstoke); S: 1, Mr R. E. Gale; 2, Mr W. Woodbury; 3, Mr N. Taylor (Weymouth); T: 1 & 2, Mr B. Bisson; 3, Mr B. Oulson; U: 1, Mr M. Fox; 2, Mr R. Oulson; 3, Mr R. Christopher; V: 1, Mr R. Forrester; 2, Mr R. Christopher; 3, Mr R. Oulson; W: 1, Mr R. Davis (Bath); 2, Mr J. White (Weymouth); 3, Mr G. Wynn (Weymouth); X: 1 & 2, Mr B. Christopher; 3, Mr V. Worth; Y: 1, Mr C. Turner; 2, Mr M. Medway; 3, Mrs P. Carter; Z: 1, Mr J. Jackson; 2, Mr N. Press; 3, Mr N. Jennings (Basingstoke); Zb: 1, Mr V. Worth; 2, Mr R. Press; Upland snail: 1, Mr R. Oulson; 2, Mr B. Bisson; 3, Mr V. Worth.

SO large a number of people wished to see the exhibits and Wildlife Display at the **DERBY REGENT AS** Open Show that the administrators had to be curtailed during the afternoon. Although a separate hall housed the trade stands, a number had to be

THE IRISH TROPICAL FISH SOCIETY are holding their 2nd annual Open Show at the Mansion House, Dawson Street, Dublin 2, on 10th September. Schedule from Mr J. P. Naimish, secretary, Kildobbin, Sandycroft, Co. Dublin, Ireland.

refused. The demand for space has outstripped the present premises; Derby Regent AS wish to apologise for the packed halls but are now making exhaustive enquiries for better premises as the number of viewers alone can exceed 2500. The best fish in show award went to Mr K. Ankers of N. Staffs.

Guppy: 1, Mr D. Laycock (Sheffield); 2, Mr A. Miffin (N. Staffs); 3, Mr R. Hudson (DR); Mollies: 1, Mr C. Buchanan (Dulwich); 2, Mr Morrey (Stoke); 3, Mr Taylor (Sherwood); Swords: 1, Mr M. Harrington (Alton); 2, Mr D. Laycock; 3, Mr C. Buchanan; Paris: 1, Mr C. Goodwin (Dulwich); 2, Mr D. Hunt; 3, Miss Lindley; Barbs, small: 1, Mr Wright (Alton); 2, Mr Hadlow (DR); 3, Mrs M. Furrer (Cresswell); Large: 1, Mr Hill (Alton); 2, Mr H. Carr (N. Staffs); 3, Mr M. Mason; Characins, small: 1 & 2, Mr D. Laycock; 3, Mr Sewall (Sherwood); Large: 1, Mr K. Ankers (N. Staffs); 2, Mr T. South (Sheffield); 3, Mr P. Whelan (Ayr); Fishers: 1, Clarka Bess (N. Staffs); 2, Mr B. Ross (Alton); 3, Mr D. Laycock; Amphipods, small: 1, Miss J. Gillies (Bacon); 2, Mrs Saunders (GKN); 3, Mr M. Foster (Cresswell); Large: 1 & 2, Miss J. Gillies; 3, Mr A. Thomas (Lancs); Goldfish, dwarf: 1, Mr R. T. Rodgers (Cresswell); 2, Mr G. Gillespie (Cardiff); 3, Mr J. Morris (Bacon); Large: 1, Mr J. Hill (Barrow); 2, Mr K. Hill (GKN); 3, Mr & Mrs. Stapperton (Sherwood); Angula: 1, Mr Hill (Alton); 2 & 3, Mr Sewall (Sherwood); Sharks & loach: 1, Mr T. South; 2, Mr C. Buchanan; 3, Mr R. T. Rodgers; Loaches & loach: 1, Mr R. Thomas (Lancs); 2, Mr & Mrs Marshall (Gillies); 3, Mr T. South; Corydoras: 1 & 2, J. Clarka Bess; 3, Mr K. Brier (N. Staffs) FTF; a.o.s. Catfish: 1, Mr Hunt (S.

Dorset); 2, Mr G. Bussorfield (FTF); 3, Mr R. Hudson (DR); Killow: 1, Mr D. J. Whitmore; 2, Mr & Mrs Marshall; 3, Mr K. Ankers (N. Staffs); Minnows & darters: 1 & 2, Mr T. South; 3, Mr K. Walsh; Rasbora: 1, Master A. Barrett (Cardiff); 2, Mr R. Moore (N. Staffs); 3, Mr Richardson (Loughborough).

Pairs, livebearer: 1, Mr P. Whelan; 2, Mr H. T. Rodgers (Cresswell); 3, Mr & Mrs Stephenson (Sherwood); Egg-layers: 1, Mr T. South; 2, Master K. Dawson (DR); 3, Mr J. Furness (Cardiff); Breeders, livebearer: 1, Mr J. Furness (Cardiff); 2, Mr H. Carr (N. Staffs); 3, Mr P. Harriman (Sherwood); Egg-layers: 1, Mr H. Carr; 2, Mr Lane (DR); 3, Mr Wright (Alton); a.o.s. Tropical: 1 & 2, Master A. Barrett (Cardiff); 3, Mr D. Robertson (DR); Jokers, egg-layer: 1, Master B. Downing (Sherwood); 2, Miss J. Gillies; 3, Master W. Gibbon (N. Staffs); Livebearers: 1, M. Whelan (N. Staffs); 2, A. & B. Furness (Cardiff); 3, Miss J. Gillies, a.o. Goldfish: 1, Mr R. T. Rodgers (Cresswell); 2, Mrs. Buchanan (DR); 3, Mr Larrym (Hastings & Bedford); Marine tropical: 1, Mr A. Carlisle (FTF); 2, Mr T. Jerran (DR); 3, Mr J. Lowe (Sherwood).

PORT TALBOT & DAS enjoyed a successful open show with 370 entries. Detailed results were:

(Club abbreviations: BR, Rhoads; CF, Cardiff; BV, Barry; FN, Penarth; LMI, Llanmorfan; SW, Swansea; N, Newport; TW, Trostrebridge; PT, Port Talbot; Ad, 1, Mr R. Perkins (FT); B: 1, 2 & 3, Mr M. Lambirth (LMI); Ba: 1, Mr J. Wood (FT); C: 1, Mr G. Harty (DR); 2 & 3, Mr C. Harding (CF); Co: 1, Mr R. J. Hoare (DR); 2, Mr J. Egan (FT); 3, Mr V. R. Meek (DR); Da: 1 & 2, Mr J. A. Thomas (LMI); 3, Mr W. Gibbon (N); Da: 1, Mr M. J. Parkin (SW); 2, Mr J. Edwards (LMI); 3, Master J. Edwards (LMI); D: 1 & 2, Mr C. Morrison (FT); 3, Mr J. Bica; H: 1, Mr C. Harding; 2, Mr J. Cilia (BY); 3, Mr M. Fowkes (FT); G: 1, Mr W. Laidrick; 2, Mr J. Rice; 3, Mr M. Tinsley; L: 1, Mr R. L. Hoare (DR); 2, Mr K. Williams (DR); 3, Mr C. Harding; J: 1 & 2, Mr E. Larshaw (Cresswell); 3, Mr R. J. Hanes (DR); K: 1, Mr D. Egan (FT); 2, Mr J. Edwards; 3, Mr G. Caccia (TW); F: 1, Mr C. Morrison (FT); 2, Mr M. Williams (DR); 3, Mr P. Jenkins (FT); Ba: 1 & 2, Mr C. Turner (CF); 3, Mr R. Perkins (FT); O: 1, Mr P. Williams (SW); 2, Mr J. Rice; 3, Mr G. Caccia; P: 1, Mr A. Preece (DR); 2, Mr G. Caccia; 3, Mr J. Perkins; R: 1, Mr G. Caccia; 2, Mr J. Liffy (N); 3, Mr W. Gibbon (N); Q: 1, Mr P. Johnson (FT); 2, Mr G. Berriman (FT); 3, Mr D. Nichol (PT); R: 1, Mr & Mrs W. Johnson (FT); 2, Mr G. Berriman (FT); 3, Mr R. J. Hoare (DR); S: 1, Mr C. Harding (CF); 2, Mr W. G. Best (SW); 3, Mr J. Rice; M: 1, Mr P. G. Thomas (SW); 2, Master J. Edwards; 3, Mr C. Harding; T: 1 & 2, Mr M. Williams; 3, Mr C. Harding; X: 1, Mr J. Egan; 2 & 3, Mr D. Warrington (CF); X: 2: 1 & 2, Mr C. Harding; 3, Mr W. Gibbon (N); N: 1 & 2, Mr C. Turner; 3, Mr M. Williams; U: 1, Mr & Mrs W. Johnson; 2 & 3, Master C. Baper (FT); V: 1, 2 & 3, Miss C. Baper; W: 1 & 2, Miss C. Baper; 3, Master J. Edwards.

BEST fish in show out of 432 exhibits at **CORBY & DAS's** Open Show was a *malinckanus* barb, entered by Mr & Mrs D. Oakley (Dunstable), which also won the Golden Wonder Perpetual trophy, and gold pin. Other trophies won were: British Steel Corporation Perpetual trophy for best brood, Mr M. Strange (Basingstoke); TCW Aquatics Perpetual trophy and FRAS Championship trophy for **Ch.** Mr W. Hickman (Dudley); Nece

Valley Aquatics Perpetual trophy for Class C. Mr P. Moye (Bletchley) Corby with 49 points won the Corby & DAS Perpetual trophy for the most successful society. Results were as follows:

R. 1 & 2, Mr D. Oakley (Donstable); 1, Mr Allen, C.; 2, Mr P. Moye; 3, Mr W. Hinkson (Dadley); 4, Mr R. Elliot (Corby); D. 1, Mr I. Farrer (Donson); 2, Mr C. Innes (Donson); 3, Mr D. Innes, Dav.; 4, Mrs Page (Corby); 5, Mr Williams, Dn.; 6 & 7, Mr W. Hinkson (Dadley); 8, Mr P. Moye, Dav.; 9, Mr E. Wilson (D.F.A.); 10, Mr G. Dixon; 11, Mr D. Carrage (Corby); R. 1, Mr B. Innes (Willingborough); 2, Mr E. Innes (Corby); 3, Mr J. Salisbury (Donson); 4, Mr J. Salisbury; 5, Mr Thomas (Corby); 6, Mr F. Victor (D.F.A.); 7, Mr P. Walla (Willingborough); 8, Mr D. Page; 9, Mr E. Holmes (Corby); 10, Mr E. Holmes (Donson); 11, Mr J. Salisbury (Willingborough); 12, Mr C. Pratt; M. 1, Mr P. Moye; 2, Mr D. Page; 3, Mr R. Gillard (Donstable); 4, 1 & 2, Mr D. Innes; 5, Mr Crabtree (Willingborough); R. 1 & 2, Mr Allen; 3, Mr P. Moye; L. 1, Mr J. Salisbury; 2, Mr M. Chamberlain; 3, Mr Allen, M.; 4, Mr Dixon; 5, Mr E. Elliot; 6, Mr E. Innes; N. 1, Mr E. Vokac (D.F.A.); 2, Mr D. Carrage (Nor.); 3, Mr J. Shaw (Corby); 4 & 5, Mr Holmes (Donson); 6, 7, Mr D. Hinkson; 8, Mr E. Holmes; 9, Mr L. Hatfield; 10, Mr D. Elliot; 11, Mr J. Shaw (Corby); 12, Mr J. Mansden (Corby); B. 1, Mr G. Pratt; 2, Mr R. Innes; 3, Mr Crabtree; 4, Mr Allen; 5, Mr R. Marshall; 6, Mr R. Potts; U. 1, Mr D. Gorton; 2, Mr R. Shakespeare (Donson); 3, Mr Allen, V.; 4, Mr R. Innes (Willingborough); 5, Mr R. Shakespeare; 6, Mr C. Carrage (L.A.S.); 7, Mr E. Vokac; 8, Mr R. Matthews (Donson); 9, Mr J. Mansden (Corby); 10, Mr M. Strange; 11 & 12, Mr M. Thomas.

