

FEBRUARY 1970

3s

Pet **Fish**

monthly

The PRACTICAL FISHKEEPING MAGAZINE



Play safe
with
TetraMin



ALL LIKE TETRAMIN.
and that has its reasons . . .

The successful aquarist demands a fish food that nourishes, is clean and gives the minimum of trouble — as is

TetraMin

TetraMin fulfils all its high expectations. Years of research has proved that apart from its ready acceptance by all species, over long periods TetraMin stimulates the appetite and because of its varied but exact composition, increases natural growth.

SUCCESSFUL BREEDING IS ASSURED WITH TETRAMIN



Send stamped addressed envelope for
FREE TETRAMIN GUIDE TO FISH FEEDING & CARE TO . . .

HERB ROYAL LIMITED (Tetra Division)

COLLEY LANE ESTATE · BRIDGWATER · SOMERSET
Telephone: Bridgwater 0883 8221/2/3 Telex: 45230 BWTR PRONTO

Please mention PFM when writing to advertisers



PetFish

Monthly 3s

Vol. 4 No. 10

February 1970

Subscription rates: £1 15s for
12 issues; 17s 6d for 6 issues
(U.S.A. and Canada \$5.00)

Editor: Anthony Evans

In This Issue

	Page
Comments and Quotes	429
Letters	430
New Pipework for London Zoo	435
Thoughts on Fish House Construction	436
In Brief	438
Aqua-tip	439
F.B.A.S. Affiliations	440
Practical Measures for Electrical Safety and Efficiency	441
Transatlantic Topics	444
A Ready Breeder in Small Tanks	445
Personal Comment	446
Black Water, White Water and Clear Water	447
Controlled Insemination of Livebearers	451
The Leeri Gourami	452
Readers' Queries Answered	455
The Riddle of the <i>Pristella riddlei</i>	457
Guppy World	458
Club News	459
Dates for Your Diary	461

© 1970

PetFish Publications

Editorial and
Advertising
Offices

554 Garratt Lane
London, S.W.17
Telephone 01-947 2805

Comments and Quotes

● Fish by rail ● 1.9 Million households are fishy ● Light-hearted gudgeon

Training Guppies

ARPEE writes: In Comments and Quotes last year I drew attention to the terrible risks run by aquarists who might be tempted to take their pets for rides in British Rail trains: paying full fare for a guppy travelling in a compartment indeed seemed possible if the precedent set by that poor mouse was anything to go by. It was with great relief that I now read that mice may travel free, likewise any other creatures which can be confined within a box no longer than 18 inches in length. They may not, however, be taken out of the container, nor allowed to annoy other passengers. This must be extremely saddening for breeders of those three-foot card-playing fancy guppies, but I suppose that the majority of us will rejoice that, when it comes to it, B.R. is capable of disposing of manifest stupidities clearly and positively. Other institutions might do well to copy.

Survey of Pet Owners

FOR the first time in this country a survey collecting together information about pet ownership (including fishkeeping) has recently been undertaken. The details accumulated were derived from interviews with housewives and in the report produced by the British Market Research Bureau Ltd the figures have been presented in terms of numbers of households. Thus, in England,

Wales and Scotland, there are reported to be 1.9 million households keeping fish (just over half a million of these apparently having only one fish!).

Some facts about the average fishkeeping household also emerge. Its senior members are, for example, most likely to be in the 25-54 age groups and have children between the ages of 5 and 15 in the household (a household with children is four times as likely to be keeping fish as are households without children).

Comparisons with the keeping of other pets reveals that households with fish are number 4 on the list, most having dogs (4.1 million households) or birds (3 million households), with cats (2.9 million households) making group number 3.

One thing we can be sure about is that in terms of numbers of animals being kept the fishes are well in the lead (in a single household there can be as many guppies, for example, as there are dogs in the whole town!).

Light-hearted Gudgeon

FROM a caption beneath a DAILY MIRROR picture of a smiling man holding aloft a gudgeon impaled on a hook: 'The angler—world champion Robin Harris—netted an MBE in the New Year Honours List. But all he could land when he celebrated with a spot of light-hearted fishing yesterday was this gudgeon, weighing under an ounce. Robin... wanted something bigger—to go with that MBE...'

No wonder some people toss them back (decorations, we mean).



LETTERS

Your comments and views on all topics of interest to aquarists are welcomed. Address letters to PFM Letters, 554 Garratt Lane, London S.W.17

Who will take my Surplus Stock?

IN an article some months ago, Mr Peter Unwin talked of the 'Guppy Bug' and warned that once one had bred guppies one would either give up or go on to more ambitious projects on guppies. I got this 'bug' and during the past year and much experimenting produced a batch of extremely good veiltails. My ambition was a red, white and blue guppy and I finally succeeded. Now, the question is, what do I do with them? I culled a batch of 54 pairs to sell to a local reputable dealer, and, as it was getting near Christmas, thought it would be an idea to dispose of them early. I took great pains to explain to the dealer that all had been quarantined and all were only 4 months old. From the previous batch the females reached over 2½ in. in length and the tail fin was close on ½ in., of the superba type.

The dealer offered me 1/- per pair, would not listen to the fact that they were young (a sales point to stress) and talked of 'runts' and this type of guppy not selling well. Two days later my batch were on sale at 6/6 per pair, with no details given.

Do all guppy breeders have to flush their stock away or feed them to oscars or dempsies? I have in my own tank a dozen or so pairs just for show, and they look great. I am most disappointed, not so much about being rooked on price, but over the fact that it seems pointless to continue if the fish cannot be disposed of, in a respectable manner.

I hope you can find space to publish all or part of my letter as I would like to know how other enthusiastic 'guppyites' get on. Maybe some 'get rich quick' dealer may also reply.

Bermondsey, London, S.E.1

L. W. BEALE

Sensitive Discus

I CAN sympathise with the discus who had lemonade introduced into their tank (Personal Comment, PFM, January 1970). The shock would probably have the same lethal effect on any self-respecting bitter drinker.

I found it odd that a specific journey was made to collect only 'a couple' of lemonade bottles of water (2 pints) to introduce into a large discus tank, which obviously did not allow for partial water changes that most discus fanciers would recommend. The source of the water was not mentioned but it is unlikely that this was a factor resulting in the death of the discus. The lemonade was the obvious cause and the quick death of all the discus suggests being poisoned.

I have had experience of the distressing effects on discus with only minute quantities of toxic substances which other fishes would not even know were there. My first mistake was soaking parts of a filter in Demol and even though I washed them carefully before re-using them I very nearly lost all my discus by poisoning. The tank involved had a capacity of 40 gallons.

The second occasion involved the use of a well-known additive for clearing cloudy water. I used a recommended dose but the discus showed distress within half-an-hour and only a considerable water change saved them.

It is perhaps lucky for the discus fancier that they do not appear to be affected by the chlorine in our tap water, and I have changed 90% of the tank water for tap water without any ill-effects.

I no longer introduce any substance to my discus tank that is not of aquatic origin, and then only with the utmost care.

Quinton, Birmingham 32

G. F. SILEY

ONE aspect of the lemonade story reported by Arpee in your January issue might link up with the recent discussions about the hazards to human health formed by the artificial sweeteners called cyclamates. These have certainly been used in some sweet drinks and I wonder whether they caused the death of the discus?

Boston, Linco.

B. THONG

Design Fault?

MRS M. J. WATKIN's letter in the December issue of PFM, regarding spares for the well-known brine shrimp hatcher, highlights what appears to be a design fault in this otherwise near-perfect piece of equipment.

Fellow club members have had similar experiences and I have had two strainers disintegrate, the first after only 6 weeks' use and the second after 6 months. I have been more fortunate than others in obtaining replacements, thanks to the efforts of my local dealer. However, it is becoming increasingly evident that some action by the manufacturers or importers is called for. Perhaps this correspondence will encourage them to rectify the situation.

G. B. PRYKE

Chairman, Hastings & Beshill A.S.

Letters continued on page 435

THE RENA "SUPER"



THE "BIG" PUMP

Copied all over the world – by some
of the best copiers in the business – but

NEVER BETTERED

Why not get an original?

at **62/-**

(Guaranteed 1 year)

Spare parts · Service · Write Sole Distributors:

AQUATIC HOBBY LIMITED

FARNBURN INDUSTRIAL ESTATE, FARNBURN AVENUE
FARNHAM ROAD, SLOUGH, BUCKS.

"I saw your advertisement in PFM"



PETFISH
MONTHLY

LETTERS

Your comments and views on all topics of interest to aquarists are welcomed. Address letters to PFM Letters, 554 Garratt Lane, London S.W.17

Who will take my Surplus Stock?

IN an article some months ago, Mr Peter Unwin talked of the 'Guppy Bug' and warned that once one had bred guppies one would either give up or go on to more ambitious projects on guppies. I got this 'bug' and during the past year and much experimenting produced a batch of extremely good veiltails. My ambition was a red, white and blue guppy and I finally succeeded. Now, the question is, what do I do with them? I culled a batch of 54 pairs to sell to a local reputable dealer, and, as it was getting near Christmas, thought it would be an idea to dispose of them early. I took great pains to explain to the dealer that all had been quarantined and all were only 4 months old. From the previous batch the females reached over 2½ in. in length and the tail fin was close on ½ in., of the superba type.

The dealer offered me 1/- per pair, would not listen to the fact that they were young (a sales point to stress) and talked of 'runts' and this type of guppy not selling well. Two days later my batch were on sale at 6/6 per pair, with no details given.

Do all guppy breeders have to flush their stock away or feed them to Oscars or dempsies? I have in my own tank a dozen or so pairs just for show, and they look great. I am most disappointed, not so much about being rooked on price, but over the fact that it seems pointless to continue if the fish cannot be disposed of, in a respectable manner.

I hope you can find space to publish all or part of my letter as I would like to know how other enthusiastic 'guppyites' get on. Maybe some 'get rich quick' dealer may also reply.

Bermansley, London, S.E.1

L. W. BEALE

Sensitive Discus

I CAN sympathise with the discus who had lemonade introduced into their tank (Personal Comment, PFM, January 1970). The shock would probably have the same lethal effect on any self-respecting bitter drinker.

I found it odd that a specific journey was made to collect only 'a couple' of lemonade bottles of water (2 pints) to introduce into a large discus tank, which obviously did not allow for partial water changes that most discus fanciers would recommend. The source of the water was not mentioned but it is unlikely that this was a factor resulting in the death of the discus. The lemonade was the obvious cause and the quick death of all the discus suggests being poisoned.

I have had experience of the distressing effects on discus with only minute quantities of toxic substances which other fishes would not even know were there. My first mistake was soaking parts of a filter in Dettol and even though I washed them carefully before re-using them I very nearly lost all my discus by poisoning. The tank involved had a capacity of 40 gallons.

The second occasion involved the use of a well-known additive for clearing cloudy water. I used a recommended dose but the discus showed distress within half-an-hour and only a considerable water change saved them.

It is perhaps lucky for the discus fancier that they do not appear to be affected by the chlorine in our tap water, and I have changed 90% of the tank water for tap water without any ill-effects.

I no longer introduce any substance to my discus tank that is not of aquatic origin, and then only with the utmost care.

Quinton, Birmingham 32

G. F. RILEY

ONE aspect of the lemonade story reported by Arpee in your January issue might link up with the recent discussions about the hazards to human health formed by the artificial sweeteners called cyclamates. These have certainly been used in some sweet drinks and I wonder whether they caused the death of the discus?

Boston, Lincs.

R. TRENG

Design Fault?

MRS M. J. Watkin's letter in the December issue of PFM, regarding spares for the well-known brine shrimp hatcher, highlights what appears to be a design fault in this otherwise near-perfect piece of equipment.

Fellow club members have had similar experiences and I have had two strainers disintegrate, the first after only 6 weeks' use and the second after 6 months. I have been more fortunate than others in obtaining replacements, thanks to the efforts of my local dealer. However, it is becoming increasingly evident that some action by the manufacturers or importers is called for. Perhaps this correspondence will encourage them to rectify the situation.

G. R. PRYKE

Chairman, Hastings & Bexhill A.S.

Letters continued on page 435

YES! This list, at the time of going to press, is representative of our stock, but like a busy station there are always new arrivals and departures. So give us a ring if your particular interest is not listed.

Abramites (M)	Dolphin (L)	Glass bloodfin (L)	Paradise fish (M)
Angels	Fescue (S)	Half-beaks (M)	Plecostomus (M)
Silver (SM)	Firemouth (S)	Hemiodus semitaeniatus (L)	bristle-nosed (M)
Black lace (SM)	Jewel (M)	Hatchets (M)	Rivulus cylindraceus (M)
Black - veil (L)	Keyhole (SM)	Marble (M)	Rubens (M)
Black - veil (L)	Marble (SM)	Silver (M)	borataensis (M)
Marble - veil (XL)	Severum (M)	Jordanella floridae (S)	dunensis (L)
Marble (SM)	Pike (M)	Labrus labrovus (S)	elagans (L)
Anost. anostomus (L)	Jack Dempsey (S)	Lamprocyber (S)	harlequin (M)
	Blue blackhead (L)	Loaches	Red line (M)
	Texas (SM)	symnori (M)	kalachra (L)
	Orange chromide (SM)	Khuli (M)	Scissorsail (S)
Apistogramma (M)	Catfish	Oxycrinus (M)	Red tail scissorsail (S)
agassii (S)	C. aneus (L)	Madona (M)	sarawakensis (M)
boralli (S)	C. agassii (M)	Whipsnails (M)	Reed fish
combrase (M)	C. albino (M)	S. striata (M)	Sharks
reitzigi (S)	C. auratus (M)	Mallawi cichlids	Diamond (M)
ramirezi (L)	C. barima (M)	Zebra (L)	Red tail (M)
gold ornatipinnis (M)	C. juru (M)	auratus (M)	Red fin (M)
wickleri (S)	C. lyfalia (M)	tropheus (L)	Black (M)
Australian rainbows (S)	C. maffneri (M)	Mossdaisy (SM)	Scats (M/L)
Alates longipinnis (M)	C. reticulatus (L)	Black sailfin (SM)	Snakeheads (L)
Aphyo.	C. spilargenteus (L)	lyretail (M)	Sunfish
Siamese tom (L)	C. scholzei (M)	Gold lyretail (M)	Black banded (L)
walkeri (L)	C. schwanzi (M)	Green lyretail (M)	Swordtails
Apl.	C. melanostictus (M)	Yellow (XL)	Green (M)
chaperi (M)	Foosia (L)	Mosquito (M)	Red wagtail (M)
dapi (M)	Upside down (M)	Moenkhausia oligolepis (S)	Red (M)
panchax (M)	Talking (M)	Metynnus (L)	wagtail (L)
platyfani (L)	Tanganyika (M)	Nannacara anomala (L)	Tuxedo red (L)
Acara (SM)	Danios	Nannochromis simidicus (M)	gold (L)
Blue (L)	Leopard (M)	Nannostomus harrisoni (L)	Golden (M)
Brown (XL)	Pearl (L)	auratus (M)	Red-eyed red (L)
Green (XL)	Giant (S)	marginatus (M)	Black (L)
Barbs	Zebra (S)	opifasciatus (L)	Red hilt lyretail (M)
arifinis (L)	Discus	Oscar (SM)	Spiny eels (M)
colpigerus (L)	Brown (SM)	Piranha brandti (M)	Tetra
Checker (L)	Red Heckel (M)	natterii (M)	Belgian flag (M)
Cherry (S)	Fighters	Platy	Bloodfin (L)
rhoda (L)	Male (L)	Red (L)	Cardinals (L)
Clown (M/L)	Female (XL)	Red wagtail (M)	London paradoxus (M)
Duckert (L)	Flying fox (S)	Lemon (S)	Glowlight (XL/M)
Ember (M)	Gouramis	Red fin (M)	Platinum (M)
faciatus (M)	Blue (S)	Lemon wagtail (M)	Lemon (M)
fasciatus (M)	Dwarf (L)	Marigold variegatus (L)	Nesona (M/L)
flammarum (L)	Honey (L)	Blue (L)	Puichers (M)
goniostatus (L)	Giant (M)	Piabucus dentatus (L)	Red fin (L)
Indonesian red tail (L)	Leoni (S)	Perch, climbing (M)	Roseate (M)
orpheoides (L)	Opaline (M)	Peacock Tilapia (L)	Slender (M)
Rap (M)	Ophiopomus pomei (XL)	Flames (L)	Serpae (M)
schuberti (M)	Thick lipped (L)	Pelmat.	Serpae eggs (S)
Spanner (M)	Guppies	annectens (M/L)	Serpae minor (M)
Tinfoil (SM/L)	De Gaulle (XL)	fasciatus (L)	Flames (S)
ticto (M)	King Cobra (XL)	guentheri (M/L)	Tilapia
Tiger (S)	Black delta (XL)	iridensis (L)	Peacock (L)
Tiger, gold (M)	Blue delta (XL)	thomasi (L)	Weather loach (M)
Black widows (M)	Red delta (XL)	klugei (M)	White Cloud Mountain minnows (M)
veiltail (M)	Golden (XL)	Gobi	Code: (XL) extra large; (L) large; (M) medium; (S) small
Beacons (M)	Hopano (XL)	Bumble bees (M)	
Blind Cave (M)	Gobi	Rhino-horn (M)	
Cavivict (SM)			
Cavivict, gold (SM)			

All your requirements for successful fishkeeping
Superb quality plants—Full stocks of coldwater
pond & aquarium fish, plants, etc.

211 Varieties
plus marines and coldwater
Minimum rail order £10
Carriage and packing £2

QUEENSBOROUGH FISHERIES

111 Goldhawk Road Shepherd's Bush London W12

Tel. 01-743 2730

Queensborough Fish Farm
Ferry Lane, Mythe End
Wraybury, Staines
Telephone: Wraybury 2885

Hours of business:
Mondays, Thursdays, Saturdays,
and Sundays 9 a.m.-5 p.m.

BUSINESS HOURS

Monday-Saturday 9-6.30
Late night Friday: till 7.30
Closed all day Thursday

14 Picton Place
London W11
(1/2 mile from Selfridges)
Telephone Watbeck 0428

Hours of business:
Monday to Friday 9.30 a.m.-6 p.m.
Saturday 9.30 a.m.-2 p.m.

Please mention PFM when writing to advertisers

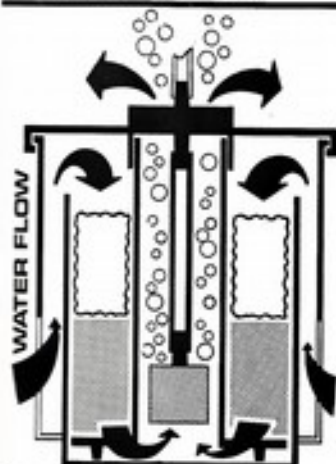
THE BOTTOM FILTER WITH THE BIG COLLECTION AREA

KEEPS YOUR TANK
REALLY
CLEAN AND CLEAR

The King British Fountain Bottom Filter, a sturdy, British-made product which sells at a fair price.