THE CNAA and National Welsh Open Show, staged by Rhondda AS did not attract a great number of entries (144) but those who attended had a very enjoyable time. FRAS judges were Mr D. Wigg, Mr C. T. Brown, Mr F. Tomkins, Mr C. Lewis, Mr F. G. James and Mr S. Langdon and the Committee would like to thank the judges for their co-operation and help during the Show. The best fish in show award went to a platy entered by Mr C. Turner of Cardiff, and the highest number of points award went to Master Nigel Grey of Bristol.

R. 1, Mr T. Clark, Bn.; 2, 3 & 4, Master N. Grey; 5, Mr C. Turner; 6 & 7, Master N. Grey; 8, Mr R. Oakley; 9 & 10, Mr C. Turner; 11, Mr J. Ciba; 12, Mr S. Howell; M. 1, Mr C. Turner; 2, Master N. Grey; 3, Mr J. Dunlop; 4, Mr R. Innes; 5, 1 & 2, Mr M. Strange; 6, Mr D. Innes; 7, 1, Mr C. E. Morrison; 8, 1, Mr M. Strange; 2, Mr J. Rice; 3, Master N. Grey; 4, Mr C. Turner; 5, Master N. Grey; 6, Mr R. Perkins; 7, 1, Master N. Grey; 2 & 3, Mr F. Thomas; 4 & 5, Mr C. E. Morrison; G. 1 & 2, Mr J. Innes; 3, Master N. Grey; H. 1, 2 & 3, Mr M. Howell; I. 1 & 2, Mr C. Harding; 3, Mr C. Phillpott; K. 1, Mr J. Edwards; L. 1, Mr C. Turner; 2, Mr D. Page; 3, Mr R. Shakespeare; 4, Master N. Grey; 5, Mr C. Harding; M. 1, Mr J. A. Thomas; 2, Mr C. E. Morrison; 3, Mr J. Edwards; 4, 1 & 2, Master N. Grey; 3, Mr C. Harding; N. 1, Mr C. Turner; 2, Mr F. Thomas; 3, Mr R. Oakley; 4, Mr C. Phillpott; 5, Mr E.

International Guppy Champions



Winners of this year's FGA World Guppy Championship were Mr and Mrs Don Phillimore of London, seen here with their trophies.

TWENTY-seven members of the EDMONTON SECTION of the FANCY GUPPY ASSOCIATION made a very rewarding trip to the Annual International Guppy Show which was held at Birmingham on Sunday 27th May. This year for the first time ever the FGA World Guppy Championship was held in conjunction with the International Show. This new event attracted 14 entries from all over the world, each entry comprising 5 perfectly matched male guppies and 5 perfectly matched female guppies. These 140 guppies made a very eye-catching display such as has never before been seen in this country. The winner of the event was the well-known guppy-breeding partnership of Don and Bob Phillimore from the Edmonton Section, who also took third place

with their second entry. Out of a total 55 classes in the Show, Edmonton members took first place in 10, second place in 15, third place in 10 and fourth in 6, scoring a total of 211 points to win the Calgary Trophy for the fourth year in succession. This was an all-time record of points for an individual section. There was a total entry of 700 made up of 1000 guppies in all. Edmonton members also took all the major awards in the International: these were: breeders matched pairs (best exhibit in show), Mr & Mrs Burrell (70 points); best male (long dorsal xvi) Mr Wally Bishop (78 points); best female (natural tailed female) Mr Ken Lee (75); Master Breeders trophy, Mr & Mrs D. Phillimore (76).

Oakley; 5, Mr J. Rice; 6, 1, Mr C. Harding; 2, Mr M. Strange; 3, Mr D. Warram; 4, 1, Mr M. Strange; 2 & 3, Mr C. Harding; Ps. 1, Mr A. Potts; 2, Mr W. Best; 3, Mr J. A. Thomson; Q. 1, Master N. Grey; 2, Mr D. Fordling; 3, Mr C. Turner; R. 1, 2 & 3, Mr C. Turner; 4, Mr D. Scoble; 5, Mr J. Rice; 6, Mr C. Harding; 7, Mr W. Best; 8, Mr P. Luck; 9, Mr J. A. Thomson; T. 1, Mr W. Best; 2, Mr R. Gorton; 3, Mr M. Williams; 4, 1 & 2, Mr R. Wick; 3, Mr D. Burrell; 4, 1, 2 & 3, Miss Carol Rupert; V. 1, Mr R. Rice; 2 & 3, Miss Carol Rupert; W. 1, 2 & 3, Miss Carol Rupert; 1, Mr R. Wick; 2, 1, Master N. Williams; 2 & 3, Master N. Grey; 4, 1 & 2, Master N. Grey; 3, Master M. Thomson.

MRS May Netherell won the Ladies Rose Bowl at the CROYDON AS Open Show. The best fish in

THE BRITISH KOI-KEEPERS SOCIETY will hold their third Annual General Meeting at Alexandra Palace on Saturday, 21st July at 2.30 p.m. All are welcome, including non-members. The Society has 100 members nationwide who receive regular Newsletters and the formation of two local Sections is announced. Full details of membership, subscriptions, regional activities etc. can be obtained upon application (i.e. please) to The Secretary, Mrs H. M. Allen, c/o Anthony Clax, Peterborough, PE1 3XU.

fish (a Bristol shubunkin) in the Show and the best tropical fish (pike cichlid) were owned by Mr G. Axe and Mr D. Noble respectively. The rest of the results are as follows:

a.o.v. Barbis: 1, Mr J. Almad; 2, Mr A. Hilliard; 3, Mr R. Hyett. Barbis (chequer, tiger, zipper, rosy, tiger): 1, Mr R. Peck; 2, Mr J. Edwards; 3, Beverley Herwin. **a.o.v. Characins:** 1, Mr R. Lawrence; 2, Mr A. Hilliard; 3, Mr R. Larcombe. **B & H:** 1, Mr R. Peck; 2, Mr J. Roberts; 3, Mr G. Herwin. **a.o.v. Cichlids:** 1, Mr D. Noble; 2 & 3, Mr B. Snell. **Angels:** 1, Mr R. Clark; 2, Mr & Mrs Press; 3, Mr J. Roberts. **Apistogramma and Neomazara:** 1 & 2, Mr R. Bennett; 3, Mr F. Gibbs. **a.o.v. Labynths:** 1, Mr D. Calley; 2, Mr G. Castle; 3, Mr R. Lawrence. **Fighters:** 1, Mr J. Wheeler; 2, Mr & Mrs Press; 3, Mr R. Clark. **Killies:** 1, Mr J. Jackson; 2, Mr G. Churchill; 3, Mr R. Tooz. **a.o.v. Catfish:** 1, Mr A. Walsh; 2, Mr J. Jackson; 3, Mr R. Lawrence. **Corydoras & Danios:** 1, Mr G. Herwin; 2, Mr M. Mumford; 3, Mr R. Harvey. **Radiolans:** 1, Mr R. Hilliard; 2, Mr A. Hilliard; 3, Mr D. Noble. **Danos & minnows:** 1 & 2, Mr J. Edwards; 3, Mr R. Peck. **Botia, loaches, flosses & shrimps:** 1, Mr A. Hilliard; 2, Mr D. Noble; 3, Mr G. Herwin. **a.o.v. Tropical fish:** 1, Mr R. Lawrence; 2, Mr A. Hilliard; 3, Mr G. Castle. **Scoré pairs:** 1, Mr C. Turner; 2, Mrs Pedersen; 3, Mr J. Wheeler. **Common male:** 1 & 2, Mr J. Wheeler; 3, Mr J. Ferguson. **Guppy, female:** 1 & 3, Mr Wheeler; 2, Mr A. Bebbington. **Swordtail:** 1, Mr C. Turner; 2, Mr W. Burton; 3, Mr Greenwood. **Platy:** 1, Mr C. Turner; 2, Mr J. Wheeler; 3, Mr R. Lawrence. **Mollies, snails & solifera:** 1, Mrs Pedersen; 2, Mr D. Hilliard; 3, Mr R. Larcombe. **Mollies a.o.v.:** 1, 2 & 3, Mr R. Bennett. **Common goldfish:** 1, Mr C. Pearce; 2, Mr A. Kendall; 3, Mr & Mrs Press. **Shubunkin:** 1, Mr G. Axe; 2 & 3, Mr Jennings. **a.o.v. Fancy goldfish:** 1 & 3, Mr R. Davis; 2, Mr R. Peck. **a.o.v. Coldwater:** 1, Mr A. Rendell; 2, Mr C. Pearce; 3, Mr G. Axe. **Breeders, sponges:** 1, Mrs Pedersen; 2, Mr R. Seall; 3, Mr C. Turner. **Breeders, livebearers:** 1, Mr & Mrs Press; 2, Mr C. Turner; 3, Mr R. Dore.

Mr & Mrs Marshallsea of Oldham won the best in show award out of 108 entries at the **BLAKEBOROUGH AS** 2nd Open Show with a first in the loach and botia class. Detailed results are:

Swordtails: 1, Susan Clarke (Aireborough); 2, Mr T. Douglas (Hull); 3, Mr S. Rans (Top Ten). **Platys:** 1, Mr & Mrs Cane (Pontefract); 2, Mr & Mrs Copley (Doncaster); 3, J. & H. Saunders (York). **Cichlids:** 1, Mr D. Power (Blakeborough); 2, Mr J. S. Hull (Aireborough); 3, Mr T. Moss (Sheffield). **a.o.v. Livebearers:** 1, Mr J. Moss (Huddersfield); 2, Mr J. A. Whitley (Aireborough); 3, Mr Süssner (Warrington). **Characins, small:** 1 & 2, Mr Cartwright (Huddersfield); 3, Mr & Mrs Jones (Chatterfield). **Large:** 1, Mr D. Whelan (Leighley); 2, Susan Clarke; 3, Mr & Mrs Trines. **Barbis, small:** 1, Mr D. Whelan (Blakeborough); 2, Mr & Mrs Bates (Newcastle); 3, Mr & Mrs Dalnes. **Large:** 1, Mr & Mrs Cohen (Pontefract); 2, Mr & Mrs Daines; 3, Mr B. Runcles. **Apistogramma, Cichlids, dwarf:** 1, Mr J. A. Whitley; 2, Mr A. Moss; 3, Miss D. Matthews (Pontefract). **Large:** 1, Mr & Mrs Collins (Grainthorpe); Mrs Freeman (Swillington); 3, Mr G. Thakbroom (Castleford). **Angels:** 1, 2 & 3, Mr & Mrs P. Bull (Cross). **Common Catfish:** 1, Mr & Mrs Cohen; 2, Mr R. Bennett (Doncaster); 3, Mr & Mrs Smith (Sheffield). **a.o.v. Anabantids:** 1, Mr & Mrs Cohen; 2, Mr G. Twidale (York); 3, Mr D. Hudson (Leeds GPO). **Fighters:** 1 & 2, Mr J. Cawthra (Castleford); 3, M. & D. Layton. **Danos:** 1, Mr A. Moss; 2, Mr & Mrs

FEDERATION



NEWS

The Season's Championship Class Shows

One of the more common arguments likely to rage over the Open Show scene again this year is that of disputed maximum size of exhibits. How often do we hear the cry, 'I've got one at home that'd have that one for breakfast'?

In an attempt to settle the issue, as far as possible, the Federation is producing guides for all Show Classes of fish under the general title of 'Points for Size'. These guides give an indication of maximum sizes likely to be reached by species of fish under aquarium conditions; fish achieving this quoted size (or exceeding it!) should be awarded the maximum 20 points under the 'Size' column on the judging sheet. To date, most of the Open Show Classes have been 'sized', with only (!) the Cichlids and Livebearers to be completed.

Despite these guides, there will always be room for argument, discussion, improvement and, of course, new species arriving on the scene so the aquarists' support will still be needed and welcomed by the FBAS Judges & Standards Committee. Any information on controversial sizes, or new additions, should be sent to the J. & S. Secretary, C. A. T. Brown, 10 Third Avenue, London W.10 in order that the records can be kept up to date. Details of the size sheets can be obtained from the FBAS, 22 Flamsted Avenue, Wembley, Middlesex.

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)
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)
Uxbridge	Xo-p	Mr R. Newman (Uxbridge)
Yeovil	Xu-w	Mr D. S. Langdon (Yeovil)

Forthcoming Championship Class Shows

1st July	Exeter AS	No-t	Egglayer pairs
4th-11th August	Portsmouth AS	Xo-p	Breeders
5th August	Tonbridge AS	Ba	
30th August	Northampton AS	Ca	Hypheosohrycon etc.
2nd September	Bethnal Green AS	Cz	
2nd September	Wellingborough AS	O	Guppy, male
8th September	Reading-Didcot-Bracknell	K	Danos & 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.

Walls (Dunstable); 3, Mr T. Smith (Sheff-
field); 4, Mr J. Forson (Castles-
ford); 5 & 6, Mr T. Smith, Rushmore; 7, Mr
& Mrs Gilling; 8 & 9, Mr & Mrs Fletcher
(Dunstable); Sharks: 1, Mr T. Smith; 2,
Mr J. A. Whaley; 3, Mr W. Blundell
(Dunstable); Flying fish: 1, Mr G. Thick-
brooks; 2, Mr T. Smith; 3, Mr & Mrs
Gates; Killies: 1, Mr J. Mosley; 2, Mr &
Mrs Bladon; 3, Mr A. Carrigan; Cynodonts:
1 & 2, Mr & Mrs Walls; 3, Mr & Mrs
Clarke (Ayrshire); a.n.v. Catfish: 1, Mr
& Mrs Copley; 2, Mr J. S. Hall; 3, Mr &
Mrs Wells; Loach & hosi: 1, Mr & Mrs
Marshburn (Oldham); 2, Mr & Mrs Clarke;
3, Mr & Mrs Tume (Sheff Valley).

Pairs, freshwater: 1, Mr & Mrs Pates
(Sheff Valley); 2, Mr & Mrs Marshburn;
3, Mr G. Robinson (Grighley); Egglayers:
1, Mr T. Smith; 2, Mr J. Masley; 3, Mr &
Mrs Tume; Breeders, freshwater: 1, Mr A.
Moss; 2, Mr & Mrs Pates; 3, Mr G.
Andrews (Hall); Egglayers: 1, Mr C.
Corbin; 2, Mr & Mrs Gilling; 3, Mr A.
Moss; Common goldfish: 1, 2 & 3, Mr J. S.
Hall; Fancy goldfish: 1 & 2, Mr J. S. Hall;
3, Mr F. Poole (Accrington); a.n.v. Gold-
water: 1 & 2, Mr J. S. Hall; 3, Mr D.
Masley; a.n.v.: 1, Mr A. Burren (Castles-
ford); 2, Mr G. Thickbrooks; 3, Mr A. E.
Hunt (Bishopcote); Fanned mini-jar: 1 &
2, Mr M. Wild (Accrington); 3, Mr & Mrs
Tume.

GLOUCESTER AS held their 2nd
annual Open Show at the Gloucester
Education and Leisure Centre in
May and exhibits (well in excess of
400) were attracted from a large
area with exhibitors competing for
124 awards (shared among the 30
classes of fish), which were presented
by Mr B. Finch, Deputy-Mayor of
Gloucester. Outstanding trophy winner
of the day was Mr N. Gray
(Bristol) who collected 5 first, 5
second, 3 third and 3 fourth awards
and also the trophy for the most
accumulated points. Premier awards
were made as follows: The Langdon
cup presented for the best fish in
show went to Mr C. Pratt for a
pumpkinseed sunbass; the Gloucester-
AS trophy awarded for the most
acquired points was won by Mr N.

ASK YOUR DEALER FOR
Brosiam
PERFUMED COLD WATER
FISH FOOD

Gray (1237 points); a Gloucester AS
tankard for the best tropical fish sent
to Mr C. Russell (Bath), the second
Gloucester AS tankard for the best
coldwater fish went to Mr C. Pratt
(Bedworth). Mr C. McQuade sent
two exhibits of Siamese fighters by
airmail and collected a first in its
class for a very fine specimen, which,
at his own request, was later
auctioned. Show results were:

Guppy: 1, Mr G. B. Ludlow (Rushmore); 2,
Mr N. Barton (Froelbridge); 3, Mr B. R.
Goff (Rushmore); Guppy (female): 1 & 2,
Mr R. B. Goff; 3, Mr P. Greenwood
(Bishop Cleeve); Mollie: 1, 2 & 3, Mr N.
Gray; Platy: 1, Mr W. Furness (Rush-
more); 2, Mr C. E. Lyon (Gloucester);
3, Mr C. Higgs (Gloucester); Swordtail: 1,
Mr N. Gray; 2, Mr G. B. Ludlow; 3, Mr &
Mrs Price (Bath).
Barbs (large): 1, Mr A. B. Faulkner
(Bridgwater); 2, Mr C. Russell (Gloucester);
3, Mr C. Russell; Barbs (small): 1, Mr C.
Russell; 2, Mr N. Gray; 3, Mr P. Young
(Gloucester); Characina: 1, Mr A. Williams
(Bishop Cleeve); 2, Mr B. Walker (Gloucester);
3, Mr C. Higgs; a.n.v. Characina: 1, Mr
P. Greenwood; 2 & 3, Mr N. Gray; Anguils:
1 & 2, Mr N. Gray; 3, Mr J. E. Ludlow;
Cichlids (large): 1, Mr L. Griffiths; 2, Mr
R. A. Bennett (Gloucester); 3, Mr B. Swell
(Bristol); Cichlids (small): 1, Mr J. F.
Davidson (Dadnot); 2, Mr J. Brown (Swin-
don); 3, Mr B. Swell; Catfish: 1 & 2, Mr N.
Gray; 3, Mr C. E. Brown (Cheltenham);
a.n.v. Catfish: 1, Mr B. R. Goff; 2,
Maurice R. Bond (Gloucester); 3, Mr A. B.
Faulkner; Fighters: 1, Mr C. McQuade
(Canade); 2 & 3, Mr & Mrs Price; Laby-
rinthis: 1, Mr A. B. Faulkner; 2, Mr M.
Butcher (Bradford on Avon); Labyrinthia:
1, Mr J. F. Davidson; 2, Mr G. Penn; 3,

Mr B. Swell; Loach: 1, Mr C. Russell;
2, Mr & Mrs Price; 3, Mr N. Gray; Ra-
bora: 1, Mr G. Parkin; 2, Mr A. Williams;
3, Mr G. Parkin; Darter: 1 & 2, Mr M.
Butcher; 3, Mr M. Gley (Cheltenham);
a.n.v. Trout: 1, Mr W. Mansy; 2, Mr P.
Russell; 3, Mr B. R. Goff; Pairs (freshwater):
1, Mr B. R. Goff; 2, Mr C. Dukes; 3, Mr
A. J. Gale; Pairs (egglayers): 1, Mr P. Young;
2, Mr C. Russell; 3, Mr D. Williams;
Pairs (freshwater): 1, Mr N. Gray; 2,
Mr A. Wain; 3, Mr R. Fross; Pairs
(egglayers): 1, Mr B. R. Goff; 2, Mr C.
Russell; 3, Mr J. Brown;
Shubunkins: 1, Mr E. Wood; 2 & 3, Mr B.
Shubunkins; Coldwater story: 1, Mr M.
Butcher; 2, Mr R. Shubunkins; 3, Mr C. J.
Giles; Goldfish: 1, Mr B. R. Goff; 2, Mr &
Mrs Price; 3, Mr M. Butcher; a.n.v. Cold-
water: 1, Mr C. Pratt; 2, Mr M. Butcher;
3, Mr N. Wood; Baginnes perch: 1, Mr
J. Sheldon; 2, Mr M. Fross; 3, Tracy
Greenwood.