ONLY 7/6

(recommended retail selling price)



- HAS DIRT INTAKE ALL AROUND BASE, GIVING A GREATER COLLECTION AREA
- secure locking cap
- complete aeration/filtration
- double skin body to trap dirt
- replaceable diffuser stone

Ask to see these items—and the whole King British range—at your local aquarists or pet shop. Or, in case of difficulty, write direct to us.

KING BRITISH
AQUARIUM ACCESSORIES CO

Cannon Mills, Union Road, Bradford, 6, Yorkshire. Tel. Bradford 73372

SUPER SLIM

**OUTSIDE
FILTER**

Capacity approx. 12 gallons per hour.
Will also fit inside aquarium.

ONLY 12/6 (recommended
retail price)

"I saw your advertisement in PFM"



Can you
remember
your
first fish?

The odds are you fed it on Gussie, the biscuit-type fish food made by Armitage Bros. Ltd., famous for many, many years. You've come a long way since then. So have we. And we're still very proud of our good name. That's why we were a little longer than others in producing fish food flakes. They had to be perfect, with a guaranteed analysis to provide exactly the right balance. Not easy. They had to float a long time and then sink so slowly that every flake is eaten, not clouding the water or blackening the bottom gravel. Even more difficult. But we did it—and Gussie stays on top.

For an extra bonus compare our prices. For Tropical Fish—Standard size 2/2, Large 3/1 & Breeder size 6/3. For Coldwater Fish—Standard size 1/4, Large 2/0. (Recommended Retail Prices)

Fish that flourish get

GUSSIE FISH FOOD FLAKES

ARMITAGE BROS. LTD · CASTLE GATE · NOTTINGHAM
THE FIRM THAT CARES FOR YOUR FISH



Please mention PFM when writing to advertisers

LETTERS

Continued from page 430

Standards for Goldfish

IT was with great surprise that we read Mr M. Cluse's letter in December's *PETFISH MONTHLY*. He quotes that part of the agreement between the F.B.A.S. and the G.S.G.B. is "That in all matters affecting the exhibiting, showing and competing of Goldfishes the G.S.G.B. shall be considered the duly authorised body".

We would like to point out that this is not so, and is not in the agreement. The full text of this agreement reached in July 1967 was circulated, by us to all affiliated

societies, and by the G.S.G.B. to all its members. For those aquarists who were interested but had no contact with either organisation it was published in *PETFISH MONTHLY*, September 1967, with covering letters by Mr H. O'Neil, chairman of the G.S.G.B., and myself.

A. G. JESSOPP

Chairman, Federation of British Aquatic Societies

Health and Vermiculturists

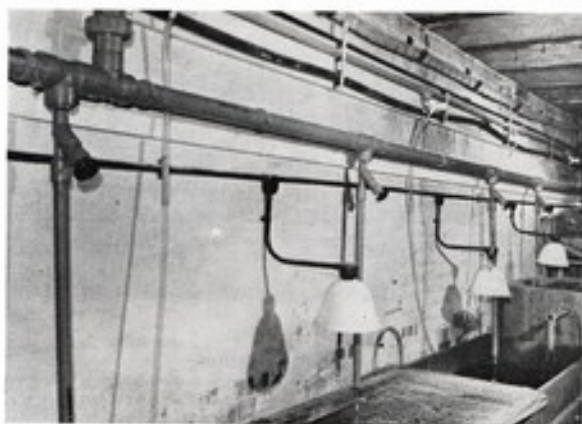
MAY we add our small voice against the suggestion that white worm can be lethal or vaguely parasitic to man. We have cultured white worm for 24 years—our yearly production is in excess of 2500 lb.—and we are, and hope to continue to be, disgustingly healthy.

V. J. DINE

Portway via Alvechurch, Wores.

Vermiculturist

New Pipework for the London Zoo Aquarium



Some 1200 ft. of plastic pipe-work has replaced original glass-lined cast iron and galvanized pipes at the London Zoo Aquarium. Air, freshwater and seawater are supplied in the pipes (above—the Durapipe supply routes are used for seawater to reserve marine tanks). In the Aquarium's pump house (left) the piping was easily fitted to metal connections, and this pipe can be joined by 'solvent welding'. Bay of Biscay seawater is pumped from the 10,000 gallons reservoir to 100 gallon tanks that feed aquaria by gravity. Maximum rate of flow is about 900 gallons per hour in the tropical marine section

Thoughts on Fish House Construction



By DAVID SMALLEY

Photographs by the author

The glass roof of the author's fish house is formed by complete sheets of glass with no overlaps. With this arrangement capillary action does not occur

SOONER or later if you possess a community aquarium the time will come when you will want to try your hand at breeding. For this you will need to purchase additional tanks and equipment, and it is at this stage that wives usually start objecting!

I therefore suggest that you consider the idea of building a fish house where you can shut out the outside world and concentrate on the study, keeping and breeding of fish.

To win over an unsympathetic family, it is a good idea to make the outside of the fish house as attractive as possible. Unfortunately all too frequently fish houses are built from unsightly materials and in a haphazard fashion, although they may be quite satisfactory as regards efficiency.

At one time I used a greenhouse to accommodate my fancy goldfish but found that temperature variations were far too excessive for my requirements. Further, as the greenhouse was of conventional shape, it

proved most unsuitable for housing aquaria.

Many aquarists begin in this way with a shed or greenhouse—which has therefore not been specifically designed for the job in hand. This rarely makes for efficient running. I expect most fishkeepers have been in fish houses where it has been difficult even to manoeuvre to see the fish, yet alone carry out routine maintenance!

The lucky ones, who can start work on a brand new building, should first consider the site, if, in fact, the space available allows any room for choice! Factors to be taken into account here are the availability of water supplies and electricity, and the amount of sunlight the location receives.

The actual design (shape etc.) of the building is best left to the individual, but a simple, low building will probably be best. The doorway etc. should be big enough to enable the stands and tanks to be manoeuvred through it.

As most club members will know,

the topic of what materials should be used to build a fish house is very controversial. I decided to use bricks, for a really durable building. Bricks are good from the point of view of heat conservation—no doubt you have at some time noted how warm the bricks of a house keep in the cool evening after a sunny day. This asset can be used by the aquarist to avoid excessive temperature fluctuation, as I have proved in my own case. I elected to have reinforced glass for the roof for maximum light combined with durability, and also to have the front of the fish house faced with stone to provide an attractive appearance. The whole building is pleasing to the eye, and yet completely functional.

On the question of furnishing the inside, aquaria of the usual 12 inch-wide type are often wasteful on service space and I have found the use of 18 inch-wide tanks ideal. In this way it is possible to obtain 50% more surface area for the same viewing or gangway space. Not only

is the use of 18 inch-wide tanks often the most efficient and economical as regards obtaining the maximum surface area, but the greater the volume of water the longer it will retain the warmth acquired from sunshine. Therefore the lack of fluctuation in temperature is noticeable with these larger capacity tanks.

If you experience difficulty in obtaining aquaria and stands to your own measurements, I suggest you might try contacting some of the advertisers in *PFM*. Try, if possible, to anticipate your requirements for the future and place as large an order as possible, as this will obviously receive better attention from the supplier!

When working on the fish house interior layout, plan for the larger tanks first; then it is easier to fit in economically any smaller tanks of a more conventional type.

As regards the finish of the frames and stands, I would recommend galvanising for a permanent finish. It is well worth the little extra outlay. Metal galvanised angle stands are to be preferred to timber: unlike wood, the galvanised metal

will not rot, it generally takes up less space, and is, of course, fire-proof.

One of the problems facing the fish house constructor is the choice of roofing materials. Most aquarists seem automatically to choose a glass or fibre glass, for generally fish-keepers are also plant growers and sunlight is thought necessary to produce good plant growth. However, before coming to any speedy decision, consideration should be given to the siting of the building and the range of temperatures required.

It may be that a tropical enthusiast specialising in varieties preferring high temperatures will find heating costs reduced considerably by having a boarded and insulated roof. Plants may be grown by means of tungsten or Gro-Lux lighting. It must be remembered at this stage that the greatest heat loss is through the roof and this is why roofing is so important to an aquarist who could be faced with high running costs if the wrong choice is made.

In my own particular case of keeping and breeding fancy goldfish, high temperatures are not required in



Collection of soft water—the easy way! Plastic pipes are used

summer or winter and a high heat loss is not important; I therefore decided upon a glass roof.

In the fish house illustrated, the



A damp-proof layer is placed on a thin layer of mortar immediately above the concrete raft of the fish house. Brick or stone courses are then laid



Space utilisation to the fullest extent: a six-tier stand of shallow breeding tanks (not galvanised unfortunately so that rusting has commenced)

pitch of the roof has been kept to a minimum to avoid heat being trapped in any high spot. It should be borne in mind that capillary action will take place on overlapping glass and P.V.C. etc., and it is therefore advisable to form the slopes of one section of material only.

From the point of view of heating the fish house, it will be found desirable to keep the building as low as practicable; the aquaria should be arranged within the building so as to utilise space as near to the roof as is comfortably possible.

If bricks are used for fish houses that are for tropical use only, for absolute efficiency it is essential for the walls to be of cavity construction. My own fish house has a cavity wall at the rear, the inner leaf being of Celcon insulating blocks. Owing to confined space, the sides were built of 4½ inch brick, but I should mention that the outside was silicised to prevent dampness penetrating; also the inside has been insulated with battens and polystyrene.

As I do not like a lot of bending, I did not have pools incorporated



Conduit protects and carries cable to the fish house above ground on concrete posts

into the floor. Instead, for ease of erection of the fish house, a reinforced 6 inch concrete raft was laid

and the walls were built on this—not forgetting to lay a damp-proof course.

With ever-rising prices, new building materials can make a fish house rather expensive. New timber especially seems most costly and the quality is often poor. If you have a limited budget I suggest that you visit a local demolition site. Often quite new buildings are being pulled down and the materials salvaged from these are usually very good. The best plan is to have a word with the site foreman and tell him what you are looking for. Always have in mind the new and secondhand prices when discussing your requirements and it should not be difficult to save a considerable amount on construction costs. All timber should be chemically treated before use with an anti-rot and infestation preservative-type solution, as this will avoid any trouble in the future.

I hope these 'thoughts' have interested you, and perhaps sparked off a few bright ideas of your own—I only hope your fish house will bring you many enjoyable years of service.

In Brief . . .

... **DIDCOT & D. A.S.** elected Mr A. Wilkinson chairman at the A.G.M., on the departure of Mr F. Hall. Mr D. C. Whiting (28 Blenheim Close, Didcot, Berks.) is still secretary and show secretary is Mr J. Trinder. The new treasurer is Mr T. Shaw; librarian is Mr P. Long. Prospective new members and visitors are welcomed at meetings on the first and third Friday of the month at 8.0 p.m. in the Social Club, Esso Research Centre, Abingdon, Berks.

... P.R.O. of the **WEST LONDON SECTION** of the **F.G.A.**, Mrs Gladys Brock, reports that the great interest shown in the guppies at **THE AQUARIUM SHOW 1969** produced a lot of requests for their purchase. It was not possible to grant this, but there is a stock controller in the Association. The Section's own Autumn Show had 197 entries with visitors from Bournemouth, Radlett and Edmonston sections. The best male fish in the show award (fan) was won by Mr C. W. Parker; best female (cofer), Mr W. M. Holmes; best breeders (females), Mr and Mrs

Fillmore. Meetings are held every third Sunday in the month at the Community Centre, Clifton Road, Isleworth at 3.00 p.m. and visitors and new members are welcome.

... **NORTHWICH & D. A.S.** are planning well in advance this year. Their own Open Show is fixed for 28th June and they plan to enter the B.A.F. The committee elected for the year is: chairman, Mr Phil Hyland; vice-chairman, treasurer, Mr Brian Pearson; show chairman, Mr Len Thorne; show secretary, Mr Cyril Davies; secretary, Mr Les Bradley (4 Ash Road, Sandriway, Northwich); P.R.O., Mr Harry Buckley; table show secretary, Mr Robert Antonio; ladies' chairman, Mrs Dorothy Thorne; librarian, Mr Mark Palin.

... **THE EASTERN COUNTIES SECTION** of the **FEDERATION OF GUPPY BREEDERS SOCIETIES** have changed their meeting to the third Friday of each month, and there has also been a change of secretary. Visitors are very welcome. Any enquiries regarding the activities of this Section should be addressed to the secretary, Mrs L. Myers, 40 Charford Road, Canning Town, London, E.16.

... **RIVERSIDE A.S.** very much

enjoyed their visit to **UNBRIDGE & D. A.S.** for the inter-club show. After a good night's entertainment of slides and a lecture on fish houses, Riverside were the victors by 25 points to 13, with Mr Peter Maslin of Riverside taking the best fish in the show award with a velifera mollie.

... **RETIRING** members of the **THURROCK A.S.** committee thanked the club for the support they had received that had made their task so much easier. The new committee is: president, Mr R. Nicholls; chairman, Mr M. Martin; vice-chairman, Mr P. Hinckley; secretary, Mr J. Aspinall (48 York Road, Corringham, Essex); treasurer, Mr H. Jason; show secretary, Mr D. Durrant (22 Kingsman Road, Stanford-le-Hope, Essex); assistant, Mr John Furber; librarian, Mr R. Stradwick; recorder, Mr J. Hatton; publicity officer, Miss A. Sutton; special duties officer, Mr K. Appleyard.

... **LINE BREEDING** of goldfish was the subject of the talk given at the November meeting of the **GOLDFISH SOCIETY OF GREAT BRITAIN**. This was followed by a discussion of the reprinting of the Standards booklet and by the presentation of the awards by the

president to the winners of the breeders' competition as follows: Singletails: 1, Miss D. Morris; 2, Mr R. Whittington; 3, Mr L. Emery. Twintails: 1 and 2, Mr J. Linale; 3, Miss D. Morris. Globeeyes: 1 and 3, Mr J. Leaver; 2, Mr H. Jago. Mixed class: 1, Mr R. Whittington; 2, Mr D. Woodley. Breeders Cup, Mr J. Linale (twintail); intermediate Breeders Cup: Mr R. Whittington (brambleheads). The judge was Mr J. Bundell.

NEW SECRETARY of HENDON & D. A.S. is Mr R. Maynard (20 Cotswold Gardens, London, N.W.2). Mr K. Purbrick, after serving as secretary for 6 years, had thought that the club would benefit from a change of officer, but in order that his valuable services should not be lost to the Society, Mr Purbrick was elected vice-chairman. Chairman is Mr H. White; treasurer, Mr P. O'Connell; assistant secretary, Mr R. Deacon; show secretary, Mr R. Sherwin; assistant, Mr D. Allison; committee: Mr B. Mould, Mr T. Glass, Mr D. Finch.

MR R. MOSELEY arranged a quiz for the NEW FOREST A.S. November meeting that proved to be a real teaser—but very informative. At this meeting Mr M. Lee won in the a.o.v. coldwater class in the table show with a tench and Mr J. Jeffrey the barb's class with a nigger barb. In the second leg of the triangular match with Bourne-mouth A.S. and Salisbury A.S. Mr R. Moseley won in the guppy class, Mr A. Williamson was first in the coldwater class with a moor, and Mr D. Harding in the classes for plants and mollies.

BISHOPS CLEEVE A.S. enjoyed the competition afforded by the I.C.I. GLOUCESTER A.S. when they held an inter-club show with them. Results were: I.C.I., 604 points, Bishops Cleeve, 623. The club's own table show results for November were: Australian rainbows: 1, Mr D. Stevens; 2, Mr P. Tinsford; 3, Mr F. Scrivin. Furnished jars: 1, Mr N. Dooley; 2, Mr D. Stevens; 3, Mr C. Surgeoner.

NEARLY every member of TUNBRIDGE & D. A.S. left their inside on a miserable November evening to hear a talk given by Mr Ken Nant of Tottenham on cichlids. Mr Nant covered every aspect of cichlid keeping from buying to breeding and rearing the fry. The one problem he didn't cover was the disposal of excess stock! Table show winners (cichlids) were: F.B.A.S. classes D, Mr J. Bellingham (zebra cichlid); Da, Mr R. Taylor (angels); Db, Mr D. Allin (*P. kribia*).

Aqua-tip

IN recent years there has been a gradual evolution of aquarium filters. We now have available filters which use the air from the air pump in a much more efficient manner, and the filters thus do a much more efficient job of keeping both the floor and the water of aquaria, clean.

Small tanks can be catered for by some of the less expensive filters, costing between 10s and 20s, but for the larger aquarium, it is better to spend 20s to 45s. A good filter can be bought for as little as 21s, and it can be as efficient as those at the other end of the price range.

I have examined a number of outside filters and have found that the dearest is not always the best value for money; in fact I have found that, with a little bit of swapping, one can produce a good filter for a reasonable cost.

In one British-made filter I found that the stream of air bubbles which came from its air stone seemed to be much finer than that from any other type of air stone in use in a filter. I owned an American filter which operated on an air stone, and I wondered if I replaced the American filter's air stone with a British air stone, would it improve the operation of the filter. I priced the British-made air stone, and it cost 1s, as opposed to 2s 6d for the American filter's air stone. I obtained a British air stone and fitted it to my American filter. It took a minute to do, and improved the filter's water turnover by, I should say, about 80%. This is quite some improvement for 1s, and the improved filter did not use any more air than before. (Some air stones produce a few big bubbles and these are usually unsuitable for use in a filter as they may give a poor turnover of water.)

One outside filter, made in Denmark, costs 21s. To fit this with the appropriate British air stone would raise its price to 22s. It's still cheaper than the British model, and has a better siphon and strainer, and an aesthetically more pleasing functional look about it. It's worth 1s to try a new air stone in your filter!

W. ALEXANDER

BRITISH TRANSPORT provided the 16 mm. colour films that made up 90 minutes of excellent entertainment for members of LLANTWIT MAJOR A.S. 'Between the Tides' was of particular interest to the marine enthusiast. Table show results, judged by Mr R. S. Wigg, were: a.v. livebearers: 1 and 3, Helen Jones; 2, Mr Archer. A.v. egg-layers: 1, Helen Jones; 2, Mr Ireland; 3, Mr J. Thompson. Helen Jones received a plaque for the best fish in show.

BASINGSTOKE & D. A.S. members were very pleased to learn that they had won the Three Counties Quiz Cup in a very close contest. Recent meetings have included a slide-illustrated talk by Mr A. Forder on aquarium plant propagation, followed by a light-hearted auction of plants donated by the speaker; and a talk by a club member on live foods, which proved very helpful, even if the lecturer would not reveal his own source of *Daphnia*! Recent table show results

have been: a.v. plants: 1, Mr G. Payne; 2 and 3, Mr H. Gough. A.v. novice: 1, Mr T. Sweeney; 2, Mr R. Isley; 3, Mr D. Putt. A.v. tropical: 1, Mr A. Clarke; 2, Mr T. Sweeney; 3, Mr H. Gough. A.v. labyrinth: 1, 2 and 3, Mr A. Blake. A.v. novice: 1, Mr R. Weston; 2, Mr D. Putt; 3, Mr M. Strange. A.v. tropical: 1, Mr B. Weston; 2, Mr A. Marshall; 3, Mr A. Blake.

SEVERAL MERSEYSIDE A.S. members went home from the talk given by Mr E. Pilling of Water World Ltd with both prime plants and newly acquired knowledge of how to care for them. The editor of the Mersey Beacon explains that Mr Pilling not only gave a detailed lecture on various plant specimens but he also donated them to the club for auction. Another most informative lecture was given by Mr B. Pengilly on the anabantid family. Mr Pengilly's skill as a photographer was well demonstrated in the slides accompanying the lecture.

... EDITOR of the **BRADFORD & D. A.S.** Newsletter has given a detailed look back in the December issue over the club's year and in doing so describes perhaps a perfect example of the sort of programme that makes a society a thriving organisation. Lectures from club members and from visiting speakers have covered a wide range of aquatic subjects, coldwater, freshwater tropicals and marines, plants, foods, diseases, breeding; visits have been undertaken to places of interest such as Belle Vue Aquarium, Pickering Trout Hatchery and Flamingo Park Zoo; a successful Society Open Show was held, visits to other societies and entertainment of them at inter-society shows including the B.A.F. Fishkeepers who would like to participate in similar activities this year can join in meetings—on the first Wednesday of the month in Room 5 and on the third Wednesday in Room 4, at Unity Hall, Rawson Square, Bradford at 7.45 p.m.

... **PHIL TAGGART**, Graham Muddeman and Robert Woodward entertained members of **LEAMINGTON & D. A.S.** with their talk on reptiles—illustrated with live exhibits including lizards, snakes and terrapins. Cross-bred week-old snakes, referred to by the treasurer as 'overgrown Tubifex' were offered for sale by Graham Muddeman. Edine of the Newsletter, Mr F. Underwood, reports on the rest of the proceedings as follows: 'Phil started the lecture off with lizards; one of them, he was pointing out, could give you a nasty bite—showing his finger in its mouth. The lizard, of course, promptly shuts its

mouth and refuses to let go. Graham and Robert in the meanwhile carry on the lecture with Phil popping up from time to time still with the lizard on his finger—a real trouser! The lizard was eventually removed, but not before he had drawn blood. Phil, of course, was worried about infection—not to himself but to the lizard!'

... **MRS S. LANGDON** used printed photographs from 1934 to illustrate his talk to **YEOVIL A.S.** members on 'Fish Extraordinary', when he described the way in which the adult discus fish form a mucus on their body on which the fry can feed. The second lecture of the evening was given by Mr Nixon on the preparation, setting-up and maintenance of the marine aquarium. The monthly table show was won by Mrs Forward (2, Mr Phinn and J. Mr Baker.

... **NEW secretary of WAKEFIELD & D. A.S.** is Mr A. Hudson (27 Hall Fold, High Burton, Huddersfield).

... **MR A. CLACK** (6 Holland Road, Chatham, Kent) has been elected secretary of **MEDWAY A.S.** and Mr J. Marshall (97 Dargate Road, Waddeslade, Chatham, Kent) is show secretary.

... **NOTTINGHAM & D. A.S.** trip to the B.A.F. was very much enjoyed and is reported to have been, in Mr Micauber's terms, a financial success: total income £21 4s 6d; total expenditure £21 4s 0d! Mr W. H. Selby reports

in the club magazine that, after several pins of best biter he has volunteered, been persuaded or asked and accepted the job of 'Personnel' Officer. It will be his task to bring together club members who have a common interest within the hobby and generally bring people closer together within the Society.

... **NORTH KENT A.S.** members have recently enjoyed a lecture on cichlids by Mr Senior and a quiz arranged by club member Mr Tom Flint. Members also gladly accepted an invitation from **CATFORD A.S.** to an inter-club show and look forward to the return match this year. Mr J. Stephens has been very successful in the table shows winning first and third places in the characin class and second in the breeders' class. (Characins: 2, Mr E. Hull, Breeders: 1, Mr C. Wood; 2, Mr R. Birch). Prospective new members should contact Mr B. Bloss, 11 Lanes Avenue, Greenhithe, Kent.

... **THE SECOND** stage of a three-cornered competition with **BOSTON A.S.** and **GRANTHAM A.S.** was held by **LINCOLN & D. A.S.** when Grantham were the victors with 750 points (Lincoln, 500; Boston, 214). Mr A. Deakin judged the show and awarded the best fish in the show award to Mr H. Kunz of Lincoln. While judging was in progress an interesting slide show was seen of the furnished aquaria of some of the inmates of the Indiana State Prison, U.S.A. The club meets on the third Monday of each month at 7.30 p.m. in the Liberal Club, St Swinins Square, Lincoln.

F.B.A.S. Affiliations

TWENTY new affiliations during 1969 brought the number of societies affiliated to the Federation of British Aquatic Societies to the record total of 108. Societies interested in joining should write to the F.B.A.S. treasurer, Mr R. A. Dove (5 Farm Close, Crowthorne, Berks.) for an affiliation form.

Bedfordshire (3%): Bedford, Dunstable, Vauxhall Motors.
Berkshire (3%): Bracknell, Didcot, Reading.
Buckinghamshire (4%): Amersham, Bletchley, High Wycombe, South Bucks.
Cambridgeshire (1%): Cambridge.
Essex (11%): Billericay, Blackwater,

Chingford, Clacton, Harlow, Ilford, Leyton, Romford, Southend, Thurrock, Walthamstow, Witham.
Hampshire (7%): Basingstoke, Bournemouth, Gosport, L.O.W., New Forest, Portsmouth, Southampton, Winchester.
Hertfordshire (5%): Boreham Wood, Hemel Hempstead, Mid-Herts., Stevenage, Verulam.
Kent (7%): Canterbury, Deal, Erith, Medway, North Kent, Sittingbourne, Tonbridge.
Leicestershire (1%): Leicester F.K.
London area (18%): Bethnal Green, Becont, Catford, Clapham, Ealing, Dulwich, East London, Enfield, Freelance, Hampstead, Harrow, Hendon, Hounslow, Independent, Lavengro, L.T.E., Riverside, Runny-

mede, Sydenham, Tottenham, Uxbridge.
Northants (1%): Northampton.
Oxfordshire (1%): Oxford.
Suffolk (2%): Bury St Edmunds, Suffolk.
Surrey (8%): Croydon, Guildford, Kingston, Reigate & Redhill, Roehampton, South Park, Surrey Circle, Weybridge, Woking.
Sussex (5%): Brighton, Crawley, Hastings, Littlehampton, Mid-Sussex.
Wales (9%): Barry, Bridgend, Cardiff, Cwmbran, Harlech, Llanelli, Llantwit Major, Newport, Penarth, Rhondda.
West Country (8%): Amesbury, Chippenham, Poole, Salisbury, Taunton, Torbay, Trowbridge, Weymouth, Yeovil.
Miscellaneous (5%): Ormskirk, Tamworth, Irish Federation.
Specialist societies (1%): Edmonton F.G.A., Radlett F.G.A., F.G.B.S.

Is it Time You Gave Your Electrics Some Thought?

Practical Measures for Electrical Safety and Efficiency

By STEVE FORSTER

WITHOUT the use of electricity, aquarists would find their hobby much more demanding. Try to imagine evolving alternative methods of heating, lighting, filtering and aerating without the use of electricity. The prospect of a fish house maintained at 78-80°F by use of a charcoal-burning, pot-belly stove, tanks aerated by compressed air cylinders or a mosses pump and illuminated by paraffin lamps would make the mind boggle!

The point, however, is that although electricity simplifies the day-to-day requirements of an aquarium it can also be lethal to both the occupants and the owner of the aquarium. As far as is known very few aquarists, if any, have come to a sudden end from electric shock but many have found that even a very small leakage current in an aquarium can soon decimate its inhabitants.

The animal world is much more sensitive to electric shock than humans and this is why devices such as electric cattle fences can be used without danger to human life. The voltage output from a standard torch battery would not be noticed by anyone handling it but could kill or severely shock small fishes such as neon tetras and guppies.

General Rules for Safety

When electricity is used the installation that is safest and most efficient is the installation which has been

wired carefully and neatly. One of the most common causes of earth leakage and short circuit currents is chaffing and fraying of conductor insulation, and it is therefore logical that if the conductors are neatly installed or mounted the risk of damage to the insulation is much less than when they are strewn all over the place.

When making adjustments to sealed thermostats, inspecting heater elements and even when changing lamps in a canopy, the supply to these devices must be switched off.

When installing electrical equipment and its circuitry, whether for one tank or twenty, never use cheap, unproven or age-old components. Cable that has been used previously or stored for a long period of time may have brittle insulation, which can crack or disintegrate if bent or twisted; used lampholders may have sticking contact pins or cracked insulation from overheating.

Equipment and Cable Sizes

Most electrical accessories for the aquarium have a very low current consumption and are therefore cheap to run and also do not require heavy cables for their supply. However, if a number of tanks are supplied allowance will have to be made for the increased current demand. Listed below are accessories, with their

current ranges, which are normally found in an aquarium.

Aerator pump	1/50 to 1/10 amp
Heater	1/10 to 1 amp
Lamps (filament)	1/10 to 3/4 amp
Lamps (fluorescent)	1/25 to 1/6 amp

It will be seen that the current demand, depending on the size of tank, can vary from approximately 1/4 amp to 2 amps. However, if ten tanks are in use the current demand will be between 2 1/2 amps and 20 amps. The cable sizes most suitable for use are:

Circuits up to	
1 amp	7/0076
1-3 amps	14/0076
3-6 amps	23/0076
6-13 amps	40/0076
13-18 amps	70/0076
18-24 amps	110/0076

For cables installed near or above aquaria it is advisable to use either PVC or TRS types, as these remain flexible and are not affected by water or salt vapour.

Aquarium Control Panel

When the correct cables for the installation have been selected the circuit should be given some thought. It is always necessary to have lighting on a separate switch, but for treatment of an infected aquarium for example it is much easier if all accessories are separately controlled. If the supply is brought from the normal domestic electric socket, a small control panel unit can be built, either to stand underneath the tank or incorporated into the framework.

Within this unit all connections can be made in a terminal strip and the protection afforded by the unit ensures that the cable joints are safe against prying juvenile fingers. An

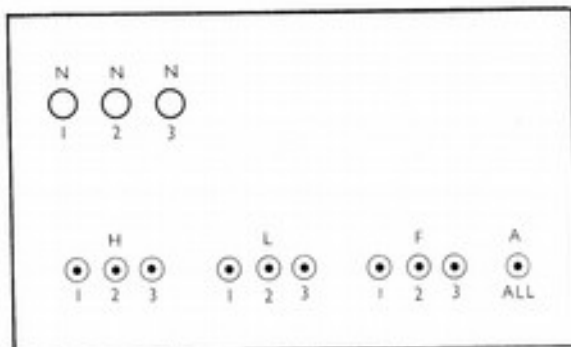


Diagram (a). Lay-out of electric control unit front panel. Heaters (H), lights (L) and filters (F) for three aquaria are controlled by switches H 1-3, L 1-3 and F 1-3 and the aerator for all tanks is controlled by switch A. N1, N2 and N3 are neon indicators, one for each tank heater.

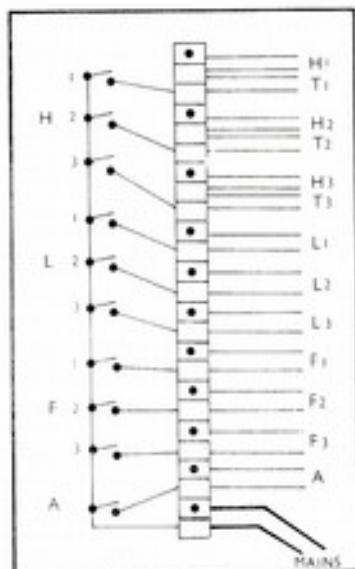


Diagram (b). Schematic wiring diagram for the control unit for three tanks. On the left are the switches (in triplicate, except for A, aerator) for H, heaters, L, lights and F, filters. In the centre strip of connectors the terminals marked ● are to be linked. On the right wiring to the three thermostats is indicated by T1, T2 and T3. The mains cable used is 40/0076.

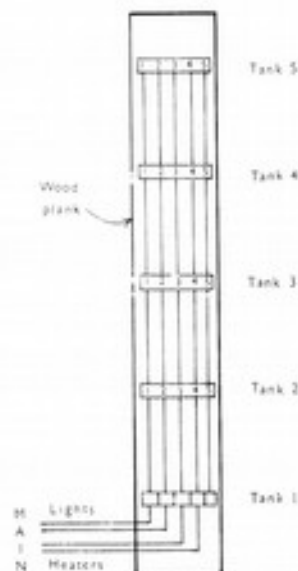


Diagram (c). Wiring arrangement for five raising tanks. All lights are connected to terminals 1 and 2, all thermostats to terminals 4 and 5 and all heaters to terminals 3 and 5 of the five-way strips across the plank. Cable size used is 23/0076.

additional advantage is that all the distribution to the various accessories can be carried out within the confines of the unit, thus eliminating a "christmas tree" type socket with numerous adaptors and plugs growing from it.

If the unit is incorporated into the frame the wiring to the accessories in

the tank is unseen, and if the unit is of a free-standing type the cables may be bundled together and run up to the tank behind the legs of the frame.

Diagram (a) shows the front panel and (b) the wiring diagram of such a unit for three tanks. It should be noted that although the main cable

for the unit is 40/0076 the cable to the individual components is either 7/0076 or 14/0076.

Where five or more similar tanks such as rearing tanks, are used, a system using a distribution circuit and individual connector blocks can be employed. Diagram (c) shows the typical circuit layout.

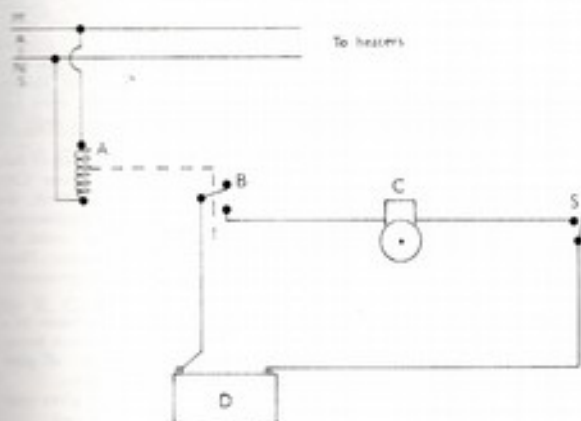


Diagram (d). Wiring arrangement for a warning system. The relay coil A is connected to the mains supply line to the heaters before the position of connection to the thermostat. The relay contacts form switch B in a low-voltage circuit that includes a bell or buzzer (C) and a dry cell battery (D). S is a switch that can be included in the circuit for use during maintenance, for example, when operation of the bell or buzzer is to be avoided

How to Test for Leakage

If some of your aquarium occupants are found dead without any visible signs of battle or disease an electrical leakage fault may be the cause. To determine whether or not such a fault exists a low scale (0-10 volts) A.C. voltmeter should be connected between the aquarium frame and any earthed metal (nor-

mally any metal water pipe). If the meter shows any movement, isolate the accessories in turn until the meter drops to zero and you have found the faulty component. If you cannot borrow or steal a voltmeter a standard torch bulb may give some indication if connected as for the voltmeter.

Earthing of individual aquarium accessories is unnecessary and in many cases impossible unless they have been manufactured with an earth connection. If it is decided to

earth the aquarium frame make sure that a positive connection is made. The reason for this is that if the frame is incorrectly earthed it is potentially more dangerous than if it were not earthed at all, because someone under the impression that metal is earthed will not worry about touching it as any leakage would go to ground. An earth connection made to a metal stand or frame will not guarantee an earthed aquarium if there is paint on the contact surfaces.

An Early Warning System

One disturbing feature of relying on electricity for heating purposes is that, should a fuse blow or a power cut occur in winter during the night, the temperature in the tank or tanks may be dangerously low by the time the failure is noticed. A simple safety circuit may be used that will make such an event immediately noticeable and allow precautions to be taken as soon as possible. The components required are a domestic bell or buzzer, as would be used on your front door, a dry battery of voltage suitable for the bell or buzzer, an optional switch for maintenance purposes, a 220/250 volt A.C. continuously rated change-over relay and odd lengths of cable 14/0076 size.

The connections of the relay coil should be made in the supply cable to the heater or heaters; should a supply failure occur the relay coil will drop out and the relay contacts will change over from the normally open contact to the normally closed contact, thereby completing the circuit to the bell or buzzer, which will then give an audible warning.



Transatlantic TOPICS

By JIM KELLY

possibility is that the offspring would have among their numbers individuals capable of survival; evolution through need.'

* * *

A PART from that now famous canal in St Helens, Lancs., the impact of tampering with natural ecology by man has not become a problem here in Britain, but in the States it is a very different matter. The matter is causing a lot of concern amongst professional ichthyologists and aquarists alike.

Two experts in the field whose authority no one will question have recently hit the National papers on the subject; I am referring to Braz Walker (who needs no introduction to *PFM* readers), and Dr Harvey W. Reno, an ichthyologist and Assistant Professor of Biology at Baylor University, Texas.

Local dealers have been selling what they called 'yellow perch' as catfish bait, to help them catch whoppers up to 100 pounds in weight; now Dr Reno has discovered they aren't perch at all but our familiar aquarium species, *Tilapia mossambica*. This fugitive from Asia Minor and/or Africa has already become a nuisance in parts of Arkansas and in many lakes and rivers throughout the south and becomes the top consumer in competition with local fish species.

'Any time an exotic species is introduced into a new, previously unoccupied region, assuming, of course, conditions are suitable, the outcome is always detrimental.' So the next time any of our readers feel like emptying their aquarium in local waters I ask them to think on these things. On how these newly introduced species are surviving in the States I leave to the words of Braz...

They could, however, conceivably survive a mild winter in this area (South Texas), by congregating around the artesian springs or other sources of warm water. The next

The midge larva best known as the glass worm or phantom larva, is no stranger to those hobbyists who have ever collected their own live foods. Though the larval stage of the phantom midge, *Chaoborus plumicornis*, is a predator feeding on tiny crustaceans, it is in turn a welcome part of most fishes' diet.

Because of its transparency the title 'phantom' is descriptive, in fact if it wasn't for the four pigmented air sacs, two in the thorax and two in the stomach, spotting it would be almost impossible. Now U.S. scientists have found that these kidney-shaped sacs serve a dual purpose: as buoyancy chambers enabling the larva to move up and down in the water under the action of day and night, and as reserve oxygen supplies when grubbing about in the mud searching for food.

By covering a glass full of these creatures with a thin, flexible membrane, and filling it to the top with water, they found that slight pressure on the skin caused the larva to go up and down in the water—rather like those toy divers we played with as kids, that rather magically moved to our command.

* * *

Rosario LaCorte is a man of many parts, all of which he does well. Living at Elizabeth, New Jersey, he shares the aquarium hobby with his wife Jean and son Robert, and when Dan Carson (himself no mean fish-keeper) visited them, Dan said the LaCorte tanks were brimming over with the widest varieties of spawnings he had ever seen in any hobbyist's hatchery.