**FBAS judges at the YEOVIL &
DAS 6th Open Show** were Mr R.
Masley, Mr B. Coombes, Mr J.
Jeffries, Mr J. Scillwell and Mr R.
Wigg. They made the best fish in
show award to a Bristol Shubunkin
entered by Mr D. S. Langdon (80
points). Mr Langdon also won the
FBAS Championship trophy for
coldwater breeders. Best tropical
award went to Mr K. Forrester
(Weymouth); best junior award to
Miss K. Rendell (Yeovil). Other
results were:

Barbs: 1, Mr K. Forrester; 2, Mr S.
Bragg; 3, Master D. Farshaw; Characina:
1, Mr P. Carter; 2, Mr N. Fisher; 3, Mr &
Mrs Masley; Cichlids: 1, Mr R. Forrester;
2, Mr C. Fiddick; 3, Mr P. Gilman; Pearl
cichlids: 1, Mr A. Vail; 2 & 3, Mr S. Bragg;
Labyrinthia: 1, Mr F. O'Brien; 2, Mr F.
Mudge; 3, Mr Ford; Toothcarps: 1, Mr F.
Gent; 2, Mrs M. J. Binfield; 3, Mr N.
Walker; Tropical case: 1, Mr J. Dickinson;
2, Mr & Mrs Mobery; 3, Master J. Edwards;
Carpenter/Brooklet: 1, Mr F. O'Brien; 2,
Mr K. Taylor; 3, Mr K. Forrester; Rabora:
1, Mr & Mrs Masley; 2, Mr K. Forrester;
3, Mr J. Stupp; Darter/winners: 1, Mr M.
Cassell; 2, Mr M. Rockett; 3, Mr A. J.
Rendell; a.n.v. Egglayers: 1 & 2, Mr & Mrs

Meetings and Changes of Officers

BARRY AS. New Secretary, Mr C.
Guthrie (3 Norton Close, Rhoson, Glam-
organ, CF66 9EF).

BRIGHTON & SOUTHERN AS. Change
of secretary, Mr S. Tick (35 Newmarket
Road, Brighton, Sussex) phone 042373.
Show secretary, Mr A. Mapham, 11 Byness-
field Drive, Mile Oak, Purbeville; phone
472847. Meetings: 2nd Monday of month.

BRISTOL TFC. Meetings: 2nd Thursday
of month. The Black Horse, Old Market,
Bristol.

ENFIELD AS. Meetings: St Andrew
Church Hall, Enfield Market Place, third
Thursday of month, 8.0 p.m.

FANCY GUPPY ASSOCIATION,
ENFIELD Section, Secretary, Mr D.
Phillimore (123 Wilbury Way, Edmonstone,
London, N.65 4BQ; phone 01-8841 2012).
Meeting first Sunday of month, 3.00 p.m.
The Royal British Legion Hall, Holmebus
110, Enfield, Middlesex.

**GOLDFISH SOCIETY OF GREAT
BRITAIN.** Mr M. D. Clark, President;
Mr G. W. Fleming (1 Rutland Road,
London, E.11), secretary; Mr M. Dudley,
assistant secretary; Mr R. Whittington,
Bulletin editor; P.R.O., Mr A. Lawton;
show secretary, Mr H. Barger.

HALIFAX AS. New secretary, Mr D.
Shields, (Cobbechester, Gaisant, King
Cross, Halifax, Yorks).

HORSFORTH AS. Chairman, Mr J. Wood;
show secretary, Mr C. Corne (14 Thorn-
leigh Grove, Leeds, LS4 5NR).

KEGHLEY AS. New secretary, Mr A.
Aspeth (46 Dalwood Road, Biddisford,
Keghley, Yorks).

LEYTONSTONE & STRATFORD DAS.
Welcome all new members. Meetings:
every Thursday, 8 p.m., Heron Green
Baptist Church, Leytonstone.

PRIVATEERS AS. New venue, Shipley
Caters Club, Stood Street, as from 4th
July, and every and Monday in month for
the ensuing year.

SEVERN SIDE ICHTHYOLOGICAL SOCIETY. Meetings: 1st and 3rd Fridays of
month; Lahnar Club, Abberystwyth,
Shrewsbury.

SLOUGH & DAS. Chairman, Mr J.
Herdin; vice-chairman, Mr K. Ferris;
treasurer, Mr D. Willess; secretary, Mrs F.
Knight (51 Alder Avenue South, Slough);
show secretary, Mr B. Knight. Next meet-
ing, Wednesday 18th July; new members
very welcome. Meetings: Friends Meeting
House, Baginns Road, Slough at 7.30 p.m.

STEVENAGE AS. Meetings: Bedford
Conservatory Centre at 8 p.m., 1st Wednesday
in the month.

**SUFFOLK AQUARISTS AND POND-
KEEPERS ASSOCIATION.** Chairman, Mr
L. Jerris; secretary, Mr P. Auliff (4
Pungnet Street, Ipswich); treasurer, Mrs
Hart; show secretary, Mr K. Cocker;
assistant, newsletter editor, Mr D. Howard;
P.R.O., Mr A. Cook; junior leader, Mr V.
Grove. Meetings: 2nd Monday of month,
Central Conservatory Club, St Stephen
Lane, Ipswich, 8 p.m.

In Brief . . .

... **PRIVATEERS AS** (Shipley) heard an interesting lecture by Mr J. S. Hall on 'Coldwater Fishkeeping and Breeding'. The Society will be moving to new premises at Shipley Carvers Club, Stead Street, as and from 9th July, and every second Monday in each month for the ensuing year.

... **BRISTOL TFC** have enjoyed lectures by Mr C. Craddock on home aquaria and by Mr H. Cotton on fish diseases and post mortems.

... **WHEN ENFIELD AS** were hosts to the Essex & North London Aquatic Association. Mr R. List gave a talk on fish diseases. Winners of the table show classes, judged by Mr S. Cowell, were: Fighters; Mr G. Cope (Tottenham); labyrinths, Mrs S. Hedges (Bethnal Green); a.o.s., Mrs S. Hedges.

... MR Jim Burtles of Mid-Sussex provided a most entertaining evening at very short notice for members of **BRIGHTON & SOUTHERN AS** when the original speaker fell ill. Half of the Society visited Portsmouth AS for their well-organised Spring Bank Holiday inter-club competition and everyone had a very enjoyable time.

... **CONGRATULATIONS** to 14-year-old Robert J. Miles of **SLOUGH & DAS**, for winning the Society's Honey Shield (most points at table shows 1972/73). The Best Fish 1972/73 award went to an *Otocinclus ornata* owned by Mrs E. Knight. Next meeting—Wednesday 18th July; new members very welcome at Friends Meeting House, Ragstone Road, Slough, 7.30 p.m.

... **WHEN BRACKNELL AS** held their 2nd annual closed show class winners were: Mr L. Little, classes **B, C, E, M, R, S** and **T**; Mr L. Jordan, classes **D, O-P, Q**; Mr D. Jeffrey, classes **F, K**; Mrs N. Jordan, class **G**; Mr E. Morgan, class **H**; Mr V. Spong, class **J** (Rose Bowl for best fish in show); Master R. Little, classes **U, V, W**. Recent lectures have included a talk and slide show on fish photography by Mr W. Wilson of Benson and one on breeding coldwater fish by Mr R. Eason.

... MR P. Carter of Preston Aquaria has been voted unani-

mously as President of **WEYMOUTH AS**. Mr R. Hart won the table show class for labyrinths (2, Miss V. Worth).

... **SUFFOLK A & PA** were hosts to **HARWICH AS** for their inter-club quiz which the Ipswich society eventually won by a mere handful of points.

... AT a recent meeting of **GAINS-BOROUGH AS**, Mr D. W. Gidding gave a short lecture on judging fish.

PLEASE note! For reasons beyond their control, RIVERSIDE AS have had to cancel their Open Show, planned to be held on 25th-27th August.

Dates for Your Diary

1st July, **GLOSSOP AS** Open Show. Details: Mrs F. Turner, 28 Newlands Drive, Hatfield, via Hyde, Chester.

1st July, **LYTHAM AS** Open Show. Leecher Gardens Pavilion, Lytham, Lancs. (Sunday). Mr E. Wilson, 68 Avenham Place, Newton, nr Kirkham, Lancs, PR4 1BQ.

1st July, **CHELMSLEY AS** Open Show. Details: Mr R. J. Hooper, 2 Leynaldale Close, Colchell, Birmingham B44 1BS.

1st July, **EXETER & DAS** Open Show. Kenford Village Hall, Kenford, nr Exeter. Details: Mr A. J. Wipaclo, 28 May Street, Exeter, EX4 6LL.

1st July, **BOREHAMWOOD & DAS** 1st Aquascapes and Furnished Aquaria Festival and Open Show. Schedule: Mr D. J. Crace, 64 Milton Drive, Borehamwood, Herts, WD4 2BR.

1st July, **GSGB** Quarterly Meeting. Conway Hall, Red Lion Square, Holborn, London, 4.30 p.m.

1st-8th July, **HOMFORD & BEACON-TREE AS** Open Show. (Dagobahn Town Open Show.) Central Park, Dagobahn, Essex. Details: Mr D. G. Kent, 74 Lywood Drive, Collier Row, Roosted, Essex, RM1 2QT; phone Romford 67804.

1st July, **BRITISH Koi-KEEPERS SOCIETY** AGM, Alexandra Palace, London, N, 4.30 p.m. All welcome including non-members.

1st July, **BILLINGHAM AS** Open Show. Amended date. Billingham Community Centre, Billingham Town Centre. Schedule (mid-May): Mr J. Atwell, 24 Hatfield Place, Peterley, Co. Durham (phone 4184) or Mr A. Crossley, 22 Stedwick Road, Billingham.

1st July, **BUNOORN AS** Open Show. Parish School Hall. Details: Mr F. Hall, 20 Chad Street, Wuncorn, Cheshire WA7 1AS.

1st July, **EXMOUTH & DAS** 1st Open Show. The Church Hall, Exmouth (corner of Raffle St. & Chapel St.). Details: Mr P. Ashton, Dunscombe, Main Road, Exmouth, Devon.

and then invited all present to 'have a go' themselves. Table show winners (judge, Mr T. Allison of Retford) were: rasboras, Mr & Mrs Gidding; pikes, egglayers, Mr & Mrs Harris; furnished jar, Mr & Mrs Dixon. Master G. Gidding won all classes in the junior section.

... MR T. Coulavitch of **LEYTON-STONE & STRATFORD DAS**, gave a demonstration and lecture on furnished aquaria. Old age pensioners are to be admitted to the Club at a reduced rate, which it is hoped will encourage some to become members.

... THE May meeting of the **STEVENAGE AQUARISTS SOCIETY** was attended by 20 members and 8 visitors to hear an interesting talk on *Mollinella* by Mr Maurice

1st July, **OLEHAM & DAS** Open Show. Wrentham Park, Oldham. Schedule (when available): Mr E. Birchwood, 20 Inverness Avenue, Blackley, Manchester 9.

4th-11th August, **PORTSMOUTH AS** Open Show. St. Patrick's Hall, Winter Road, Southsea, Portsmouth. Setting up Saturday 4th August; judging, 9th; open to the public, Monday, 6th to Saturday, 11th. Schedule: Mr J. Sillwell, 74 Salcombe Avenue, Copner, Portsmouth, Hants, PO3 6LD.

4th August, **TONBRIDGE & DAS** Open Show. Tonbridge School, Tonbridge, Kent. Schedule: Mr L. T. Mearns, 27 Norton Way, Five-Oak Green, Tonbridge, Kent.

5th August, **BLACKPOOL & FYLDE AS** Open Show. The Norbeck Castle Hotel, Norbeck, nr. Blackpool.

12th August, **NORTH STAFFS AS** Open Show. Cambridge Drill Hall, Waterloo Road, Cambridge. Stake-on-Trees. F.N.A.S. Rules. Details: Mr K. Ankers, 4 Castle Street, Chester, phone 770 05419, or Mr J. S. Booth, 135 Beverley Drive, Basildon Stake-on-Trees, South.

12th-15th August, **MIDLAND OPEN SHOW (MAPS)**. Bagley Hall, Broad Street, Birmingham. Details: Mr F. Green, 48 Perrot Street, Winton Green, Birmingham, 12; phone 041-554 9064.

12th-15th August, **HARWICH & DAS** Open Show. The Queens Hotel, Devon Court, High Street, Harwich. Details: Mr A. Green, 31 The Ridgeway, Dovercourt Essex, CO12 4AU.

15th August, **BEDWORTH A & PS** Open Show. Nicholas Chamberlain School, Bulkington Lane, Bedworth. Schedule: Mr J. Housden, 7 Tamar Road, Bulkington, Warks.

15th August, **STROUD & DAS** Open Show. Technical College, Stratford Road, Stroud. Schedule: Mrs D. Cole, Avignon, The Hill, Bardsick, Stroud, Glos, GL6 4JH (phone: Stroud 4954).

15th August, **Huddersfield TFS** Open Show. Paddock Civic Youth Club, Beach Street, Paddock, Huddersfield.

15th August, **GREAT YARMOUTH & DAS** Tropical Fish Exhibition. North Drive, International High School, Gt. Yarmouth. Details: Mr P. G. Wason, 21 Cannon Road, Hunley, Gt Yarmouth, Norfolk.

25th August, **FLEETWOOD AS** 1st Open Show. Flaxmound Grammar School.

Details: Mr N. West, 40B Mowbray Road, Hamwood; phone FWD 3972.

1st September, **FBAS Assembly**, Conway Hall, Red Lion Square, London, WC1, 4.30 p.m.

2nd September, **WELLINGBOROUGH & DAS Open Show**, Queensway Centre, Colchester Road, Wellingborough. Schedules: Mr D. Sc. Birchener, 1A George Street, Wellingborough, Northants. (phone Wellingboro 3741).

2nd September, **THORNE AS Open Show**. Details: Mr B. Banks, 49 Warren Road, South Common, Thorne, Doncaster.

2nd September, **BETHNAL GREEN AS Open Show**, Bethnal Green Institute, 229 Bethnal Green Road, London, E.2. FBAS Supreme Championship Trophy Class C2 (large characters). Schedules: Mrs Sybil Duggan, 145 Ashburton Avenue, Seven Kings Road, Essex IG2 9E (phone: 01-998 1430).

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

8th September, Combined **BRACKNELL & DIDCOT AS & READING & DAS Open Show**, White Knights, Shinfield Road, Reading. Details: Mr John Horsey, 4 Rickmans Close, Woodley, Berks. (phone: Reading 666917).

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**, New House, Harlow. Schedules: Mr S. Jones, 48 Whitesands, Harlow, Essex.

9th September, **NEWBURY & DAS Open Show**. Details later.

9th September, **NUNEATON AS Open Show**. Details later.

10th-11th September, **BRISTOL AQUARISTS SOCIETY Open Show**. Details: Mr E. N. Bowden, 12 Stansleigh Walk, Knowle, Bristol, BS4 2RL.

10th September, **MID-HERTS AS Open Show**. Details later.

10th September, **WESTON-SUPER-MARE & D TFC Open Show**, St Johns Hall, Oxford Street, Weston-super-Mare. Details: Mr J. Clarke, St Judes, North Wood, Cheddar.

10th September, **HOUNSLOW & DAS Open Show**, The Youth Centre, Cecil Road, Hounslow, Middlesex. Schedules: Mr H. Dean, 23 Woodlawn Drive, Feltham, Middlesex (phone: 01-984 0923).

10th September, **HASTINGS & ST LEONARDS AS 1st Open Show**, Concordia Hall, Church Road, St Leonards. Schedules: Mr F. Adams, 17 Lower South Road, St Leonards-on-Sea, TN37 6RH.

10th September, **STONE AS Open Show**. Full details later.

10th September, **BUXTON & DAS Open Show**, The Pavilion Gardens, Buxton.

London's Sixth Annual Exhibition of Fishkeeping

The AQUARIUM SHOW '73

Presented by the Federation of British Aquatic Societies
Friday 2nd November to Sunday 4th November
 at the Royal Horticultural Society's Old Hall, London S.W.1

Sponsored by **PETFISH MONTHLY**

Enquiries to: **Show Organiser,**

PFM, 554 Garratt Lane, London SW17 0NY Phone 01-947 2805

Schedules: Mr A. Holland, 5 Midland Terrace, New Mills, via Stapleford, Cheshire.

22nd September, **RHONDDA AS 5th Open Show**, Central Hall, Trecynnydd, Rhondda. Batching 9.00-12.30. Schedules: Mr M. Williams, 122 Top Trebanog, Trebanog, Rhondda, Glam. Excellent car-parking.

22nd September, **GSGB 25th Anniversary Show**.

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

30th September, **HUCKNALL & BULWELL AS Open Show**, Bulwell Youth Club, Coventry Road, Bulwell, Nottingham. Batching, 12 noon-2.00 p.m. Schedules: Mr J. Sutcliffe, 273 Wicklow Court, Basford, Nottingham.

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. Batching 12 noon-2.15 p.m. Schedules: Mr D. Stone, 237 North Wingfield Road, Grassmoor, Chesterfield, Derbys. S24 5ER (phone: Staveley 2775).

30th September, **NORTHAMPTON & DAS Open Show**, The Drill Hall, Northampton. Schedules: Mr G. Allatt, 50 Chiltern Avenue, Northampton.

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

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

6th October, **EAST LONDON A & PA Open Breeders Show**. Schedules: Mr F. Vicker, 23 Irons Way, Collier Row, Romford, Essex.

7th October, **HINCKLEY & DAS Open Show**, Heathfield High School,

Belle Vue Road, Earl Shilton, Leicester. Details: Mr T. Saunders, 29 Browning Drive, Leics.

15th-16th October, **FNAS BRITISH AQUARISTS FESTIVAL** at Belle Vue Gardens, Manchester.

28th October, **DONCASTER & DAS Open Show**, Broadworth 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, PFM, 554 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, Seston 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, **1973 HENDON CONGRESS** (provisional date).

17th November, **KINGSTON & DAS/ SOUTH PARK AQUATIC (STUDY) SOCIETY combined Open Show**, T.A. Centre, Surbiton Road, Kingston, Surrey. Schedules: Mr D. J. Mackay, c/o 51 Mount Road, New Malden, Surrey (phone: day, 01-572 0632; night, 01-942 6021).

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

18th 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, Podsey.

Tested and Tried Since 1956-the Original
WINDMILL PREMIER BIOLOGICAL FILTER

NORWOOD AQUARIUM

London's Leading Wholesale Suppliers of Aquatic Equipment
 Prompt and Reliable Service to Retailers
 24 KNIGHTS HILL, LONDON S.E.27 Phone 01-670 6908

Classified ADVERTISEMENTS

AQUATIC SUPPLIERS

TETRAMIN AT LOWEST PRICES
 8 ozs £1.99, 16 ozs £3.80, 32 ozs £6.90.
 C.W.O. Post Free. Send SAE for full
 lists. Pentland Aquatics (PF1) 54 Pen-
 land Park, Loanhead, Midlothian.

OVER 120 VARIETIES tropical,
 marine and pond fish—for personal
 shoppers only. Kingsbaries, 208
 Croydon Road, Beckenham, Kent.
 Phone 01-650 3716. Closed Wednesdays.

M.S. TROPICAL FISH (Maurice
 Stray—Aquario), Church Road,
 Bishops Cleeve, nr Cheltenham, Glos.
 We have the finest selection of tropical
 marines in Gloucestershire; also a
 comprehensive selection of freshwater
 tropicals, plants, and all other aquarists'
 requirements. Phone 024-267 3077.
 Open till 8.30 p.m. weekdays.

EQUIPMENT

**AQUARIUM FRAMES, STANDS
 AND SHADES** delivered at trade
 prices. Quality ornamental stands
 made to measure at bargain prices. All
 sizes quoted—send s.a.e. for price list.
 Hecknry Engineers Ltd., Derwent
 Place, Leeds 11. Phone 250651.

RUSTPROOFED AQUARIA, orna-
 mental stands, glazing cement. Equip-
 ment manufacturers: s.a.e. Westby's,
 Barton, Ormskirk.

REPTILES

REPTILES, AMPHIBIANS. Free list.
 J. & D. Naturalists, 51 Sandy Road,
 Seaforth, Liverpool, 21.

CLASSIFIED ADVERTISEMENTS

Rates: 4p per word (minimum charge
 40p); Box no. 10p extra if required.
 Remittance with order to be sent to

PetFish Monthly
 554 Garratt Lane, London, SW17 0NY

WATER PLANTS

ASK YOUR DEALER for Brazilian
 Plant Fertiliser. There's nothing else
 quite like it. A natural vegetable pro-
 duct containing no chemicals. Easy to
 use.