As president of the now disbanded New Jersey A.S., Rosario attended every single club meeting for 12 consecutive years—quite a record in itself, which set me thinking whether anyone could top it?

From my own experience I know that Fred Campbell, present secretary of the Fancy Guppy Association and Bury A.S., attended every meeting for 8 years running.

If you know of any aquarist that can top either Rosario in the States or Fred in Britain, let us hear about it—it would be interesting to find out who does hold the record!

* * *

No one would deny the expertise displayed by professional photographer, Andrey Roth, in his many wonderful illustrations of tropical fish. So often many experts are very reluctant to impart to the masses what experience over the years has taught them. This doesn't apply to Mr Roth!

In a lecture on the subject of fish photography to The Greater City Aquarium Society, New York, he explained many of his professional methods and how they could be easily adopted by the amateur. Here are just a few of the tips he generously passed on:

- While pictures can be taken in a community tank, it is much better to make your own all-glass aquarium for the purpose.
- Avoid white gravel, it gives your pictures a washed-out look.
- When photographing fish noted for their prowess at jumping, keep them in focus by placing a second glass inside the tank, about 4 inches behind the front glass; this 'corral' can be tipped forward so the top edge touches the front of the aquarium, thus stopping any fish from leaping out.
- Use an electronic flash or bulbs; floodlights overheat the water.
- Work with no other light on in the room but that illuminating the aquarium.
- If the fish are nervous, work the camera through a screen or cloth drape.

And finally, the answer to a question I know will be on all our photographic readers' lips: 'What camera does Mr Roth use?'

His favourite is a Nikon with a 50 mm. lens, but he says the important thing is not necessarily an expensive camera but in knowing how to work within the limits of the one you possess.

A Ready Breeder in Small Tanks

Fundulosoma thierryi (Ahl 1924)

AHL first discovered *Fundulosoma thierryi* among specimens he received from the Margu District of northern Togo (between Kadjamba and Bogobila in the south and Panpamba and Nadjaba in the north). This fish is a true annual from the savannah areas, with many temporary small river systems, of northern Togo. In the past *F. thierryi* has been often confused with *Aphyosemion walkei*, as one strain of *thierryi* is very similar to *walkei* even though *walkei* is a species from the humid Ghana forest areas and the eggs differ in many ways. The eggs of *thierryi* have a few long, non-adhesive filaments in one pole. Scheel claims *F. thierryi* between the *Aphyosemion* and *Nothobranchius* forms.

The colours vary from strain to strain. This species

the female to the bottom of the tank, placing his long dorsal fin over her back, and spawn with her just below the surface of the peat. One egg is deposited at a time, so several attempts are made before the female is spawned out. I then separate the male from the female with a glass divider for several days, until the female is once again plump with eggs, and then remove the glass for a few hours until the female is depleted of eggs.

Dry food as well as live food is accepted and eaten with great relish if a pair is spawned often. Eggs are removed from the peat once a week and placed in a little water from the tank for about 10 days; by that time any eggs that are not fertile will have developed fungus and have been removed from the water. The remaining eggs are then placed in a little moist peat and stored in a

By R. C. ARMSTRONG

Fundulosoma thierryi



R. C. ARMSTRONG, A.R.P.S.

has a rather deep body, and females are slightly smaller than the males. Males have a green or blue sheen on the body, overlaid with red spots, turning to yellow in the fins, and in some cases orange. The dorsal fin is large, yellow with red or brown spots, the caudal is V-shaped with extensions, again yellow or gold with red or brown spots, the anal fin is yellow with red or brown spots, and all fins have a red or brown border. In the female all fins are clear, the body is green to slight yellow with red or brown spots at odd areas, but generally very little colour.

The water conditions required by *thierryi* are pH 5.5-6.6, GH 2-5 degrees. I have bred them in tap water and kept them in that water for some time but softer water will often increase the egg output from the fish. Breeding takes place at the bottom of the tank, which I cover with peat or very soft plants (willow roots will do, or moss anchored to the bottom). The male will force

plastic bag inside a dark coffee jar for not less than 4 months. Then, if when I examine them I find that the eggs are 'eyed up', I hatch them; if not, I return the eggs to the jar for another month, when I will try again. The fry will hatch if ready, in seconds sometimes, but those that have not hatched in 24 hours will join the others for the next month's hatch. The fry will feed at once on micro worm and fresh hatched brine shrimp. With good feeding they will be ready for breeding in from 6 weeks or less.

F. thierryi is a very colourful fish and one I would recommend to those aquarists with room for only a small tank; I breed mine in a 12 in. by 8 in. by 8 in. all-glass tank and this does not stop growth if the water is part changed at regular intervals and plenty of good food is used. Any food not eaten in a few hours must be removed as soon as possible in such a small tank.

OBSERVATIONS ON WATER PLANTS IN SOUTH AMERICA

Black Water, White Water and Clear Water



Typical riverside landscape of the Rio Negro region, showing trees and shrubs under water far out into the river with no immediate zone for growth of water plants

THE heart of the enormous Amazon basin is Manaus, today being transformed into a modern town, but well known as the setting-off point for many expeditions. Many aquarists connect the secrets of the whole of tropical South America with the name of this town. Our firm here ply numerous riverboats up and down the Amazon (Rio Solimoes) as well as the Rio Negro basin, which empties into the Amazon a little below Manaus, and as far up as Columbia. For hydrobiological purposes, and discounting the countless flowing shades and windings, in the whole Amazon basin three different water types are distinguished, namely black water, white water and clear water.

Black Water

The river system of the Rio Negro represents a typical black water area, of which the lowest pH (most acid) value is evident only in the upper courses of the tributaries. Here pH values from 4 to 4.5 are characteristic, which, as is well known, arise like the black colour of the water from humic acids and other materials of organic origin. In the lower courses of the Rio Negro itself, in August 1967, with a water temperature of 86°F (30°C) we recorded a pH value of 6.0. With Durognost no measurable hardness at all could be ascertained; therefore with such low concentrations of dissolved salts this method of water analysis is much too insensitive. The

By Dr JOACHIM SCHULZE

Photographs by the author

Translation by F. MARSH

black water in tropical South America is usually considered to be the poorest river water in the world electrolytically; its electrical conductivity frequently reaches the extremely low value of distilled water.

The extremely flat surface area characteristic of the Amazon basin, with the corresponding very small drop in the river bed and with the seasonally sharply fluctuating amount of condensation, has produced a special kind of river landscape for whose exploration we mainly thank Sioli. Because of the considerable tide variations large parts of the low ground bordering the river are regularly flooded. Here is the flood forest, or the Igapo rain forest, in which can flourish only those trees and shrubs that can live for months at a time with a large part of their leaves submerged.



A massive example of *Echinodorus amazonicus* with leaves about 3 ft. long. This growth occurred in a clear water area where the small river (Rio Paixe Boi) forms a lake of flooding.

During flood periods the Igapo rain forest is covered to a depth of 18-21 feet above the ground, so that shrubs and small trees, even tree tops, are completely under water. These great variations in the water level can hardly be tolerated by rooted submerged water plants. Added to this is the deleterious effect of the influx of the black water on the plant vegetation, so that in this area we must record an astonishing lack of water plants. We enquired about this of the catchers of tropical fish who were resident in Manaus, and who travelled over the enormous area of the Rio Negro and its neighbouring rivers with their boats. We were given at all times the information that it was hopeless to search for water plants in these areas.

These observations from Nature should be a lesson to many aquarists, who try by peat filtration or the addition of peat extract to the aquarium water to improve the living conditions of aquarium water plants. That

which leads in Nature to a barren lack of plants can hardly have good results in the aquarium. However, it should be stressed that this is not true for fish. Very many beautiful varieties of fishes come out of these black waters; for example, the red neon, of which species alone 20 million fish are exported from Manaus annually. But what holds good for many fishes is often no rule for water plants.

White Water

Downstream from this area of the Rio Negro, which is so inhospitable to the lover of water plants, is the white water area of the Amazon. White water is characterised by a relatively higher content of electrolytes in the dissolved solids, a higher pH value (less acid), lying only slightly under the neutral point, and a higher concentration of suspended mineral components which give



Where the open water extends into lighter areas within the flooded forest *Echinodorus* plants are also found. In the water shown here was found a plant that was possibly *Echinodorus tunicatus* small but could be a new species.

water the loamy opaque colouring. This suspended matter comes from soil erosion in the source areas and over courses of the rivers. In course of time, according to the conditions of the flow, they are deposited and lead to extensive building up of sediment in the area of floodplains—which is again at times a fully inundated river area. Here also is found the typical flood or Igapo forest.

Unlike the black water the white water is much more favourable for the development of water plants and so we find considerable aquatic vegetation. Of course, the plants must be suited to the enormous variations in the level of the water, so that it is understandable that we find chiefly floating plants or rooted water plants with floating leaves. Characteristic are the immense floating beds with *Paspalum repens* and other grasses, which can readily adapt themselves to the changes in water

is not capable of surviving. We must remember here that white water, because of the concentration of suspended matter, lets very little light through, so that in a 10 or 20 inch depth of water there remains only a tiny fraction of the light energy from the surface. It is well known that, chiefly owing to the small amount of light penetrating inland waters, rooted and entirely submerged water plants can hardly survive at depths greater than 3-6 feet. The wanderer in summer through our own native waters can persuade himself of this fact.

Clear Water

Lastly we consider the clear water biotopy, in the area of a small tributary to the south of the Amazon mouth delta near Paixe Boi, east of Belem. Clear water



This *Echinodorus* plant having heart-shaped leaves was photographed growing emerse. Possibly *E. lancifolius* or *E. muricatus*

level. Another characteristic species of this area is *Limnium*. We found, too, the floating plant *Limnium*, as well as the rare and beautiful *Phyllanthus* species. This belongs to the Euphorbiaceae family, which altogether embraces about 290 genera. Only the genus *Phyllanthus*, which itself alone takes in 480 species, has a floating water plant.

Also characteristic of this area are water lilies, foremost the well-known *Victoria regia*, whose habitat unfortunately we could not reach with the boat; only later were we able to see it by flying over the area between Manaus and Belem at many points. When the water level rises the plant extends the leaf stalks to a length of 25-30 feet and so is in a position to adapt itself splendidly to the changing water level.

Our most sought-after Brazilian plants, the *Echinodorus* species, we did not find in this area at all. Locally based plant collectors also reported no findings of this genus to us, and it is also unlikely that this plant can exist in such water conditions. If a plant roots at the bottom and cannot, either by lengthening its stems or by means of freely floating leaves, take advantage of light from the surface, then during the deep flooding it

resembles white water in quality and is produced at times in the lower courses of the white water rivers, where the clouding material has meanwhile been deposited. This area is an old and very well known habitat of plants for aquaria; long before World War 2 small-leaved Amazon swordplants were collected here and exported to Europe by the first airships, the Zeppelins. The small insignificant river (Rio Paixe Boi) forms a huge flood area.

We travelled over this large lake-like water area with two Brazilian guides, with whom communication was, naturally, difficult. We finally made our questions understood by sign language, when we wanted to reach the habitat of this *Echinodorus* species. The men understood and merely pointed from the boat into the water. We saw that the water, which was about 25 inches deep, showed a thick bottom growth of *Echinodorus amazonica* Rataj, early called *Echinodorus brevipedicellatus* (Kuntze) Buchenau. The Brazilians climbed out of the boat and in a few minutes had huge clumps of the plant rooted up and packed in the boat.

The plants live here submerged almost the whole year. Only during the driest season, for at the most 4 or

6 weeks, does the water recede far enough for the plants to live emersed. As a result of extensive adaptation to the submerged way of life the plant also propagates itself abundantly through leaf shoots forming on the flower sprays. It is not surprising that this plant is splendidly suited for culture in aquaria.

At certain places the open, fully sunlit water surface extends right into the flooded forest. In spite of the very much inferior light conditions there we found the same plant in large areas in shallow water, which demonstrated to us once more the great adaptability of plants to changing light conditions. Quite near we found in practically the same conditions yet another very beautiful and valuable *Echinodorus* species with the wide heart-shaped leaves of the species complex 1 (described in my earlier articles in PETFISH MONTHLY). According to the descriptions in the literature it could have been either *Echinodorus tunicatus* Small or *Echinodorus marginatus* Grisebach; however, these species have been reported to have a more westerly distribution (Guyana to Costa Rica). It could also be an entirely new variety, as will

perhaps be verified as a result of new investigations by Mr Rataj. At all events, here also was displayed a definite adaptation to the submerged way of life, which we could clearly perceive; that is, from the flower sprays of the plants hung numerous leaf sprouts or adventitious plants. Experiments with the cultivation of these plants in the aquarium are now in hand and here the plants have proved themselves well.

In contrast to almost all other representatives of the heart-shaped leaf species complex 1, with exclusively submerged cultivation the plant does not have the tendency either to spoil or to grow over the water surface. As moreover the broad heart-shaped leaf shape is very highly valued for decorative reasons, when set together with the narrow-leaved varieties, one can prophesy a great future for this plant in the aquarium world.

The biotopy of the two beautiful *Echinodorus* species found shows that in the narrower Amazon area the clear water, and not the white water or black water, offers the most favourable living conditions for *Echinodorus* species.

Personal Comment

Continued from page 446

infestation. This rather gives the lie to the theory that only weak and run-down fish get 'ich' in the first place. In so many instances, as we have demonstrated above, it is the well-established fish which are vulnerable equally with those that have stood the rigours of importation and transshipment from place to place.

This rather gloomy assessment of the risk of outbreak of 'ich' after the normal quarantine period is not inconsistent with the advice normally given. This is that 14 days should be allowed at least, and this should be extended if the fish are not in superb condition at the conclusion of this period. If one accepts that the vast majority of cysts (like the seeds) will have reacted in the normal 'germination' period, the odd ones which Nature has put away for a rainy day will be a small minority, and if some form of immunity has built up against attack from them during the ensuing period, they may well have become active but fail to leave a mark on their would-be hosts. It would be interesting to speculate whether fish can actually attract attack by emanating something that is attractive to young 'ich' parasites. Conversely, could they, in good health, exude something that repels them? One thing is fairly certain, and that is that 'ich' is intended to survive, and in this process it will be aided by our very incomplete knowledge of its weaknesses. Aquarists must realise that quarantine with fish is no more likely to eradicate 'ich' attack than will similar treatment prevent rabies from entering this country—the recent headline news which shook the dog and wildlife world underlines the weaknesses of even the most rigorous systems designed for the public good.

The reader may wonder why I have disregarded chemicals as means of eliminating the parasite at the outset. Surely, if we used some of the well-known cures, even though no spot is evident, we should keep the tank in a more or less sterile state? It is probably true that any free-swimming youngsters would be knocked off, but I am less convinced that the encysted state would

succumb in entirety. Most aquarists are familiar with the situation where an attack of spot seems to defy all cures and where the outcome is either death of all the fish or a long-drawn-out struggle with the use of that chemical which has proved most effective. Nature seems quite capable of protecting creatures from man's worst excesses, and poisoning is one of these. Already, the immunity of certain flies to DDT is causing some considerable concern in pest control quarters, and just as some fish seem to have developed an immunity to spot itself, so has spot apparently adjusted itself to certain chemical hazards in various of its strains.

If this Time Delay Theory, as I will tag these idle notions, is anywhere near the truth, what practical measures might one take as a consequence? If I knew the answer to the question as to how the cyst behaves once it is formed I could be firmer with my advice. I believe that the cyst attaches itself to objects, but also that it can drift about unattached without losing its ultimate potency. This would point to very careful transfer of fish from quarantine container to their final destination, avoiding any unnecessary cross-carriage of water in which the cysts might be floating. Gentle netting from the intermediate transfer container into the tank of destination, in other words, rather than 'floating in' would seem to be a wise precaution.

The matter of quarantining plants requires a lot of thought, and I can only suggest that they are put into a container with a rather higher temperature than usual (say 85°F), and with a mild dose of an anti-'ich' preparation. After a week they ought to be safe enough to transfer, provided always that they don't contain any time-delayed cysts which happen to be resistant to the chemical you have used. If you have any suggestions as to a way around this one I shall be delighted to have them. I think that the only other practical point to bear in mind is the advisability of drawing water from sources least likely to contain cysts. Rainwater from covered butts will almost certainly be sound, as will water from wells and springs. Tapwater should be sound enough but I should hate to bet heavily on this in all parts of the country. Water from anybody else's tank should be regarded as utter poison. The choice is otherwise yours!

Controlled Insemination of Livebearers

It is often desirable to obtain precisely timed initial inseminations of virgin, or re-inseminations of gravid, females of viviparous fishes in the family Poeciliidae. Commonly used methods have been artificial insemination (Clark, 1950) and the introduction of the females to established males for various lengths of time (Rosenthal, 1952).

During studies on the virgin ovarian cycle and sperm replacement in female guppies, *Poecilia reticulata* (Peters), a simple and quick procedure for securing inseminations was developed. The technique involves anaesthetising the female in a solution of tricaine methanesulphonate (MS-222) before introducing her to the male previously established in a tank. The concentration of the solution is adjusted to the size of the fish by sprinkling small amounts of MS-222 into the container. The specimen is suspended in the solution until muscular movements cease but opercular movements are still noticeable. She is then introduced into the mating tank.

Sexual activity of the male usually ceases within a few seconds; insemination takes place shortly thereafter. If the female revives before copulation, re-anaesthetisation and perhaps introduction to a different male may be necessary. Success of copulation can be judged by the type of genital contact and the subsequent jerking behaviour of the male. Contact may not be immediate, and the male may thrust repeatedly at the genital pore with his gonopodium, pushing the female through the water. Once contact is made, it may last only a fraction of a second, giving the female a slight flip forward; or it may last longer and terminate in a violent snap release as the male jumps away, causing the pair to twist and spiral in the water. In either case, after the release of sperm

A new method for obtaining precisely timed inseminations in viviparous fishes

the male makes a series of jerks that consist of spasmodic contractions of the body. The number and magnitude of these spasms vary with the type of contact and release. They may continue for several seconds after copulation even though the female has been removed from the tank.

The technique has been used with a high degree of success. Out of 68 attempted inseminations of virgin females, 62 (91%) produced progeny. All nine re-inseminations of previously impregnated females with

permits insemination during phases of the ovarian cycle or gestation period when she normally would be unreceptive (Kadow, 1954; Liley, 1966). This nearly motionless condition neutralises any of her negative-behaviour movements which might otherwise thwart the male in his attempts at copulation. This condition may also simulate a posturing behaviour on her part which may act as a positive stimulus to the courting male (Liley, 1966).

Although this method has been used only for intraspecific matings in *P. reticulata*, it has potential for investigating the behavioural repertoire in other poeciliid species, as well as for securing interspecific matings where attempts by natural methods prove to be unsuccessful.

By BRADLEY S. BOWDEN

sperm from males with a marker gene were successful. Loss of sperm into the water occurred in only 10 (6.8%) of the matings; it was not influenced by the duration of the genital contact. Progeny were produced from eight of these matings; the two failures were from contacts of short duration.