AQUARIUM PLANTS. Vallisneria
 straight, *V. tortu*, *Elodea densa*,
Cabomba, *Sagittaria*, *Hygrophila*,
Myriophyllum, *Bacopa*, giant *Bacopa*,
Cardamine, *Rotala*, *Ludwigia*, dwarf
Ludwigia, *Ambulia*, 3 for 15p. *Fontina-
 lis*, *Riccia*, *Azolla*, *Salvinia* 10p
 each. *Wisteria*, red *Hygrophila*, *Amaz-
 on sword*, 15p each. Malayan swords,
Nymphae lily, *Samolus*, *Aponogeton*
undulatus, *A. silvaceus*, *A. crispus*,
 pigmy chain sword, micro-*sagittaria*,
 Indian fern, *Triantha* (violet), dwarf
 rush, striped rush, giant *Hygrophila*,
 willow *hygrophila*, hair grass, water
 lettuce, *Cryptocoryne affinis*, *C. bec-
 kettii*, *C. trilata*, *C. lutea*, *C. nevilli*,
C. petchii, *C. wendtii*, *C. willisii*,
 20p each. Madagascar lace leaf plant,
 95p. Minimum order 50p post and
 packing 10p. John Chalmers, Hobby-
 Fish Farm, Wolverton, Bucks.

**PERRY'S FOR PLANTS ALL TANK
 GROWN.** 1st and 2nd Awards British
 Aquarists' Festival. Assorted selections
 tropical or cold, 50p, 75p, £1. *Fallis*,
rotu, *S. muriei*, 35p doz. *Cryptocoryne*
beckettii, *willisii*, *barreletiana*, 12/p each,
 six assorted 50p. *C. bellina*, 20p. Water

wisteria, giant *hygrophila*, 12/p. Post
 5p. C. R. Perry, Professional Aquarist,
 615 West Street, Crawley.

MISCELLANEOUS

BADGES. Every Society needs bright
 enamel badges. For best service and
 quality contact R. E. V. Gomm Ltd.,
 14-15 Frederick Street, Birmingham
 B1 3JE.

DRIED SHRIMP MEAL, fine,
 medium, coarse. Small whole dried
 shrimps. *Daphnia*, 28 lb minimum.
 Prices on application. H. E. Daniel
 Ltd, London, SE19.

THOUSANDS OF MICRO EELS!
 A must for breeders of egg layers. Starter
 cultures and instruction 37p post free.
 Berkshire Aquatics, 359 Oxford Road,
 Reading Berks RG2 4216Z.

BOOKS

BIND your copies of **PETFISH MONTHLY**
 as you receive them. Binders £1.10 (13)
 each post free from PFM offices.

**FBAS Show Fish Guides and Technical
 Information.** Booklets nos. 1, 2 and 3,
 24 pages each; 18p each post free.
 P.F. Publications, 554 Garratt Lane,
 London SW17 0NY.

**GOLDFISH SOCIETY OF GREAT
 BRITAIN STANDARDS BOOK.** Re-
 vised (1972) 40-page publication. Stan-
 dards for 13 approved fancy goldfish
 varieties, illustrated in line. 40p post
 paid. P.F. Publications, 554 Garratt
 Lane, London, SW17 0NY.

**TORTOISES, TERRAPINS &
 TURTLES** by I. and A. Noel-Hume.
 112 pages, 15 plates, 19 line drawings.
 30p. PetFish Publications, 554 Garratt
 Lane, London, SW17.

WINDMILL PRODUCTS
SUPER AIR REJECTOR Aquarium Cleaner
 Amazing Cleaning Power and Telescopic Action

Coldwater fish must have a complete diet.

Whether kept in ponds or aquaria, coldwater fish need a complete balanced diet to give them the essential protein, vitamins and minerals.

From extensive trials Phillips nutrition scientists have evolved

a range of Fish Foods that more than meet these requirements.

In fact, Phillips Fish Foods are as nourishing as live foods and the best you can buy. Which explains why they're the choice of leading aquarists and pond-

keepers.

And when you feed Phillips Foods you can vary the diet with three highly nutritious staple foods—Phillips Flaked or Phillips Granular Foods or Phillips Maxi-flakes.



Phillips Flaked Fish Food

A special blend of liver, fish and meat meals, insects, mushrooms, vegetable matter, brewers' yeast, milk powder and cod liver oil. Rich in protein, minerals and vitamins.

Drum 11p, 1½oz 22p, 4½oz 50p, 18oz £1.57.

Phillips MaxiFlakes

Large flakes for food feeding the larger coldwater fish.

10oz 54p, 12oz £1.57p.

Phillips Fish Food Granules

A highly nutritious and balanced food for all coldwater fish.

10oz 54p, 3oz 27p.

Phillips Fish Foods—the best that cost less.

PHILLIPS YEAST PRODUCTS LIMITED, PARK ROYAL ROAD, LONDON NW10 7JX.



"I saw your advertisement in PFM"

WINGATE of WINCHESTER

7 MARKET STREET

Tel 2406

for HEALTHY TROPICAL FRESHWATER AND MARINE FISH—and A COMPREHENSIVE STOCK OF
AQUARIUMS AND ACCESSORIES. Main stockists of JUWEL and GEM aquariums.

Est. 1948

**GILLWAY AQUATICS**

14 THE PRECINCT, TAMWORTH, STAFFS. B79 7AE

Tel. TAM 65617

WHOLESALE—AQUARISTS

**MAIN AGENTS FOR THE
FABULOUS SERA RANGE
OF FOODS** (in our opinion the
finest flake foods made).

**OUR MARINE DEPARTMENT
IS NEARING COMPLETION**—the
end of the month should see
US READY FOR THE RUSH?

MAIN AGENTS FOR ELITE FOOD—
the acceptable non-flake food

**CASH AND CARRY DEPARTMENT
FOR RETAILERS IS OPEN**



- PURE DEIONISED WATER OF YOUR CHOICE
- pH 5.5 . . . OR . . . pH 6.8
- PURE . . . OR . . . ULTRA PURE

Now, you can provide the exact water conditions for your fish to thrive and multiply. Elgastat 500 gives a choice of two soft water qualities—Instantly, at the turn of a tap—no chemicals, no fuss, no danger.

Elgastat 500: the original aquatic deioniser
Send 3p stamp for details to: Dept. C1
PURAQUA, 5 Beech Avenue,
Lane End, Buxton

price
£5.90
plus 30p P & P

**YOU WANT THE BEST
FISHES?
TROPICAL, FRESHWATER,
MARINES, PLANTS:**

Direct from BREEDERS

Contact: GARDENIA AQUARIA
26 JALAN TERUBOK
SINGAPORE 20

Cables: Brutus

**Your Fish Need a Lift—the
WINDMILL BOOSTER AIR-LIFT**

Please mention PFM when writing to advertisers

NEW from *McLynn's*



**A Top Quality Pellet Food—Just the Right Size
for all Types of Coldwater Fish
From McLynn's—Makers of Fine Fish Foods**

AT YOUR LOCAL SHOP NOW

Distributed by **Impelec LTD**

89-89a PARK STREET SLOUGH BUCKS.

"I saw your advertisement in PFM"

"My pool came in this carton"



POOL LINERS

Materials in stock

FLEXILENE

BUTYL

JURALENE

POLYTHENE

LAKEFLEX



Pumps, fountains, ornaments, glass-fibre pools, water lilies, fish, aquatic plants—in fact everything you need to make a perfect water garden

Please send for our *FREE* water garden catalogue.

**KOI CARP, MIRROR CARP
BLUE SHUBUNKINS, FANTAILS
COMETS, TENCH, MOORS**

THE SURBITON AQUARIA

Established 22 years

27-29 Brighton Road
Surbiton, Surrey KT6 5LR

Phone 01-399 6783

Open 9-5.30

Closed Sundays and half day Wednesday

KENRAY

MULTI-PURPOSE FILTER

KENRAY
6ft SYPHON SET

KENRAY
INSIDE FILTER

PLUS OTHER
KENRAY
PRODUCTS
ON STAND 26 AT
ALEXANDRA PALACE
14th-15th JULY

**KENRAY (PATENTED)
PRODUCTS LTD**
COMMERCIAL PLACE
6A LAKE ROAD
PORTSMOUTH, HANTS.

Phone Ports. 21459

A Guide to Freshwater Aquarium Fishes

*George Hervey
and Jack Hems*



This is an authoritative work of reference for the aquarist who already has some grasp of the fundamentals of aquarium management. It explains how to set up and stock an aquarium and describes a large range of aquatic plants and a still larger range of fishes. It advises on breeding, feeding and the diagnosis and treatment of diseases. 176 pages. 50 colour and 70 black-and-white photographs and diagrams.

From all good booksellers £2.75

In the event of difficulty, direct from Dept. SS Hamlyn House, 42 The Centre, Feltham, Middx, enclosing a cheque/PO for £3.00 which covers despatch and package costs.

HG The Hamlyn Group

"I saw your advertisement in PFM"

UNIQUE BIOLOGICAL FILTER

UNDER-GRAVEL

FOR TROPICAL AND MARINE OR COLD WATER AQUARIA

Fit it—Forget it!



REGD. DESIGN
No. 75444

This filter, which will operate from a standard air pump, was designed especially to meet the exacting demands of the modern aquarist.

The design of the base and the large bore air-lift (which can be fitted either end) give the high rate of filtration necessary even for marines.

Nothing but water can get beneath the flush fitting base once it has been installed and no further attention is necessary.

OBTAINABLE FROM YOUR USUAL SUPPLIER NOW! (OR DIRECT—add 17p p. & p.)

These three sizes, used singly or in multiples

9" x 17"	98p including VAT
11" x 17"	106p " "
11" x 23"	109p " "

will fit the standard range of aquaria.

Manufactured in England by **ALGARDE** 401a Ripple Road, Barking, Essex

DMO PRODUCTS

66 GEORGE STREET
CROYDON, SURREY

	Usual Price	Our Price		Usual Price	Our Price
	incl. V.A.T.	incl. V.A.T.		incl. V.A.T.	incl. V.A.T.
	and P & P	and P & P		and P & P	and P & P
FOOD			POWER FILTERS		
Tetramin 8 oz.	£2.32	£2.12	Airstream Power	£8.17	£7.25
Tetramin 2 lb.	£7.99	£7.19	Nuova Turbinette	£17.07	£15.49
Tetramin Lge. flake (12)	£8.34	£7.65	Nuova Turbino	£20.49	£18.49
Phillips 1 lb. 2 oz. ...	£1.73	£1.66	Nuova Turbo	£25.05	£22.49
Phillips Lge. flake ..	£1.58	£1.39	Eheim 386	£20.45	£18.42
Phillips c/water	£1.58	£1.39	Eheim 386 S/water ..	£22.56	£20.06
K.B. Vit-a-min 1 lb. ...	£2.42	£2.29	Eheim 486	£50.60	£47.72
K.B. Vit-a-min 2 lb. ...	£4.50	£4.19	Diatom	£22.94	£19.58
Pond Pride Breeder ..	£2.17	£2.06			
AIR PUMPS			PONDS		
Tiger	£6.93	£6.58	Proops Pump	£10.46	£8.99
Zoobeko 300	£5.85	£5.19	K.B. Pond Filter	£4.39	£3.99
Wiss 120	£12.65	£10.99	Aqua Glow Lighting ..	£9.90	£8.99
Wiss 300	£25.85	£21.99			
Terms: Cash with order or C.O.D.			SUNDRIES		
Satisfaction or money refunded.			Ozonking Ozonizer	£18.31	£13.85
Prices subject to alteration 1 month from date of publication.			Edrick Ozonizer	£18.53	£17.67
			Send stamp for complete list.		