Although females that received a single insemination by this method were not maintained in production until the sperm was depleted, as many as five successive broods were obtained over a period of 110 days.

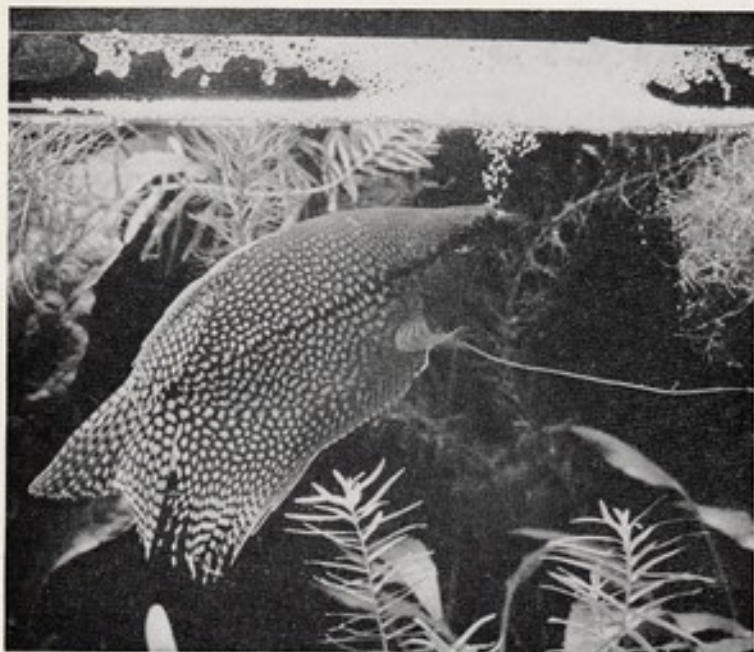
The advantages of this technique are that it ensures the exact timing of insemination and provides easily observable criteria for determining the success or failure of copulation without resorting to genital sperm smears. Furthermore, the anaesthetised condition of the female

This article was first published in THE PROGRESSIVE FISH-CULTURIST (U.S.A.).

References

- Clark, E. (1950). A method for artificial insemination in viviparous fishes. *SCIENCE*, **112**, p. 722-723.
- Kadow, P. (1954). An analysis of sexual behavior and reproductive physiology in the guppy, *Lebistes reticulatus* (Peters). Doctoral thesis; New York University.
- Liley, N. R. (1966). Ethological isolating mechanisms in four sympatric species of poeciliid fishes. *BEHAVIOUR*, Suppl. 13, 197 p.
- Rosenthal, H. (1952). Observations of reproduction of the poeciliid *Lebistes reticulatus* (Peters). *BIOLOGICAL BULLETIN*, **102**, p. 30-38.

The Leeri Gourami



Here the male leeri gourami is seen blowing bubbles of air at the tank surface to form the nest. The relatively longer and more pointed finnage distinguishes the male from the female as can be seen from the photograph opposite

Trichogaster leeri

THE leeri gourami is a particularly beautiful fish. Although fairly large (reaching up to about 4 in.), they are peace-loving, and indeed somewhat shy; their colouring is lovely. The pearl or mosaic fish, as it is also known, is one of the most beautiful representatives of the labyrinth fishes (Anabantidae), and has graced continental aquaria since the year 1933.

The ecology of its homelands (Indo-China, Thailand, the Malayan peninsula, Sumatra and Borneo) includes both fairly turbid yellow- or brown-coloured waters, that allow very little light to penetrate, and the open unshaded waters of the swamps and pools. The rich vegetation along the banks of the turbid streams often forms an arch of plants over the water surface and this, together with the dark colour of the water, creates very unfavourable conditions for a good growth of water plants. On the other hand, the water in the pools, which are lit and warmed by the sun, are well stocked with water and marsh plants. Many of these are the ones we grow in our aquaria.

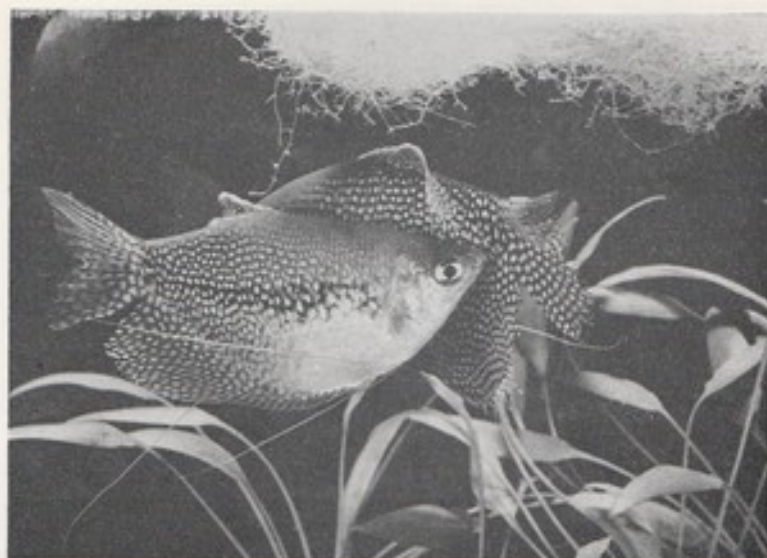
Among the floating plants the most important one is *Ceratopteris thalictroides* (Indian fern), which is rooted in the bottom but grows over the water surface and *Ceratopteris thalictroides* var. *cornuta*, which spreads out in enormous patches. Several varieties of *Limnophila* (*Ambulia*), *Hygrophila* and a number of known *Cryptocoryne* species and other plants are represented. In the same area as the leeri live many other species of fishes such as *Barbus*, *Rasbora*, *Danio*,

By RUDOLPH ZUKAL

Photographs by the author

Translation by F. MARSH

When the female (left) is ready to spawn she swims beneath the bubble nest and will push against the male with her head. Immediately the male spreads his fins and curves his dorsal fin and body

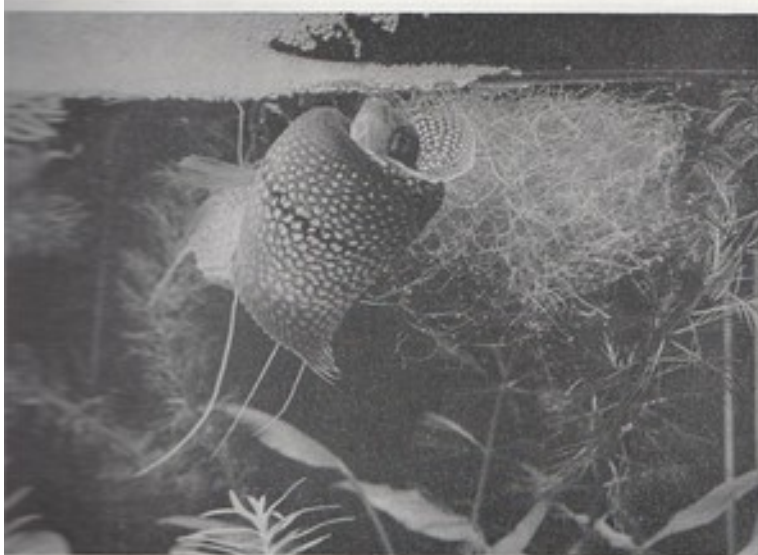


Macropodus, Laubuca, Aplocheilus, Botia, Acanthopoma, Dermogenys, Betta, Trichopsis, Trichopterus and Colisa.

Nearly all the anabantids live in shallow water that has been thoroughly warmed through, where the temperature never sinks below 72°F (22°C) and is mostly much nearer 86°F (30°C). Such warm water, containing much mineral material and rotting organic matter, is very poor in oxygen. And so the adaptation found in the labyrinth fishes has taken place. They not only take in oxygen through their gills, but, for much of the time, use air from the water surface. The air is sucked in through the mouth and is assimilated into the 'labyrinth' organ near the gills. Thus the blood is

provided with the necessary oxygen. The used air is expelled through the mouth and gills.

Leeri gouramis should not be kept in too small a tank. Normal tap water that has been left to stand may be used. It should be maintained at a temperature of 72°F (22°C) and planted with bushy plants. Good lighting and not too high a water level provide ideal conditions for the fish. They can be kept in a community tank with small fish, and will thrive on live foods. I have heard many aquarists complain that they cannot rear this fish because it contracts skin ulcers before it reaches adulthood. If, however, leeris are kept in water that is not too old and which is partly changed regularly, they can grow to the imposing size of some 4 in.



The embrace of the mating pair beneath the bubble nest involves inversion of the female (here the turning procedure is only just beginning). Usually the eggs are released whilst the female is on her back below the nest



This breeding pair of leeri gouramis adopted the embrace immediately beneath the nest but then fell to the tank base, still in the embrace. Eggs were not released until the pair was on the bottom.

Breeding requires no specialised knowledge. Sex differences are easy to see in adult fish. The male is more slender and his dorsal fin is extremely elongated. The female is fuller in the belly, not so intensely coloured and her dorsal fin is rounded. The fish are keen to spawn, but one must be careful to choose a full female for propagation. For the spawning, a medium sized tank can be used, filled with normal tap water that has been allowed to stand and brought to a temperature of 75-80°F (24-26°C). Leafy plants and a few floating plants are then added; stones to serve as a hiding place for the female should not be forgotten since many males become rather vicious and can cause considerable damage to the female.

The fish spawn under the bubble nest prepared by the male. The number of eggs is very large, 1000 being no rarity. After the spawning is finished the female must be removed, otherwise she will be rammed by the male and can suffer injury. The male takes over the job of rearing the brood alone. The eggs hatch after 24 hours and the fry are free-swimming on the third day. At this point they must be provided with the finest live foods and it is also wise to remove the male. The young are ready to mate in their second year.

I have portrayed the whole spawning process in my pictures. It happened in this spawning, a fairly rare though not unknown occurrence, that during



Amidst the swirling 'storm' of eggs in the water the male is seen pushing the female away before he proceeded to collect the eggs in his mouth. After conveying them to the bubble nest the male 'spat' them into the bubbles.

The eggs are lighter than water and slowly rise after being released. A small cluster of the eggs just released can be seen in this picture, the mating pair again, unusually, being on the tank bottom



the spawning embrace the fish fell to the bottom and the eggs were produced there. Because the eggs are lighter than water they drifted up to the surface and were collected by the male and taken under the bubble nest. The spawning lasted for some 2-3 hours.

Readers' Queries Answered



Power Cuts

Can you please help me in connection with the threatened power cuts? My house is not centrally heated so I am really desperate about the fish. How can I cope with the threatened situation?

In the event of power failure during cold weather the steps to be taken to delay cooling of an aquarium can be listed under two headings: (1) insulating the aquarium against loss of heat; (2) supplying heat to the tank, as necessary, from an external (non-electric) source.

(1) The back, ends and base of the aquarium can with advantage be covered with insulating material—expanded polystyrene (e.g. ceiling tiles) in as thick a layer as can be obtained, even before there is risk

of power cuts. Then (at night or when a power cut occurs, or when the house is going to be left for several hours and power cuts are likely), all that needs to be done is to cover the tank (top and front) with further insulation—a thick blanket or an eiderdown (make sure that the lighting is switched off) is probably the most readily available. With such coverings the rate of cooling of the tank should be delayed to well within the danger point. Do not remove any coverings to check the temperature for about 4 hours unless power is restored.

(2) In very cold weather in an unheated room a power cut of several hours' duration could cause dangerous cooling even with the precautions outlined above. Then

the placing of a paraffin convector heater beneath the tank, the floating of a large saucerpan of very hot water in the tank (renewed every 2-3 hours) or even the (cautious) addition of a kettle of boiling water every few hours are ways in which the tank temperature can be kept up.

With provisions of these kinds we think that you will not experience losses of fish from power cuts. The biggest danger would be if you should have to be away from home for a lengthy period during cold weather. Most fishes will survive quite a long period of 65°F and well-insulated tanks (24 in. by 12 in. by 12 in.), starting at 75°F, take quite a time to fall even to this level when unheated at average room temperatures.

Spatterdock

I bought a Cope Fear spatterdock at the beginning of the summer which has grown very well until 6 or 8 weeks ago. Now I can only get the leaves up to about 1-1½ inches. Can you tell me how to improve the growth of this plant?

It is very possible that your spatterdock has ceased to grow because of a change in lighting conditions. If it was receiving any natural light from a window, the reduction in light-intensity with the winter days would need replacement by extra artificial illumination, as it is a plant that requires strong overhead lighting. The rhizome of this plant, a sprouting portion of which is the form in which it is usually sold, also has a tendency to rot away gradually. This usually happens quite quickly, whereas you have already obtained good growth, but if additional light does not produce the desired result it would be worth gently investigating the root. One plant authority recommends planting the root in a small amount of good soil to prevent this rotting from taking place. Another course of action that might improve the situation, if you do not replace fresh water in your tank very often, would be to siphon out about a third of the tank water and replace it with fresh. Water can become too 'old' for good plant growth.

Bumble-bee Catfish

I was offered a couple of bumble-bee catfish but was advised that they need a regular diet of Tubifex worms. Such worms are difficult to obtain in my area. Would it be possible to feed them on dried food instead?

Microglanis paraguayae will certainly prefer live foods but small garden worms will be equally as suitable as *Tubifex*. Chopped worm and small pieces of raw ox heart will be acceptable as well. Frozen foods will be taken as will dried food if no other foods are offered. These catfish are peaceful creatures but do have large mouths into which small fishes will disappear. They are, of course, nocturnal animals and must be supplied with lots of hiding places of wood or stone or plants to enable them to take cover from the light.

Bulbs as Heaters

I have two 36 in. by 15 in. by 12 in.

tanks each heated by two 40 watt bulbs. These cause the temperatures to soar to 80°F after about 7 hours of use. Is there a way to prevent this?

The only satisfactory way of dealing with this problem will be to install an aquarium thermostat. This can be an inside-fitting or an external model and, if wired in series with the heating lamps, will switch them off when the temperature exceeds the value you select.

Adequate Lighting

A short while ago I purchased a lighting kit, consisting of two 40 watt tubes and two chokes, for my 24 in. by 12 in. by 12 in. tank. At the moment I am having difficulty in getting my plants to grow properly. I would be very pleased if you could possibly tell me how many hours I should have the lights switched on and at what time they should be switched on and off.

It is not possible to suggest precise periods of lighting to guarantee plant growth since the individual circumstances vary so much from tank to tank. Nearly always various periods have to be tried to discover the best. If your tank receives no other source of light it would be likely that around 10 hours daily would be the time required for the lights to be on to give best plant growth. It is unlikely that less than 8 hours will be found at all adequate. These suggestions are based on the assumption that you have a mixed collection of plants of the usual aquarium types in the tank.

Polluted Tank

Can you please help me with an unwanted visitor that I have in my tank. It is a white, thin worm, not more than ¼ in. broad and 1 in. long. These worms crawl on the glass, rocks and plants. I have tried methylene blue, and I have also sterilised the tank and washed the plants. I feed with Tubifex worms. Could these be the cause? I have not lost any fishes.

There are a number of tiny worm-like creatures that can appear in enormous numbers in aquaria under certain circumstances. A common arrival is *Spirontocaris*, although its size is not usually as great as the size you mention. However, the appearance of these creatures is a signal that the tank water is being polluted in some way, as they thrive because

there are an excessive number of micro-organisms, on which they feed, in the water. The micro-organisms, in their turn, are there in large numbers because of an abundance of food for them; this could be through the use of too much dried food or the decay of water plants. Certainly the rotting of organic matter of some kind will have been the cause of this trouble. Excessive decay of uneaten *Tubifex* worms could be a source of this as well as almost any other kind of food.

The remedy will be to replace most of the aquarium water with fresh water (replace the gravel as well if this appears to be discoloured, and especially if it is black underneath the surface). You must then be sure that you do not give more food of any kind than the fishes will quickly clear up, or ensure that plants are being kept healthy by giving them adequate amounts of light. The creatures will disappear very quickly once their source of food supply is cut off by improving your aquarium hygiene.

Breeding 'Rams'

*Could you please give me some information on the breeding conditions necessary to breed *Apistogramma ramirezi* or butterfly cichlid? I have just lost all my American flag fish fry and I am planning to get a pair of *ramirezi*. How big do they grow and are they suitable in a community tank with neon, penguins, swords etc?*

The commercial breeder removes the eggs of the *ramirezi* from the breeding adult pair soon after mating and raises them in a similar manner to the eggs of angel fish, but it is quite safe to leave the parents with them if you wish; however, though most parents take care of the eggs, just the odd ones find they make a tasty dish, so they must be watched. The adults should be conditioned on live *Tubifex*, small pieces of meat and live *Daphnia*, all of which they like. They grow to a size of about 2½ in. As to their suitability for the community tank, some of these dwarf cichlids are and some are not. It is a matter of watching their antics for the first few days and not trusting them with small fishes. Remember, even the zebra can become a bully and it is impossible to 'type cast' every single member of a fish species as being either peaceful or war-like.

BREEDER'S NOTEBOOK

The Riddle of the *Pristella riddlei*

TO some, the X-ray fish appears to be merely plain and unattractive; to others it is warm and exciting. It is a common enough fish to purchase as a rule, though if you want it suddenly you may well find that it's going through one of its periodic disappearances. Just as suddenly, it will be about again in the aquatic shops.

I find it an attractive fish and fishkeepers who do find it pleasing have here a hardy, long-lived, peaceful but active inmate for any community tank of medium-sized fishes. It is described by several common names—in a lot of places it is referred to as the 'enamel fin', but where I live it is known as the 'X-ray fish' because of its partly transparent body in which the swim bladder can be easily detected.

It is not difficult to describe the coloration in this species, and there is really not much difference in this respect between the sexes. The transparent body has a touch of green in the upper region near the back. The dorsal fin is short and round, tipped with white with patches of black and yellow below, and held erect. The anal fin is transparent, tinted pink on occasions with the bottom edge merging into black and yellow. The eye is black with a faint iris. Caudal and ventral fins are tinted slightly pink. The females are usually larger and fuller, dipping deeper at the back from the anal fin, and when breeding are paler in colour. The male is more streamlined, with deeper colour in his dorsal and more curve to the anal. When adult, it reaches a length of 1½ to 2 in.

A good breeding pair need to be 12 to 18 months old to obtain good results. Many people consider this species to be easy to breed, but I disagree entirely with this. I would myself class them as 'hard' and I have found on occasion that they can be a difficult fish to induce to spawn. My best spawnings have come when the adult fish have been well conditioned on live foods for some weeks and then the sexes separated for 3 to 4 weeks before breeding. It breeds in the usual characin way, but it requires plenty of light (if possible, sunlight) and, as they are very swift-moving fish, a tank of size 24 in. by 12 in. by 12 in.

Delayed hatchings of up to 10 weeks from spawning are reported with this fish. I have not personally experienced such a delay, but after one spawning which produced 80 fry, the spawning tank was left empty for 3 weeks and 15 more fry suddenly appeared. These were transferred and 4 weeks later a few more were seen, 7 weeks from the original spawning. On this occasion I left the tank for 11 weeks before deciding it was safe to take it down.

Up to 200 eggs can be obtained and the fry require very fine food, such as egg yolk squeezed through fine muslin, very fine infusorians and newly hatched brine

shrimps, on which the fry will gorge themselves until they look ready to burst and the reddish-brown shrimp colour can be clearly seen in their stomachs.

Incidentally, one of the best colour contrasts I ever obtained in my fish house was when I mixed 20 young adult *Pristella* in a 3 ft. by 15 in. by 12 in. tank with the same numbers of similar sized *serpae* and *rosaceus*, which I had bred at the same time. It was really an impressive display. Another little wrinkle I have learned in connection with X-rays is that if the water is tinted slightly pink, the fish, particularly the males, become very highly coloured. It happened quite by accident when by mistake I dropped a couple of small grains of potassium permanganate into the tank; but for 3 or 4 days, while the water was tinted, the fish looked really vivid. I do not know the explanation for this, unless the dye acts as some sort of stimulant. Unfortunately, of course, the colour does not last long in the water.

The spawning set-up that I found successful was to cover the tank bottom with a good layer (some 2½ in.) of marbles or pebbles, as for barbs and danios. The spawning medium used was, in fact, upholstery packing that had been well boiled, of course, spread all over the bottom and clumped up in the middle to about half the water depth, which was some 9 in. of well-matured water topped up with fresh tap water. The temperature at the time of spawning was 78°F (25°C) and the eggs hatched at 81°F (27°C). Spawning was induced by the light of the morning and the early sun hitting the front glass of the tank. The parents should be removed as soon as possible after breeding, as they are egg-eaters, and the top of the tank shaded to prevent too much light affecting the eggs.

This species is native to Venezuela and the Guianas and is sometimes known in America by a suitably descriptive name 'the goldfinch characin'.



By J. LEE



GUPPY

World

IN guppy breeding, too many aquarists believe that they should breed with the male guppy as soon as he starts to display his colours. This stems from the misguided idea that this is a sure way to ensure he passes on 'vigour' to his future progeny.

Because the colour patterns change as the fish matures, I have even heard breeders claiming that by mating them when young they ensure that one particular colour combination will be handed on! Do these misguided folk honestly think that the genes carrying the inherent material to influence the male's offspring change with age?

If you do breed with such young fish then you might be unaware of any inherent weakness in the strain, or maybe a deformity that will only become obvious as the fish matures. When a breeder goes on, brood after brood, using such immature fish it is not surprising that much time and effort is wasted, which results in the breeder, when he does eventually allow some of the fish to reach adulthood, throwing out the strain in disgust. He then blames that whipping boy of the hobby, 'inbreeding', as the cause. When are they going to understand that inbreeding only made their mistake of improper selection obvious?

On television, colour has arrived for the masses like some many-hued guppy—the world was told to expect the sunrise and received anything but natural colour. In Britain the guppy show bench has concentrated on the shape of its fish rather than on their colour.

With 1970 promising the curtain up on 15 male outlines and seven female, the British breeders won't want for variety but, like the serpent in that other Eden, the question has

reared its head: 'Is it time for us to consider the sub-dividing of our more popular classes into colour?'

Though, I agree, some of the broadtail classes in our shows do tend to be a little overweight compared to the shorter varieties, my answer is still a definite 'no', and not without reason or experience.

This colour system has been used elsewhere in the world for some time and has only resulted in a virtual disappearance of many types of guppy. And that isn't all, it has created controversy as to when a blue guppy is no longer blue but black.

By PETER UNWIN

Then take the green group. Most of my readers who have kept these varieties know that green can merely be a matter of light angles. Heaven help our poor judges if we expect them to sort out these kinds of problems as well as what they already have.

Colour television has arrived as a costly 'con'; it could be just as expensive if we applied the same principles to the show bench.

To succeed in this world you must be prepared to change, but change with a reason for so doing and not for its own sake. One change that will soon be affecting all of us will be the introduction of the metric system—will someone crack the 4 centimetre male? (see 1974 for October, 1968, page 277).

To test just how prepared fish-keepers are for the take-over we took a cross section of all ages and asked them one question: 'What exactly is a milligram?'

The answers were a riot, though a few surprised us by getting it right. 'It's about the size of a pinhead.' 'Some kind of chart, I think.' 'Has it anything to do with the weather forecast?'

'Must be a million grams, though what a gram is is anyone's guess!'

The best answers came from two lady hobbyists: the first thought it was one of those Greetings Telegrams where you had to keep the message to a certain number of words (she thought I said 'mini-gram!'); the second said she didn't know, but, if it would help me, the regular prescription she had from the doctor 'had 100 milligrams printed on the label and the tablets were pink and ever so tiny...'

Before you, dear reader, start chuckling, and without looking it up, do you know what a milligram is? (Answer is at the foot of this page.)



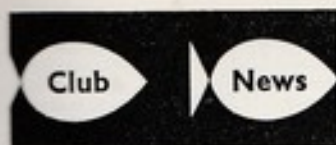
Automatic feeders for fish tanks have been slow to catch the imagination of the British hobbyist. Perhaps availability and price had something to do with it, a reason why the many so-called 'vacation blocks' have become very popular, I think.

Briefly, these consist of some binding medium having fish food embedded in it; the block slowly dissolves, releasing portions of food at regular intervals during your absence.

If you use these blocks do check that the pH of the water isn't drastically changed by them, because one we tested had just that effect. In the early days some manufacturers used plaster of Paris and I don't have to go into what those blocks did to the water.

Another point is that these feeding blocks attract the snails and soon become smothered with the creatures eagerly eating the exposed food. But this can be a blessing in disguise. One reader used the blocks to eradicate snails from his tank—he simply took the block out each day, killed the snails adhering there, and replaced his 'trap' for another haul!

Milligram: a thousandth part of a gram. If you didn't know then you need a PETFISH DIARY—it's crammed with all you need to go metric.



ALTHOUGH EALING & D. A.S. were disappointed in not quite making an award for the society tableaux at the Aquarium Show, they felt the disappointment was more than compensated for by the large number of new members who appeared at the club as a result of the Show. At recent meetings, the accent has been on 'home-grown' lectures given by club members, and topics have covered subjects such as feeding, electrics, diseases and things to make (including a very efficient power filter), as well as slide shows prepared by members. With the onset of winter, the social committee have also been getting into their stride, and a Tramps' Ball and a Fancy Dress Pantomime evening have already been great successes. A childrens' party and a dinner and dance are also planned.

The competitive side has not been forgotten and an away match was recently held with Uxbridge A.S. The home team were victorious by 88½ points to 86½, but Ealing has promised revenge at the next confrontation!

MID-SUSSEX A.S. were hosts at the annual inter-club show held with Brighton & Southern, Redhill & Reigate, Crawley and Littlehampton societies. Each club entered three exhibits in four classes, and judge Mr Cannon commented on the fine standard reached by many of the 75 entries. The best fish in the show award was won by Mr D. Soper of Mid-Sussex with a *Merymus*, in the characin class. The final pointing resulted in a win to the home team by 939 points. Brighton & Southern were second with 929½ points, Littlehampton third with 915, Redhill & Reigate fourth with 908½ and Crawley College fifth with 825 points.

There were 24 entries in the club's home aquarium competition and results were: 1, Mr J. Walker; 2, Mr A. Prior; 3, Mr D. Soper. In the junior section, first place went to Andrew Dwasniewski, second to S. Caulderbank and third to D. Ranson. Results of the club's Exhibitor of the Year competition have been announced: senior section, Mr D. Soper 643½ points, Mr J. Walker 632 and Mr C. West 624½; junior section, A. Dwasniewski 569, S. Caulderbank 266, D. Ranson, 195½. Fishkeepers interested in joining the Society should contact the secretary,

Mr J. Reeve, 36 Rumbolds Lane, Haywards Heath, Sussex.

HEYWOOD & D. A.S. held their annual show in conjunction with the Heywood Horticultural Society's show and both Societies felt that they benefited from the arrangement. Visitors to the flower show took a great interest in the fish exhibits and the display aquaria, and club members are sure that a few more prospective 'addicts' have been attracted to the fishkeeping hobby as a result. The best fish in the show award was made to Mr D. Moorcroft of Merseyside A.S. for a scot (83 points). Other results were:

A.v. fancy goldfish: 1, Mr S. Walsh (Accrington, 76); 2 and 3, Mr C. Whitney (Accrington, 75, 73). A.o.v. goldfish: 1, Master A. Kaye (Huddersfield, 72); 2, Mrs E. Davies (Heywood, 71); 3, Mr C. H. Whitney (Accrington, 62). A.o.v. coldwater: 1, Mr C. H. Whitney (74); 2, Mrs Cobb (Belle Vue, 72); 3, Master A. Kaye (Huddersfield, 68).

Guppies (male): 1 and 2, Mr W. Orton (Salford, 77, 76); 3, Mrs Cobb (75). Guppies (female): 1, 2 and 3, Mr R. Tomkinson (Glossop, 75, 74, 73). Mollies: 1, Mr M. T. Webb (Salford, 78); 2, Mr M. Jones (Valley, 77); 3, Mr J. Murray (Salford, 76). Sword-tails: 1, Mr R. Grimshaw (Sunnybrow, 70); 2, Mr F. Cobb (Belle Vue, 77); 3, Mr D. Hogarth (Salford, 76). Platys: 1, Mr M. T. Webb (Salford, 78); 2, Mr D. Trace (Ashton, 76); 3, Master I. Hepinstall (Castleford, 75).

Small barbs: 1, Miss B. Kaye (Huddersfield, 78); 2, Mr D. W. Smith (Tadcaster, 76); 3, Mr J. Murray (Salford, 75). Medium barbs: 1, Mr M. T. Webb (Salford, 77); 2, Mr M. Tomkinson (Glossop, 76); 3, Mr C. Britton (Ashton, 75). Large barbs: 1, Mr C. Britton (77); 2, Mr M. Dolman (Valley, 76). Labeos, sharks, foxes: 1, Mr F. Gates (Castleford, 70); 2, Mr M. Jones (Valley, 78); 3, Mr R. Moorcroft (Merseyside, 77). Loaches: 1, Mr F. Gates (78); 2, Mr M. Webb (Salford, 77); 3, Mr A. Gardner (Heywood, 75). Small catfish: 1, Mr Kershaw (Heywood, 77); 2, Mr M. Cobb (Belle Vue, 76); 3, Mr D. Smith (Tadcaster, 74). Large catfish: 1 and 2, Mr F. Gates (Castleford, 70, 76); 3, Mr J. Lord (Valley, 75).

Anabantids: 1, Mr M. Cobb (Belle Vue, 78); 2, Mr J. Boswell (Top Ten, 76); 3, Mr B. Dawson (Oldham, 75). Fighters: 1, Mr A. Whitlock (Tadcaster, 79); 2, Mr A. Newall (Glossop, 77); 3, Mr J. Lord (Valley, 76). Cichlids (small): 1, Mr M. Webb (Salford, 78); 2, Mr J. Boswell (Top Ten, 77); 3, Mr D. Smith (Tadcaster, 76). Cichlids, large: 1 and 2, Mr E. Ormesher (Southport, 80, 78); 3, Mr J. Mooney (Glossop, 77).

Characins (small): 1, Mr M. Tonge (Oldham, 78); 2, Mr B. Dawson (Oldham, 77); 3, Mr M. Jones (Valley, 76). Characins (medium): 1, Mr M. Webb (Salford, 78); 2, Mr K. Daniels (Merseyside, 76); 3, Mr A. Birchall (Sunnybrow, 74). Characins, large: 1, Mr R. Adamson (Independent, 80); 2, Mr K. Daniels (Merseyside, 77); 3, Mr A. Gardner (Heywood, 76). Toothcarps: 1, Mr W. Orton (Salford, 78); 2, Mr D. Smith (Tadcaster, 77); 3, Mr M. Tonge (Oldham, 76). Danios: 1, Mr F. Campbell (Bury, 77); 2, Master I. Hepinstall (Castleford, 76); 3, Mr D. Hogarth (Salford, 75). Rasboras: 1, Master D. Foster (Rochdale, 77); 2, Mr M. Jones (Valley, 76); 3, Mr R. Moorcroft (Merseyside, 75).

Breeders livebearers: 1, Mr M. Cobb (BelleVue, 80); 2, Mr A. Gardner (Heywood, 77); 3, Mr R. Tomkinson (Glossop, 76). Breeders egglayers: 1, Mr S. Walsh (Accrington, 78); 2, Mr G. Kershaw (Heywood, 77); 3, Mr D. Smith (Tadcaster, 76). Pairs livebearers: 1, Mr A. Steer (Stretford, 80); 2, Mr D. Hogarth (Salford, 79); 3, Mr A.

Gardner (Heywood, 77). Pairs egglayers: 1, Mr M. Cobb (Belle Vue, 79); 2, Mr G. Kershaw (Heywood, 78); 3, Mr M. Webb (Salford, 77). A.o.v. tropical: 1, Mr R. Moorcroft (Merseyside, 81); 2, Mr J. Mooney (Glossop, 79); 3, Mr A. Whitlock (Tadcaster, 78). Juniors a.v. tropical: 1, Master D. Moorcroft (Merseyside, 80); 2, Master I. Hepinstall (Castleford, 79); 3, Master A. Kaye (Huddersfield, 76). Juniors a.v. coldwater: 1, Master N. Wallbank (Accrington, 74); 2, Master F. Cobb (Belle Vue, 73); 3, Master K. Miller (Heywood, 79).

SEVERAL important events closed 1969 for BETHNAL GREEN A.S. First was the A.G.M., at which the following officers were elected: chairman, Mr J. Gower; secretary, Mr P. Arnould; show secretary, Mr A. Davis; assistant, Mr J. Coombs; treasurer, Mr J. Hayes; P.R.O., Mr A. Collings (11 Arrowsmith Road, Chigwell, Essex); committee, Mr T. Newman, Mr W. Williams, Mr J. Adams, Mr P. Brindley. This was followed by the Society's first annual dinner and dance and it was so successful that it is sure to become a part of the club's annual programme. The highlight was the presentation of the year's trophies by the Society's resident lecturer, Mr Frank Tomkin. Members also visited Independent A.S. for a return inter-club table show and while Mr Baker was judging the 24 fish benched (three fish in four classes for each team), members were competing in a Criss-Cross quiz. A most enjoyable evening for Bethnal Green, since not only were they the victors in the quiz but they were also winners of the table show by 25 points to 15.

NEWS from WARRINGTON A.S. lists a number of interesting lectures that the club has enjoyed in recent months. Secretary Mr A. Addison gave a talk on the accessories used with the aquarium and demonstrated this with a comprehensive range of filters, heaters, thermostats and pumps. An interesting discussion took place on what equipment was really necessary and best suited to the aquarist's needs. At another meeting, the 'Braz Walker Show' was enjoyed but difficulties with the sound track marred the presentation. At a later meeting, Mr J. Wooton, a club member, gave a talk on the animal kingdom. Recent table show results have been:

Pairs, tropical egglayers: 1 and 3, Mr B. Philcock; 2, Mr B. Bewick. Pairs, tropical livebearers: 1, Mr M. Baker and Mr C. Macklyn; 3, Mr B. Bewick. Guppies: 1 and 3, Mr H. Greenall; 2, Mr and Mrs Clarke. Mollies: 1, Mr B. Bewick; 2, Mr L. Crawford; 3, Mr M. Baker. A.o.v. coldwater: 1, 2 and 3, Mr J. Wooton.

THE BRISTOL T.F.C. annual general meeting was held at the end of a very successful season, the highlight of which was held to be, without any doubt, the 1969 Open Show.

It was reported that this had attracted a record number of high standard entries and a committee has now been formed to organise the 1970 show. Show secretary is Mr E. Newman (71, Somerdale Avenue, Knowle, Bristol 4) and further details will soon be announced. Officers elected for the year are: chairman, Mr L. Littleton; vice-chairman, Mr A. Kimber; secretary, Mr W. Holland, assistant, Mr C. McGrath; treasurer, Mr R. Toozie; reporting secretary, Mr R. Chapman (4, Howcroft Court, Eastmead Lane, Stoke Bishop, Bristol 9); programme officer, Mr K. Gale; librarian, Mrs P. Chapman. Award winners for the 1969 table shows were—open section, Mr F. Brown; novice section, Mr J. Smith.

It was reported that many very capable speakers had visited the club during the season and a varied selection of films were shown. A coach outing to London for The Aquarium Show in London proved very popular with members and friends and it is hoped similar visits will take place during 1970. An invitation is extended to visitors and prospective new members to attend monthly meetings (held on the third Tuesday of the month at the Swan Hotel, Stokes Croft, Bristol 1 at 7.30 p.m.).

SECRETARY of the FANCY GUPPY ASSOCIATION Mr Fred Campbell sends us the following report on the combined Open Show and Christmas Party of the MANCHESTER SECTION of the F.G.A.

"The best laid schemes of mice and men gang aft agley". Once more the immortal words of Robert Burns were prompted by the mortal operation of British Rail. Jim Kelly, who delights in conducting the fun and games, had spent a great deal of time and trouble in preparing the programme. Unfortunately, when the festivities should have been starting he was on Piccadilly station awaiting the train from London, which was conveying the Radlett contingent. It eventually arrived one hour and 20 minutes behind schedule. Just in time to prevent the guests from getting restless, however, another train capably driven, or should I say conducted, by Sam Croft, wound its way into the hall. It consisted of 20 units and, as it came to a halt, each one displayed a lettered card which announced collectively that they were the 'Birmingham Section F.G.A.'. At the same time they began chattering out the age-old greeting 'We wish you a Merry Christmas and a Happy New Year'. A wonderful idea, perfectly carried out. Thank you Birmingham!

A QUERY raised by Mr R. L. Poulter in the Koi Newsletter No. 4 concerns the difficulty of obtaining pure blue koi. Mr Poulter writes: 'I have never seen a pure blue koi to date. One must conclude that Japan is keeping such fish to herself. I would be very interested to learn if anyone has obtained one yet. I have four beautiful examples of blue but they all have red or some other colour in addition to the blue.' Anyone interested in the formation of a National Koi Club should write to Mr K. D. Fawcett, Fantasy Pet Products Ltd, 13 Nottley Lane, Reigate, Surrey.

"The Radlett party arrived shortly afterwards and the festivities were quickly in full swing. The highlight of the proceedings was undoubtedly the powers revealed by the Indian mystic "The Great Fag" and the audience were spellbound at his extra-sensory perceptiveness.

"The Show, too, was a tremendous success, no less than 250 entries being benched. Very creditable when one considers the late date and the vagaries of the weather. The advantage of being able to use a separate room for the show and exclude all but show staff and judges until after judging was fully demonstrated. Unfortunately, with a Christmas Party going on, the workers tend to become "out of sight out of mind" and, as the wine flowed our concern for their welfare was inclined to ebb. I am sorry, they must have done a great job, as they invariably do."