Please mention PFM when writing to advertisers

BEND & EXTENSION AIR-LIFT for the ALGARDE UNDER-GRAVEL FILTER

Fits straight on to the existing air-lift tube of the filter.

Prevents splashing and staining of hoods and cover glasses.

Extends to height of 20 in. from filter base.

Forms an effective silencer on filters used without air stone.

Used with the outlet of bend at water level creates a current effect along top of water.

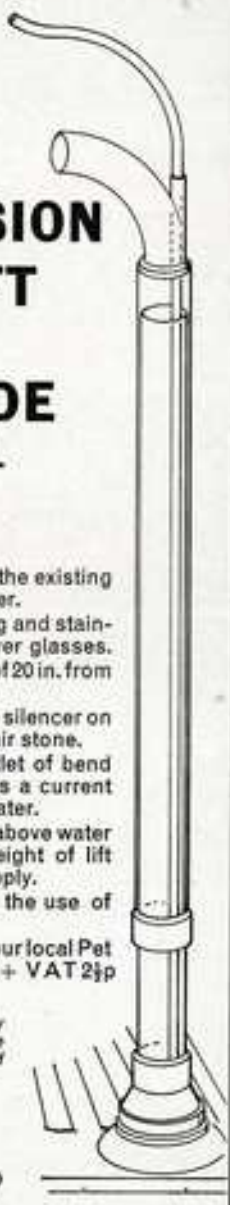
Bend can be lifted above water level if preferred. Height of lift dependent on air supply.

Does not prevent the use of an air stone.

Obtainable from your local Pet Store now, Price 25p + VAT 2½p

If you wish to order by post send 33 pence (Cheque or P.O.) to cover Kit and Post and Packing.

ALGARDE,
401a RIPPLE ROAD
BARKING, ESSEX.



The fish will know the best When YOU put it to the test

These foods are made exactly to the taste of your fish. Their unique formulae have absolutely no equal.



VITAWIL Staplefood: Represents the ideal basic food for all tropical fish. Highly nutritious and laboratory-tested, it is readily accepted by all species as a staple-diet.



ROSAWIL Colourfood: Excellent supplementary food for the promotion of colour and spawning condition of all tropical fish.



VITALITY Conditioning Food: Forms a valuable supplement to all tropical fish as a conditioner providing good health and longer life. Conditions fish for breeding.



Available at your local pet shop

"I saw your advertisement in PFM"

WINDMILL BREEDING TRAP

The Trap with the Multiple Uses



After their winter ordeal, your pond fish need



Datam POOL DIET Pellets —the ESTABLISHED brand —NOW!!

Datam Pool Diet consists of high-protein pellets in assorted sizes to suit all grades of pond fish. Packed in large moisture-resistant drums. Because they are the best—make sure you have a good supply in NOW!

We need hardly remind you that Datam Pond Fish Food is the leading brand in its field—so much so that we can only just keep pace with the demand!

ASK YOUR FRIENDLY NEIGHBOURHOOD DATAM DEALER



Factors and

Trade enquiries: **DATAM PRODUCTS**
PRINCESS WORKS, STATION ROAD, BEESTON, NOTTS.
For the best in Aquatic Supplies

All kinds of TROPICAL FRESHWATER
FISH for export
GUPPIES, SWORDTAILS, PLATIES,
MOLLIES ETC.

We are seeking an efficient and responsible
agent in England. We own a large
TROPICAL FISH FISHERY

SUN SHINE TROPICAL FISH FIELD
Head Office: P.O. Box 39-201 Taipei, Taiwan,
Rep. of China.
Fisheries: No. 20-2, Jen Te Ts'un, Jen Te
Hsiang, Tainan Hsien, Rep. of China.

LODDON AQUARIA

32 Old Reading Road
Basingstoke, Hants

Specialist for TROPICAL
MARINE & COLDWATER FISH,
LIVINGROCK, INVERTEBRATES

Live foods available
PLANTS & EQUIPMENT

Open:

Mon-Sat 9.30-5.30 Sun 10-1

WINDMILL Straightway
WINDMILL 4-Way
WINDMILL T-Piece
WINDMILL Clamp



AIR CONTROLS

Please mention PFM when writing to advertisers

The House of Fishes

Tel. Hemel Hempstead 4723

THEY TELL US that Dick Turpin used to call for a spot of "elbow bending" in this 16th century one-time hostelry (I'm surprised he found the time between those marathon trips to York.)

Well, even today we could still offer him a drink—

**of the best DEIONIZED WATER
at only 5p per gallon**

Maybe not as fortifying as "Ye Olde Mulled Ale" but it suits our discus beautifully.

THEY ALONE ARE WORTH A VISIT, AND THERE IS A LARGE SELECTION OF COLDWATER, TROPICAL AND MARINE FISH TO KEEP THEM COMPANY

COME AND SEE THEM—THEY LIKE VISITORS

77 OLD HIGH STREET, HEMEL HEMPSTEAD, HERTS. HP1 3AF

Open 9 a.m. - 7 p.m. Closed Wednesday and Sunday.

**WHY IS
KING BRITISH
VIT-A-MIN
MORE MODESTLY
PRICED?**

**BECAUSE IT IS
MADE IN BRITAIN**

- ★ CARRIES NO IMPORT DUTIES
- ★ FEWER CARRIAGE CHARGES and
- ★ FEWER HANDLING COMMISSIONS

12 nourishing ingredients

- Mosquito larvae
- Shrimp meal
- Soya meal
- Algae
- Crab meal
- Tubifex
- Liver
- Anti-oxidants
- Whale oil
- Fish meal
- Crustaceans
- Bulk roughage



BUY VIT-A-MIN AND GET BETTER FOOD VALUE FOR YOUR MONEY.

Everything necessary to keep your fish in sparkling health.

Ask for King British VIT-A-MIN at your local aquarists' shop or, in case of difficulty, write to us.

KING BRITISH
AQUARIUM ACCESSORIES CO LTD

Garston Mills, Union Road, Bradford,
Yorkshire BD7 3HW
Telephone 0274-79241 (3 lines)

IN 6 POPULAR SIZES, PLUS LARGE FLAKE

SMALL	12 grammes	11p + VAT
MEDIUM	26 grammes	20p + VAT
ECONOMY	2 oz	36p + VAT
BREEDERS	1 lb	£2.20p + VAT
JUMBO	2 lb	£4.15p + VAT
KING SIZE	8 oz	£1.20p + VAT
KING SIZE (large flake)	6 oz	£1.20p + VAT



"I saw your advertisement in PFM"

Micky Aquarium in NEALS NURSERY

Heathfield Road, London, SW18

Phone 01-874 2037

We have a large selection of Tropical Fish in stock as well as Goldfish, Koi carp plus all Fancy Goldfish.

**LOTS TO DO IN OUR SHOP—PLUS
LOOKING AT FISH, WE STOCK BIRDS
AND HAVE A 3-ACRE NURSERY GROUND**

WE DO IT ALL

**SO COME AND SEE US BECAUSE
WE WANT TO SEE YOU**

Open 7 days a week
Weekdays 8.30-5.40 Sunday 9.0-4.45

OVER 350 VARIETIES

OF TROPICAL FISH ALWAYS IN STOCK PLUS
MARINES AND COLDWATER, A WIDE AND
VARIED SELECTION OF PLANTS, TANKS,
BOOKS, POOLS AND ALL ACCESSORIES.
STOCKISTS OF THE EXQUISITE RANGE OF
TROPHY ALL-GLASS AQUARIUMS AT

ROSEDALE AQUATICS

EATHORPE	43 MELBOURNE RD
Nr LEAMINGTON SPA	EARLSDON
Phone MARTON	COVENTRY
632 681 STD 0926	Phone 72772

OPEN SIX DAYS A WEEK

AT EATHORPE	AT COVENTRY
MON AND FRI	THUR AND FRI
10 AM — 9 PM	10 AM — 8 PM
WED THUR SAT SUN	MON TUE SAT SUN
10 AM — 6 PM	10 AM — 6 PM
CLOSED ALL DAY	CLOSED ALL DAY
TUESDAY	WEDNESDAY

OUR AIM IS TO SATISFY

K. S. PRICE

ARNOLD'S YARD
OLD MARKET PLACE
ALTRINCHAM, CHESHIRE

Tel: 061-928 7957
(rear of the Unicorn Hotel)

AND

265 BURNAGE LANE
MANCHESTER 19

Tel: 061-432 5406

*Manufacturers of Aquaria
Tropical, Marine and Coldwater Fish
Plants, Live Foods and Accessories*

SPECIAL OFFER—JULY ONLY

for callers at either shop
36½" x 15" x 12" nylon-coated angle iron
aquarium, silicone-sealed, suitable
for marines
only £7.50

Send S.A.E. for our retail price list

HOURS

ALTRINCHAM
Tues, Wed, Thur, Fri,
10 a.m. to 6 p.m.
Sat, 10 a.m. to 5 p.m.
Sun, 11 a.m. to 4 p.m.
Closed Mon.

BURNAGE

Tues, Wed, Thur, Fri,
9.30 a.m. to 6 p.m.
Sat, 9.30 a.m. to 5 p.m.
Closed Sun and Mon.
Lunch 1 p.m. to 2 p.m.