MANY members of **HOUNSLOW & D.A.S.** may well be keeping terrapins after the interesting and detailed talk given by the Society's new chairman, Mr Barry Abbott, on this subject. The table show was for labyrinths and was won by Mr Bert Pratt with a giant gourami (75 points); 2, Mr John Basham (dwarf gourami, 71); 3, Mrs Rona Brewer (thick-lip gourami, 72). At its A.G.M. the Society heard the officers report on a successful year. Club meetings and social events had been well attended and the club could look forward to another year of growth. Officers elected were: secretary, Mr Derek Woodward (14, Uxbridge Road, Hanworth, Middlesex); treasurer, Mr Harold Woodward; show secretary, Mr Bert Pratt; Press secretary, Mr John White; librarian, Mr Eric Sheppard; P.R.O., Mrs Rona Brewer; entertainments officer Mr Bob Nelhams; floor members, Mr Dave Brooks, Mr Ted Dorrell.

SWILLINGTON A.S. prepared for their home furnished aquarium

competition by arranging for a lecture to be given on the subject on a club night. The competition itself was judged by Mr J. Skinner and won by Mr D. Dickson, who received the Jeff and Marjorie Skinner Trophy. Mr C. Batty came second and Mr A. Crowther third. The Society has also held its fourth members' table show. Results of this were:

Furnished jars (Leeds trophy): Mr and Mrs Stringer; 2 and 3, Mr Peter Reynolds. Lovelace's pairs (Swillington trophy for Lovelace's pairs): Mr H. Wemble; 2, Mr Paul Reynolds; 3, Mr M. Crowther. Egg-laying pairs (Swillington trophy for egg-laying pairs): 1 and 2, Mr A. Crowther; 3, Mr L. Longfellow. Clays and minnows (G. & M. Birds trophy): 1, Mr L. Longfellow; 2, Mr H. Wemble; 3, Mr and Mrs Stringer. L.O.S. (S. A. Pullan trophy): Mr Peter Reynolds; 2 and 3, Mr Paul Reynolds. Mr Longfellow also received the Best in the show award for the red-tailed black shark he entered.

FROM the report given by **SOUTH-END, LEIGH & D.A.S.** on their activities at the end of 1969, it would seem that club members are enjoying a very active winter season. As a result of winning the inter-club competition held with East London and Thurrock A.S. the gavel and block trophy will remain in the Society's care for the coming year. Although members were not successful in winning the inter-club competition held with Billericay, Blackwater and Witham they achieved 31 points and came third. The home furnished aquarium competition has been held and was won by Mr Malcolm Upton (2, Mr A. Russell; 3, Mr Don Finch). Lectures have included one by Mr D. Cheswright and Mr D. Edwards on cold-water management and a demonstration by Mr Cheswright on setting up an aquarium. A talk on breeding was given by Mr Bob Wallings and Mr F. F. Capon.

At the A.G.M., members heard that the Society now has over 90 members. Officers elected were: president, Mr D. Edwards; vice-president, Mr R. Passmore; secretary, Mr J. Norris (58 Leigh Cliff Road, Leigh-on-Sea, Essex); treasurer, Mr D. M. Cheswright; journal editor, Mr P. F. Capon; assistant, Mr R. D. Orford; librarian, Mr R. Nield; assistant, Mr L. Mitchell; P.R.O., Mr R. Wallings; table show secretary, Mr D. Finch; refreshment secretary, Mr R. and E. Blossham; committee member, Mr S. Norris.

35 SOCIETIES were represented among the 496 entries benched at the eighth annual open show held by **AIREBOROUGH & D.A.S.** Heading the points table at the end of the show was Aireborough itself with 69 points, Castleford with 54, Bradford with 20 and Salford with 19.

The classes were judged by Mr W. Catmull, Mr M. Jones, Mr A. M. Deakin, Mr B. Inman, Mr J. M. Skinner and Mr G. Holmes and the following awards were made:

Inter-society furnished aquaria (3 entries): 1, Halifax A.S. (set up by Mr D. Fryer, who received Peate's Challenge shield and A.D.A.S. Special Award); 2, Nelson A.S.; 3, Aireborough & D. A.S.

Novice classes (125 entries). A.V. livebearer (17): 1, Mr L. Hepinstall (Castleford, 75); 2, Mr K. Marshall (A.D.A.S., 73); 3, Mrs Brothwood (Merseyside, 71). A.V. barb (8): 1, Mr L. Hepinstall (C'ford, 75); 2, Mr R. Hepinstall (73); 3, Mr A. Baldwin (Nelson, 76). A.V. characin (10): 1, Mr M. Dwyer (A.D.A.S., 76); 2, Mr P. Chorley (Bradford, 74); 3, Mr and Mrs Batten (C'ford, 73). A.V. cichlid (15): 1, Mr R. Whitaker (Privateers, 77); 2, Mrs A. Carey (York, 73); 3, Mr C. Thompson (A.D.A.S., 74). A.V. anabantid (21): 1, Mrs Brothwood (Merseyside, 74); 2, Mr C. Mallaby (Mount Pleasant, 72); 3, Mr J. Christopher (Rotherham, 71). A.V. carp and minnow (17): 1, Mr R. Hepinstall (C'ford, 71); 2, Mr M. Colley (Independent, 74); 3, Mr B. Conlon (Selby, 72). A.V. catfish and loach (21): 1, Mr E. Wells (L'ncaster, 76); 2, Mr G. E. Cuff (Lincoln, 74); 3, Mr A. Baldwin (Nelson, 73). A.O.V. (7): 1, Master J. Moorhouse (Bradford, 79); the Councillor Alderman Wm. Hudson Cup for highest pointed novice exhibit and A.D.A.S. Special Award; 2, Mrs E. Asquith (C'ford, 74); 3, Master J. Moorhouse (70).

Breeders classes (37 entries). Livebearers: guppies: 1, Mr and Mrs F. Buxton (Barnsley, 71); 2, Mr H. Gardner (A.D.A.S., 70); 3, Mr R. V. Brothwood (Merseyside, 69). Platys: 1, Mr and Mrs Hogarth (Salford, 70); 2, Mr H. Gardner (A.D.A.S., 67). Swordtails: 1 and 2, Mr P. Reynolds (Swillington, 72, 71); 3, Mr H. Gardner (A.D.A.S., 68). A.O.V.: 1, Mr L. Kaye (Top Ten, 73); K. J. Bateman Cup for highest pointed breeders livebearer exhibit and A.D.A.S. Special Award; 2, Mr E. F. Hunt (A.D.A.S., 70); 3, Mr H. Gardner (A.D.A.S., 69).

Egglayer classes (23 entries). Barbs: 1 and 2, Mr and Mrs Cohen (C'ford, 73, 71); 3, Mr and Mrs Buxton (Barnsley, 72). Characins: 1, Mr and Mrs Cohen (C'ford, 73); A. D. Lawson Cup for highest pointed breeders egglayer exhibit and A.D.A.S. Special Award; 2, Mr and Mrs F. Buxton (Barnsley, 74); 3, Mr and Mrs Healey (Barnsley, 72). Cichlids: 1, Mr J. A. Whiteley (A.D.A.S., 70); J. & R. Robinson Trophy to the exhibitor gaining most points; 2, Mr G. Monk (A.D.A.S., 69); 3, Mr and Mrs Webb (Salford, 68). Anabantids: 1, Mr J. Wright (Alfreton, 74); 2, Mr and Mrs Cohen (C'ford, 73); 3, Mr O. Tate (Nelson, 76). Carps and minnows: 1 and 2, Mr and Mrs Hogarth (Salford, 72, 70). Catfish, loach and a.o.v.: 1, Mr G. E. Cuff (Lincoln, 72); 2, Mr P. Reynolds (Swillington, 70).

Advanced classes (131 entries). Guppies (11): 1, Mr R. V. Brothwood (Merseyside, 70); G. E. and K. Walker trophy for highest pointed livebearer exhibit; 2, Mr R. Taylor (A.D.A.S., 77); 3, Mr R. V. Brothwood (76). Platys (17): 1 and 2, Mr D. Sewell (Rainsworth, 74, 73); 3, Mr and Mrs Webb (Salford, 70). Swordtails: 1, Mr A. Hudson (Wakefield, 74); 2, Mr and Mrs Cohen (C'ford, 73); 3, Mr P. Reynolds (Swillington, 71). Mollies (6): 1, Mr L. Kaye (Top Ten, 73); 2, Mr J. A. Whiteley (A.D.A.S., 72); 3, Mr and Mrs Hogarth (Salford, 70). A.O.V. livebearer (8): 1, Mr and Mrs J. Robinson (A.D.A.S., 76); 2, Mr G. Monk (A.D.A.S., 74); 3, Mr P. Reynolds (Swillington, 71). Siamese fighters (14): 1 and 2, Mr R. V. Brothwood (Merseyside, 77, 72); 3, Mr and Mrs Cohen (C'ford, 76). A.O.V. anabantid (27): 1, Mr W. Selby (Notts & D., 77); 2, Mr L. Kaye (Top Ten, 76); 3, Mr D. Sewell (Rainsworth, 74). Dwarf cichlids (18): 1, Mr J. Brooking (Wakefield, 82); 2, Mr J. A. Whiteley (A.D.A.S., 81); 3, Mr P.

Carey (York, 79). Angel fish (8): 1, Mr J. A. Whiteley (A.D.A.S., 81); 2, Mr J. A. Stretton (A.D.A.S., 79); 3, Mr M. Allsop (Alfreton, 73). A.O.V. cichlid (3): 1, Mr and Mrs Howard (Barnsley, 83); 2, Mr R. Taylor (A.D.A.S., 82); 3, Mr D. Sewell (Rainsworth, 76). Small barbs (17): 1 and 3, Mr J. A. Whiteley (A.D.A.S., 78, 75); 2, Mrs J. Tonge (Oldham, 76). A.O.V. barb (4): 1, Mr J. A. Whiteley (A.D.A.S., 76); 2, Mr C. Britton (Ashton, 75); 3, Mr P. Carey (York, 74). Small characins (13): 1, Mr and Mrs Buxton (Barnsley, 72); 2, Mr B. Dawson (Oldham, 76); 3, Mr J. Wright (Alfreton, 69). Flying foxes and sharks (13): 1, Mr and Mrs F. Gates (C'ford, 73); 2, Mr A. Hudson (Wakefield, 74); 3, N. & V. Fearn (Stocksbridge 73). Rasboras, danios and minnows (17): 1, Mr J. Wright (Alfreton, 74); 2, Mr R. Taylor (A.D.A.S., 71); C. & N. Raybould (Rotherham, 70); Corydoras catfish (15): 1, Mr R. Taylor (A.D.A.S., 82); 2, Mr A. Baldwin (Nelson, 78); 3, Mr and Mrs Hogarth (Salford, 75). A.O.V. catfish (9): 1, Mr F. Pullman (Stockton, 70); 2, Mr P. Carey (York, 78); 3, Mr and Mrs F. Gates (C'ford, 77). A.V. loach (18): 1, Mr and Mrs Zaminus (Bradford, 76); 2, Mr and Mrs J. Robinson (A.D.A.S., 73); 3, N. & V. Fearn (Stocksbridge, 72). A.O.V. (8): 1, Mr D. Kennedy (Bradford, 83); 2, Mr C. Britton (Ashton, 76); 3, Mr L. Hepinstall (C'ford,

75). Pairs livebearers (10): 1, Mr and Mrs Webb (Salford, 74); 2, Mr G. Monk (A.D.A.S., 73); 3, Mr and Mrs Hogarth (Salford, 70). Pairs egglayer (26): 1, Mr M. Tonge (Oldham, 75); Whitehouses Pet Emporium Ltd trophy for highest pointed exhibit of pairs; 2, Mr and Mrs Webb (Salford, 74); 3, Mr and Mrs Healey (Barnsley, 73). Common goldfish (1): Mr R. Lister (A.D.A.S., 72). Fancy goldfish: 1, Mr P. Moorhouse (Bradford, 84); 'Magnificent 18' trophy for highest pointed advanced exhibit, A.D.A.S. Special Award and highest pointed fish in show award; 2, Mr G. Thickbroom (C'ford, 72); 3, Mr M. Cole (Swillington, 71). A.O.V. coldwater fish (6): 1 and 2, Mr J. Hooper (Bradford, 75, 71); 3, Mr J. Kay (A.D.A.S., 67). Furnished mini-jars: 1, Mr J. Greenwood (Halifax, 72); 2, Mr B. Mignion (A.D.A.S., 70); 3, Mr I. Kovacevic (Halifax, 69). Aquarium plants: 1, Mr J. Greep (A.D.A.S., 76); 2, Mr J. Kay (A.D.A.S., 74); 3, Mr and Mrs Webb (Salford, 73). A.O.V. characin (8): 1, Mr G. Monk (A.D.A.S., 76); 2, Mr B. Eyre (Worksop, 72); 3, Mr J. A. Whiteley (A.D.A.S., 71). Toothcarps (19): 1, Mr W. Batley (B.K.A., 79); 2, Mr M. Tonge (Oldham, 72); 3, M. & A. Crowther (Swillington, 71). A.V. marine fish (1): Mr V. Fletcher (Worksop, 62).

Dates for Your Diary

22nd February. **ROTHERHAM & D. A.S.** Open Show. Drill Hall, Fitzwilliam Road, Rotherham. Schedules from Mrs C. Raybould, 52 Dovercourt Road, Masbro, Rotherham.

1st March. **KEIGHLEY A.S.** Open Show. Details from Mr B. White, 1 Moss Carr Road, Long Lee, Keighley.

8th March. **Huddersfield T.F.S.** Open Show. Cambridge Road Baths, Huddersfield, Yorks. Details from Mr M. Bone, 1 Bradshaw Drive, Holnley, Huddersfield HD7 2EU.

21st March. **EAST DULWICH A.S.** second Open Show. St Barnabas Parish Hall, Dulwich Village, London, S.E. 21. Details to be announced.

29th March. **NELSON A.S.** Open Show. Nelson Civic Centre, Stanley Street, Nelson. Schedules from Mr B. Tate, 12 Priory Close, Bingley, Yorks.

18th April. **THURROCK A.S.** third Open Show. Show secretary, Mr D. Durrant, 22 Kingsman Road, Stanford-le-Hope, Essex.

how?

How can I ensure a regular supply of food for my newly born fish when away from home?

MAKE a drip feeder from an old pickle jar or small aquarium. Any container that will hold water will do provided that it will fit over your tank. Filled with water containing either Infusoria or a mixture of water and any of the manufactured liquid or powdered fry foods on the market, the container is suspended above the nursery tank.

The solution is fed to the aquarium via a 'U' tube made from stiff plastic and rubber or plastic hose—rate of drip can be controlled by a clamp on the siphon tubing leading into the larger aquarium.

To keep the food mixture well agitated, thus ensuring a regular supply of food to the waiting mouths, try using an air stone with just a mere trickle of air issuing from it; placed in the supply jar this will keep things moving. Be sure to see that the end of the siphon is down below the surface of the liquid.

After starting the siphon and controlling the rate and amount of drip into the fry, all you have to do by way of maintenance is to keep the liquid topped up from time to time. Experiment will soon show you how long your supply will last.

24-26th April. **STOCKTON-ON-TEES A.S.** Open Show. St Peter & Paul's School, Durham Road (A177), Stockton-on-Tees. Schedules from Mr K. Clonnet, 25 Thames Avenue, Thornaby, Teesside.

3rd May. **DERBY REGENT A.S.** Open Show. Sherwood Foresters Recreation Centre (Normanton Barracks), Normanton Park Road, Derby (follow R.A.C. signs).

3rd May. **CROYDON A.S.** Open Show. Stanley Hall, South Norwood Hill, South Norwood, London, S.E.25.

3rd May 1970. **BURY & D.A.S.** Open Show.

9th May. **MIDWAY A.S.** Open Show (provisional).

10th May. **ASSOCIATION OF YORKSHIRE A.S.** Open Show. Details to follow.

10th May. **ACCRINGTON & D.A.S.** Open Show. St John Ambulance Hall, Bull Bridge, Accrington. Bunching 12-2 p.m. Details from Mr C. Whinney, 42 Lywood Road, Blackburn.

10th May. **SOUTHEND, LEIGH & D.A.S.** Open Show. St Andrews Hall, Electric Avenue, Writchell-on-Sea, Essex. All enquiries to Mr M. V. p.m., 12 Merrivale, Basildon, Essex (South Basildon 3441).

10th May. **UXBRIDGE & D.A.S.** Open Show. Meadow School, Royal Lane, Hillingdon, Uxbridge. Schedules from Mr N. V. Lee, 46 Airedale Road, Ealing, London W.3.

10th May. **COVENTRY P. & A.S.** Open Show. Foleshill Community Centre, Coventry. For show schedules, send a.a.c. to Mr S. Woodbridge, 32 Ridgeway Avenue, Coventry, CV3 5BP.

7th June. **LINCOLN & D.A.S.** Open Show. Details to follow.

11th June. **LLANTWIT MAJOR A.S.** Open Show. Town Hall, Llantwit Major, Glam.

14th June. **BOURNEMOUTH A.C.** Open Show. Kinross Community Centre, Bournemouth.

14th June. **LOUGHBOROUGH & D.A.S.** third Open Show. Town Hall, Market Place, Loughborough. Schedules will be available from Mr I. Parry, 91 Poplar Road, Loughborough, Leics.

21st June 1970. **SWILLINGTON A.S.** Open Show.

25-27th June. **BRISTOL T.F.C.** Open Show. Congregational Church Hall, Newton Street (off Stapleton Road), Bristol 4. Details from Mr E. Newman, 71 Somerdale Avenue, Knowle, Bristol 4.

28th June. **NORTHWICH & D.A.S.** Open Show.

28th June. **ALFRETON & D.A.S.** Open Show. Albreton Hall, Albreton, Derby. Details from Mr S. Hill, 35 South Street, Hiddings, Derby.

9th July. **HIGH WYCOMBE A.S.** Open Show. West Wycombe Hall, West Wycombe, Bucks.

7th July. **LYTHAM A.S.** Open Show. Louthor Pavilion, Louthor Gardens, Lytham, Lancs.

11th July. **BASINGSTOKE & D.A.S.** Open Show. Details from Mr A. Hales, 35 Bounty Road, Basingstoke, Hants.

12th July. **GRANTHAM & D.A.S.** first Open Show. Guildhall, St Peter's Hill, Grantham. Schedules available mid-February from Mr S. Paver, 59 Alexander Avenue, Newark, Notts.

19th July. **BARNESLEY T.F.S.** Open Show. Venue to be arranged.

22nd October-2nd November. **THE AQUARIUM SHOW '70.** Royal Horticultural Society Old Hall, Vincent Square, London, S.W.1.

Make a note of your date in the PETFISH AQUARIST'S DIARY for 1970—available from 22nd's office, 7s post free.

Classified ADVERTISEMENTS

AQUATIC SUPPLIERS

OVER 120 VARIETIES tropical, marine and pond fish—for personal shoppers only. Kingfisheries, 308 Croydon Road, Beckenham, Kent. Phone 01-650 3716. Closed Wednesdays.