THE 22ND BRITISH AQUARIST FESTIVAL

Will be held this year at
*Belle Vue Zoological Gardens
Manchester on 13th and 14th
October.*

Schedules will cover all fish as
before—full details will be
published shortly

Will interested Traders please
contact The B.A.F. Organiser
G. W. COOKE, Esq, 33 FIELD HILL,
BATLEY, YORKS. Phone 3467

Please mention PFM when writing to advertisers

FOR RAPID HEALTHY GROWTH YOUR FISH NEED A VARIETY OF FOODS

from the U.S.A.—WARDLEYS

Brine Shrimp Pellets 30p, Supremix 15p, Vitafare 13p, Hi Glow 26p, Fryfare 15p, Salmon Eggs 13p,
Pool Fishfood 20p, Liquid Smallfry 21p, Wunderbar Flake Food 1oz—21p, 2oz—39p, 8oz—£1.31

from Japan—OWARAFU

The completely new wheat gluten fish food that comes in cellophane-wrapped bars. Break off a small section, place it in water and watch it expand and float whilst the fish swarm to feed from it!
Just 30p per pack

from West Germany—DEL FREEZE-DRIED FOODS

Sali Del (Freeze-Dried Brine Shrimp) 28p Tropic Del (Freeze-Dried Daphnia) 18p Aqua Del
(Freeze-Dried Mosquito Larvae) 25p

from the U.K.—FANTASY KOI PELLETS

These long-floating Koi and Pool Pellets are so popular, not only for all coldwater fishes but also for the medium and larger tropicals. Fine, medium and coarse grades available, 1oz Drums 9p,
4oz Drums 20p, 1lb Polybags 60p

T.F.H. AND FANTASY PROVIDE THE VARIETY

We have listed just a few of the fish foods that we distribute in the U.K. All prices quoted are suggested retail prices exclusive of V.A.T. These foods are available at better aquarist suppliers nationwide. If you would like a full list of all our foods and other products plus a sample piece of the new Owarafu fish food, simply send a s.a.e. to

T.F.H. (GREAT BRITAIN) LTD—FANTASY PET PRODUCTS LTD

13 NUTLEY LANE, REIGATE, SURREY RH2 9HR
Telephone Reigate 47305 or Reigate 45191 (order dept.)

ARE YOU AN AQUARIST WHO NEVER HAS ANY PROBLEMS?

Then you don't need the experienced advice of Doug Andrews,
John Fox and Michael Bates

But you will *still* want to see the hundred plus tanks filled with
300 plus varieties of fish at:

**A.B. AQUATICS
10 REDDAL HILL ROAD
CRADLEY HEATH
WARLEY, WORCS.**

Between the hours of

12.00—8.00 p.m.

Monday, Tuesday, Thursday, Friday.

10.00 a.m.—6.00 p.m.

Saturday, Sunday.

"I saw your advertisement in PFM"



Granulated. 58% Protein

BRITAINS MOST ADVANCED TROPICAL FISH FOOD

The professional fish food now available at your local aquarist shop. Rec. retail price 40p

PROFESSIONAL because it is used by the majority of fish breeders and hatcheries.

PROFESSIONAL because it has been scientifically formulated to give maximum growth, colour and condition to your fish.

FORMULA: - 58% Protein, 2% Fibre, 14% Ash, 10% Moisture.
Vitamins A, D, E, B₁, K, B₆, B₁₂, C.

Will Not Cloud Water

PROMIN LTD., Manor Lane, Holmes Chapel, Ches. CW4 8AB, Tel. Holmes Chapel 3832

MIDLAND AQUARIUM & POOL SOCIETY

30th ANNUAL OPEN AQUATIC SHOW 1973

including THE INTERNATIONAL HERPETOLOGICAL SOCIETY OPEN SHOW

15th-19th AUGUST

BINGLEY HALL BROAD STREET BIRMINGHAM

Admission: Adults 15p, children & O.A.P. 10p
Organised parties at reduced rates

20 Coldwater Classes • 26 Tropical Classes • Marine Tropicals
Decorative Aquaria • Class 50 • 32 Trophies • Trade Stands

Hours of Opening

Wednesday 2.30-10.00 p.m. Thursday 12.00-10.00 p.m.
Friday 12.00-10.00 p.m. Saturday 10.00-8.30 p.m.

BAR & BUFFET CAR PARK approx. 3 mins QUALITY RESTAURANTS IN VICINITY

For further details contact

HON. SEC. M.A.P.S.
Phone 021-554 9064

Mr. T. GRICE
46 Perrott Street, Winson Green, Birmingham 18

Please mention PFM when writing to advertisers

TACHBROOK TROPICALS LTD

244 VAUXHALL BRIDGE ROAD LONDON S.W.1 Telephone 01-834 5179

The Aquatic Specialist Store With its Own Fish and Aquatic Plant Nurseries

A Selection of Aquatic Books from Our Stock can offer an Ideal Present

HARD COVER BOOKS

All about Tropical Fish (McInerney)	£5.30
Advanced Aquarist (Ghadially)	£2.00
Anabantids, Gouramis & Related Fishes (Dr. Robert Goldstein)	£2.30
Aquaria (Jim Kelly)	75p
Aquarium Fishes & Plants (Rataj & Zukal)	90p
Aquarists Guide (Kelly)	£2.00
Aquariums (Evans)	30p
A History of Fishes (Norman & Greenwood)	£2.25
Breeding Aquarium Fishes (Axelrod & Shaw)	£4.30
Complete Aquarists Guide to Freshwater Tropical Fishes	£4.50
Coral Fishes	£2.50
Caribbean Reef Fishes	£5.25
Cichlid Handbook	£4.30
Diseases of Fish (Bacteria)	£3.25
Diseases of Aquarium Fishes	£1.90
Diseases of Fishes (Van Duijn)	£6.00
Diseases of Fishes (Lower Vertebrates)	£3.60
Diseases of Marine Fish	£1.50
Encyclopedia of Aquarium Plants	£4.30
Encyclopedia of Tropical Fish (Axelrod)	£4.00
Exotic Aquarium Fishes (Innes)	£2.25
Exotic Tropical Fishes (Loose Leaf)	£6.50
Exotic Tropical Fishes (Bound Cover)	£6.30
Freshwater Tropical Fish (Gilbert)	£4.50
Freshwater Fishes of the World (Sterba)	£6.25
Guide to Tropical Fishkeeping (Brymer)	£3.00
Goldfish Pools, Water Lilies and Tropical Fish	£3.45
Goldfish and Koi in your Home	£3.45
Garden Ponds (Boarder)	30p
Goldfish (Evans)	30p
Home Aquarium	£2.50
How to Keep and Breed Tropical Fish (Dr. Emmens)	£2.30
Handbook of Tropical Aquarium Fishes	£2.24
Illustrated Dictionary of Tropical Fishes (Frey)	£3.60
Introduction to the Cichlids (Dr. Robert Goldstein)	£1.90
Keep and Breed Tropical Fish	£4.30
Livebearing Aquarium Fishes (Jacobs)	£6.00
Marine Fish (Loose Leaf)	£8.50
Marine Looseleaf Supplement No. 1	40p
Marine Tropicals	£1.87
Modes of Reproduction of Fishes	£6.00
Pacific Marine Fishes (Book I)	£8.50
Poisonous Marine Animals	£3.25
Rivalins of the World (Scheel)	£6.00
Reptiles and Amphibians	£3.50
Reptiles and Amphibians of Europe	30p
Saltwater Aquarium Fishes (Axelrod)	£3.75
Sea Anemones	£2.60
Seahorse Encyclopedia	£2.75
Seawater Systems	£4.00
The Freshwater Aquarium (O'Connell)	£1.88
The Pictorial Encyclopedia of Fish	£1.75
The Water Garden (H. C. Witham Fogg)	35p
Tropical Fish Colour	£1.20
Turtles of the World	£5.00
Tropical Fish (Ron Waring)	£1.50
Tropical Fish in the Aquarium (Lodewijks)	£1.05
The Goldfish (Hervey and Hems)	£2.50

Tropical Aquarium Fishes	63p
The Book of the Garden Pond (Hervey and Hems)	£2.25
Tropical Fish (Gohm)	£1.75
Tropical Fish in your Home	£1.75
Textbook of Fish Diseases	£3.75
Ways of Fishes	£3.25

SOFT COVER BOOKS

Aquarist Binder	£1.00
A Study of Reptiles and Amphibians	60p
Aquarium Plants	17p
Angelfish in Colour	17p
Aquarium Plants and Decoration	53p
African Barbis	12½p
All about Aquariums	£1.00
All about Breeding Tropical Fishes	80p
All about Discus	£1.50
All about Guppies	£1.25
A Manual of Aquatic Plants (Roe)	£1.38
Aquarium Fish Diseases	40p
Aquarium Hygiene	65p
Aquarium Plants	65p
Aquarium Plants in Colour	17p
Aquarium Repair Manual	15p
Aquarium Water Chemistry	17p
Argentine Pearl Fish	15p
Beginning the Aquarium	15p
Beginning the Terrarium	40p
Beginning with Tropicals	17p
Bettas in Colour	17p
Breeding Fishes in Colour	17p
Breeding Livebearers	17p
Breeding Aquarium Fish	65p
Catfish for the Advanced Hobbyist	80p
Colourful Egglayers	17½p
Colourful Livebearers	17½p
Colourful Tetras	17½p
Diseases of Amphibians (Book II)	£1.25
Diseases of Reptiles (Book III)	£3.60
Diseases of Tropical Fish	15p
Discus in Colour	15p
Danios	15p
Diseases of Fish (Crustacea)	£3.25
Electricity in the Aquarium (Warbutron)	38p
Exotic Supplements 1-14	each 40p
Exotic Binder (Supplements)	£2.05
Enjoy your Catfish	17p
Enjoy your Cichlids	17p
Enjoy your Discus	17p

Postage: For orders up to £1.00, 15p; up to £2.00, 25p; up to £4.00, 37p; up to £6.00, 47p.

MONTHLY PUBLICATIONS

PecFish Monthly, 1yr.	£3.00;	6mths.	1.50;	20p (+ 5p p.p.)
T.F.H. Magazine	£3.12;	..	1.56;
The Aquarist	£3.00;	..	1.53;

SHIRLEY AQUATICS LTD

WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: 021-744 1300

Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

COLIN ROE'S

FOOD FOR

KOI

AND ALL FANCY

POND FISHES



Small pellets For Fish under 6" (weight not less

than 1lb.)

Large pellets For Fish over 6" post paid

PRICE 66p per bag (inc. VAT).

TRADE
ENQUIRIES
INVITED

PLEASE NOTE—All enquiries requiring a reply **MUST** be accompanied by S.A.E. Our premises are situated on the main Stratford-Birmingham road, 8 miles from Birmingham, Midland "Red" Bus No. 150 from Bus Station, Birmingham, passes the door, sign at "The Crown", Monkspath.

HOURS OF BUSINESS—NOVEMBER-MARCH 10 a.m.-3 p.m., APRIL-OCTOBER 10 a.m.-6 p.m.

CLOSED ALL DAY SUNDAY AND MONDAY

TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Tropical minimum order £7.50, insulated container and carriage £1.50. Cold-water minimum order £3 plus £1.35 van and carriage. Plants by post (minimum order £0.50) please add £0.25 post and packing.

PRINTED BY ARLARD AND SON LTD, BARTHOLOMEW PRESS, DORRING