MALDON AQUARIA (Mr G. F. Yallop). Varied stock of fish, plants. Tubifex, 10-6.0 except Wednesday. 191 High Street, Maldon, Essex.

PLYMOUTH TROPICALS for your fish, plants and equipment. North Hill Nurseries, Tavistock Road, Plymouth. Phone 62663.

OLDBURY'S OF CHESTER. 100 varieties tropical fish, freshwater and marine. 40 varieties plants. Equipment. Live foods. Evenings after 7 p.m. Weekends 2 to 6 p.m. 36 Pearl Lane, Vicars Cross, Chester 41671.

CLASSIFIED ADVERTISEMENTS

Rates: 8d. per word (minimum charge 8s.); Box no. 2s. extra if required. Remittance with order to be sent to **PetFish Monthly**
554 Garratt Lane, London, S.W.17

HYLANDS FARM, TROPICAL FISH

For a large selection of healthy fish and aquarium plants displayed in 50 show tanks. Full range of equipment including Geolux Lighting Kits, Jewel Gem, stainless steel, angle iron and Hyware tanks; coloured gravel, glass rocks, books, Tubifex fresh weekly. Closed Mondays and Thursdays; open Wednesdays and Fridays 10 a.m.-6 p.m.; Tuesdays, Saturdays and Sundays 10 a.m.-6.0 p.m. Hylands

Farm, Dunmow Road, near Thaxted, Essex (situated on the A.130 road). Phone Great Easton 314.

YOUR ESSEX DEALER for tropical fish, plants and equipment. Reptiles and terrapins when available. Billericay Aquatics, 15 Radford Way, Billericay, Essex (adjacent station). Open Sunday mornings. Billericay 2865.

WE ARE EXPANDING: with the great success of our water gardens, we are now expanding to Tropical Fish. Over 100 tanks. Hundreds of good quality fish will soon be for sale. Also plants and all equipment. Opening early in the New Year. Stainers Water Gardens, North Street, Martock, Somerset. Phone Martock 3331

PLEASE MENTION PETFISH MONTHLY when replying to advertisers.

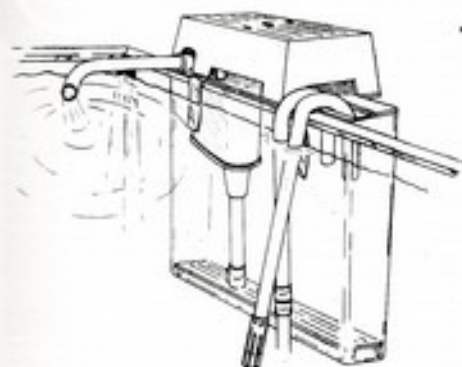
Continued on page 464

ACUREL[®] Q for WHITE SPOT, fungus and algae
NOW IN CAPSULE FORM, 10 accurate easy to
administer dosages. Retail 6/9d.

Bioquatic Laboratories: 161 Rustlings Road, Sheffield S11 7AD.



THE SENSATIONAL NEW MOTOR FILTER



The POWERSTREAM SLIMLINE

Sensational Design

- Circulates about 40 gallons of water per hour
- The motor is located on top of the filter—where it ought to be
- A cover integral with the motor on the filter body

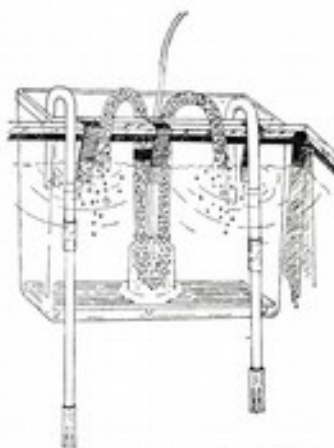
Sensational Price—129/- complete

The POWERSTREAM CONVERSION UNIT

Sensational Concept

- Can be used to make a power filter out of most air-operated outside filters—ideal for the Inter-Pet Airstream range
 - Can be fitted to Undergravel Filters
 - Pumps about 40 gallons per hour
- Sensational Price—136/- for the unit
- Combined with the Airstream Super Twin ► a BIG Power Filter for 165/9

AVAILABLE ABOUT THE END OF JANUARY



This is the Airstream Super-Twin with the big box. **29/6d.**

All spares readily available—at reasonable prices
British designs by Dr. J. N. Carrington—Made in England by INTER-PET
Write to us for further details

Available through your dealer, or in case of difficulty post free from:

INTER-PET · DORKING · SURREY

Tel: Dorking 3202/3



"I saw your advertisement in PFM"

ACUREL® F A GREAT NEW CONCEPT IN aquatic environmental control. Clears cloudy and green water, improves filter capture efficiency by over 500%. Keeps decorative aquaria crystal clear. HARMLESS TO FISH AND PLANTS. Bioaquatic Laboratories: 161 Rustlings Road, Sheffield S11 7AD. Retail 8/6d.



Classified ADVERTISEMENTS (continued)

EQUIPMENT

LARGE AQUARIA FRAMES, STANDS, SHADES. 1 x 1 x 1/2 in. steel angle: 36 1/2 x 15 x 12 in., 29s; 42 x 15 x 12 in., 36s. 1 1/2 x 1 1/2 x 1/2 in. steel angle: 48 x 15 x 12 in., 46s; 48 x 15 x 15 in., 50s; 48 x 18 x 15 in., 54s; 60 x 15 x 12 in., 55s. Stands to take 2 tanks, 37 x 12 x 36 in. high, 50s; 42 1/2 x 12 x 36 in., 58s; 48 1/2 x 12 x 36 in., 62s; 48 1/2 x 15 x 36 in., 68s. Aluminium shades 36 1/2 x 12 in., 30s; 36 1/2 x 15 in., 36s; 42 x 12 in., 40s; 48 x 12 in., 46s; 48 x 15 in., 50s; 60 x 12 in., 57s. Shades sent only with frames or stands. Carr. paid. Money back if not satisfied. Any size to order. List, s.a.c., Hockney Engineers, Derwent Place, Leeds 11. Phone 25061.

SHOW JARS. New glass show jars with screw tops, for carrying fish and showing: 4 in. square - 6 in. deep, 7s 3d each; 4 1/2 in. square 10 in. deep, 4s. Reduction for quantities. Collection only, PFM Offices.

BIND your copies of PETFISH MONTHLY as you receive them. Binders 20s (53) each post free from PFM offices.

RUSTPROOFED AQUARIA, ornamental stands, glazing cement. Equipment manufacturers: s.a.c. Westbys, Barton, Ormskirk.

FISH

SUPERB VEILTAIL GUPIES. Awarded 'Water Life' diploma. Best in open show £1 per pair, carriage 9s. C. R. Perry, Professional Aquarist, 615 West Street, Crewe.

MARINE LOVERS. They say it is unusual for Moorish Idols to feed in captivity. Edal and her five ladies-in-waiting don't seem to have heard this statement. The only food problem they create is acquiring enough frozen prawns and spinach. Why not pay us a visit? There's lots to talk about at The

Sea of Tranquility. Phone any time for an appointment until 9.0 p.m. 01-959 6050.

REPTILES

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

WATER PLANTS

PERRY'S FOR PLANTS. 1st and 2nd Awards British Aquarists' Festival. Assorted selections tropical or cold, 7s 6d, 10s 6d, 12s 6d. *Vallisneria spiralis*, *S. natans*, 6s doz. *Cryptocoryne beckettii*, *willinkii*, *haerrelliana*, 2s 6d each, six assorted 10s. Water wisteria, giant hygrophila, 2s 6d. Post 1s. All advertised accessories. C. R. Perry, Professional Aquarist, 615 West Street, Crewe.

WATER GARDEN CENTRE requires for the 1970 season all types of aquatic plants—lilies, coldwater, tropical, marginals, oxygenating bunches. Large and small quantities. State types, prices and when available to Box no. 105.

MISCELLANEOUS

BADGES. Every Society needs bright enamel badges. For best service and quality contact R. E. V. Gomm Ltd., 14-15 Frederick Street, Birmingham 1.

DRIED SHRIMP MEAL, fine, medium, coarse. Small whole dried shrimps, Daphnia, 28 lb. minimum. Prices on application. H. E. Daniel Ltd. London, S.E.19.

TROPHY PRODUCTS have now moved to new, extensive warehouse and workshop premises. New address and head office is: Laurence Drive, Stover Trading Estate, Yate, Nr Bristol.

WE ARE TUBIFEX specialists. This means we offer fresh, clean and, equally important, regular supplies of live Tubifex throughout the year. Prices are as follows. Min. order 3 lb. @ 6s 8d per lb.; 4 lb. @ 6s per lb.; 20 lb. @ 5s per lb. Trade only. Carriage extra. Cheque or P.O. with orders please to: North Thames Products, 97 Elderfield Road, Clapton, London, E.5.

WHITE WORM BY WEIGHT. 1 oz. 6s 6d, 2 oz. 11s, 4 oz. 20s, 8 oz. 37s 6d. Post paid, C.W.O. Activated worm compost, 6 lb for 20s. V. J. Dene, Denford Aquatics, Alcester Road, Portway via Alvechurch, Worcs.

BOOKS

1969 F.B.A.S. SHOW FISH GUIDES and Technical Information, 24 pages, 2s 6d post free. PetFish Publications, 554 Garratt Lane, London, S.W.17.

F.B.A.S. SHOW STANDARDS for Cultivated Tropical Fish, 24 pages, 2s 6d post free. PetFish Publications, 554 Garratt Lane, London, S.W.17.

PERSONAL

TO MR AND MRS LEN SMITH 2 Mercers Road, Holloway, London, N.19, a daughter, Alison.

Post Mortem Examination

W. HAROLD COTTON, F.R.M.S., Ichthyonomist, post mortem examination of tropical and coldwater fishes. Specimens should be wrapped loosely and very wet in grease-proof paper, surrounded by a damp cloth and then re-wrapped in dry grease-proof paper and sent in strong container. A brief history and any relevant details should be given. No preservatives please. Examination fee 5s. 39 Brook Lane, Kings Heath, Birmingham 14. Phone: 021-444 1693.

FOR HEALTHY TROPICAL FISH AND WELL ESTABLISHED PLANTS

—AND A VERY COMPREHENSIVE STOCK OF AQUARIUMS AND ACCESSORIES

WINGATE 7 MARKET STREET WINCHESTER



Main stockists of JUVEL and GEM aquariums. Retail and Wholesale

Phone 2406



ELECTRICAL
AQUARIUM
EQUIPMENT

**ALL-BRITISH
POWER WITH ECONOMY**



The **PET CRAFT**
TRADE MARK

A.4420

AQUARIUS HIGH VOLUME **AIR PUMP**

* BRITISH MADE * Over 35% more
power than any other pump at the price
price **63/-**
From your Pet or Aquarist Store



PET ACCESSORIES

Manufactured and Distributed by **THOMAS'S LTD SHELF HALIFAX** 0422 21171

"I saw your advertisement in PFM"

CHOICE IN POWER FILTERS
MEANS

EHEIM

POWER FILTERS

- EHEIM 388** COMPACT
FRESHWATER
- EHEIM 388** COMPACT
SEAWATER
- EHEIM 386** SINGLE
FRESHWATER
- EHEIM 386** SINGLE
SEAWATER
- EHEIM 387** DOUBLE
FRESHWATER
- EHEIM 387** DOUBLE
SEAWATER
- EHEIM 476** MAJOR
FRESHWATER
- EHEIM 476** MAJOR
SEAWATER
- EHEIM 486** SUPER
FRESHWATER
- EHEIM 486** SUPER
SEAWATER
- EHEIM 586**
POWER
MASTER
FRESHWATER
OR SEAWATER

The finest power filters in the
World—ask anybody who's got one!

**AQUATIC
HOBBY LTD**

FROM ALL GOOD PET
AND AQUARIUM STORES

A PRACTICAL FISHKEEPING MANUAL



IN
FULL COLOUR

10/6

KOI

By COLIN D. ROE
& ANTHONY EVANS

This new PRACTICAL FISHKEEPING MANUAL
from PetFish Publications is the first compre-
hensive book in English on the fancy Nishiki-koi
from Japan.

Colour photographs show a wide range of the
available koi varieties; information on the origin
of these, as well as practical advice on keeping
and breeding koi, is made available for the first
time in Britain.

56 pages 8 in. by 5½ in.

Published by

PETFISH PUBLICATIONS

554 GARRATT LANE, LONDON S.W.17

If you are a fishbreeder

WHY NOT RING

HARROW GREEN AQUATICS

at 01-539 1250

for a quotation for your stock and for
any other fishes you have for sale?

**625 LEYTONSTONE HIGH ROAD
LONDON E.11**

Please mention PFM when writing to advertisers



What food is best for your fish?

Phillips Flaked Fish Foods are scientifically prepared to provide the best balanced diet for both tropical and cold water fish.

Their high protein content promotes vitality, ensures healthy growth and contributes to long life. Natural colour brilliance is improved, resistance to disease is increased — and exclusive saprolegnil gives a high degree of protection against cotton wool fungus.

And Phillips Flaked Fish Food is guaranteed not to cloud the water or cause black mould on gravel. So come clean. Ask for Phillips. By name.

Available from your local Aquatic dealer. Cold water and tropical. Small drums 2/2d. Tins 1½ oz. 4/7d., 4½ oz. 10/10d. and 18 oz. 32/7d.

Phillips Flaked Fish Foods

Phillips Yeast Products Ltd.,
Park Royal Road, London, N.W.10.



"I saw your advertisement in PFM"



THIS IS A MICKFIELD FISH BAG

We take care of our fish here at the Centre—**BEFORE** they're sold **AND** after!

This is why we provide the Mickfield Fish Bag—a handy carrier with printed instructions and our get-them-home safely guarantee.

Our fish are worth looking after—they're worth looking **AT** as well!

Come out to the country and go home with a Mickfield Fish Bagful!

MICKFIELD FISH CENTRE
Mickfield, Nr. Debenham, Suffolk
(0449 71 336)



FOR SAFETY

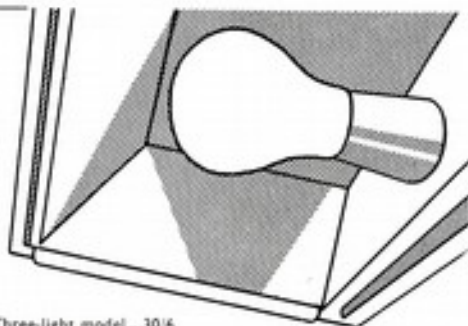
Replace your standard light sockets with the KING BRITISH waterproof **SAFE LIGHT FITTING**

A new innovation in light fittings gives maximum safety.

A moulded rubber fitting fits up to the base of the bulb to keep the electricity supply waterproof.

Reasonably Priced

- One-light model...16/9
 - Two-light model...23/6
 - Three-light model...30/6
- Including over 2 yards of double insulated flex.



KING BRITISH

AQUARIUM ACCESSORIES CO

Cannon Mills, Union Road, Bradford, 6,
Yorkshire. Tel. Bradford 73372

Ask to see this item—and the whole King British range—at your local aquarists or pet shop. Or, in case of difficulty, write direct to:



Please mention PFM when writing to advertisers

ALL AROUND the WORLD

aquarists praise the DIAL-O-MATIC THERMOSTATIC HEATER



View of Control Head with Condensation Cover removed. Note the Neon Indicator and the Calibrated Control Dial affording immediate visual selection of temperature between 60°—90° F. To prevent accidental alteration, the dial is recessed and its movement requires the insertion of a ball-pen point into the cavity provided.

The perfect
aquarium heater

★

PRICE

47/0

(inc. P.T.)

100w 150w
10" 12"

★



YOU CANNOT GO WRONG WITH 'Es-Es'

Es-Es

- The natural choice of the discriminating
- The result of the 30 years' experience from the originators of glass-cased aquarium heaters
- A range of twenty first-class products to suit all pockets
- Products with those extra touches of craftsmanship - made to a high standard - safe to use - dependable - durable - different. All guaranteed

SINGLETON BROS. (Electronics) LTD.

TRURO HILL · PENRYN · CORNWALL

"I saw your advertisement in PFM"

EARLSWOOD *Water Gardens*

165 Wood Lane
Earlswood, Solihull
Warwickshire

Wholesale and Retail
***Tropical Fish
and Plants***

Call and see our wide selection
of Quality Fish and Plants
and also our Extensive Range of Tanks
and all Equipment

Open 9.0 a.m.-6.0 p.m. every day including Saturday and Sunday

The House of Fishes

Telephone
HEMEL HEMPSTEAD
4723

FEBRUARY—THE MONTH OF AQUARIUS

The signs indicate that a visit to the HoF could better your fortune on the Show bench and make for greater success in your fish breeding. Towards the end of February, Aquarius subjects will experience an urge to excavate large depressions in the ground. This latent desire to hibernate could result in a very attractive pond—always provided a reliable PVC or butyl liner from the HoF is used. Your lucky colour—methylene blue. Your lucky number 77*.

ARE YOU OFF THE BEATEN TRACK and reliant on postal and rail parcels services? You may be interested to know that we have customers residing in the north of Scotland, Lancashire, Norfolk, Suffolk, south Wales, north and south Devon and Cornwall as well as the Home Counties—could be that we could satisfy your requirements too.

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

77* HIGH STREET, HEMEL HEMPSTEAD, HERTFORDSHIRE

Please mention PFM when writing to advertisers

WHOLESALE RETAIL

**BONNER AQUARIA
19 BONNER STREET
BETHNAL GREEN
LONDON E.2
Tel. 01-980 1488**

**TROPICAL PLANTS
 FISH
COLDWATER ACCESSORIES**

Importers of Tropical Fish and Plants.
Trade Supplied. Phone or call any time.
Thursdays by appointment only.
Mon.-Fri. (except Thur.) 9 a.m.-8 p.m.
Thurs. 9 a.m.-1 p.m. Sat. 9 a.m.-6.30 p.m.

KING BRITISH

**the BRINE SHRIMP EGGS
WITH A HIGH HATCHING
RATE**

These best quality eggs from San Francisco Bay have a high hatching rate and, if necessary, complete hatch can be available in under 48 hours.
Recommended retail prices: size 1, 2/6; size 2, 4/-; size 3, 7/6; size 4, 14/-. Ask for them at your local aquarists' shop ... and be sure the bottle bears the King British symbol.

KING BRITISH
Aquarium Accessories Co.
Cannon Mills, Union Road
Bradford, 6, Yorkshire
Tel. Bradford 73372



If you have any difficulty in obtaining the King British product you require, please write direct to us.

**A NEW
SILICONE
AQUARIUM
SEALER**
From I.C.I.



18/6

Won't Shrink or Harden
Harmless to Both Freshwater and
Seawater Fish

Sole Distributors

AQUATIC HOBBY LTD
FROM ALL GOOD PET
AND AQUARIUM STORES

"I saw your advertisement in PFM"

The HOBBYIST'S

written for beginners & experts . . .

EXOTIC TROPICAL FISHES

Dr. Herbert R. Axelrod
and other Authorities



The world's most complete book about tropical fishes. Comprehensive sections on aquarium management, plants, commercial breeding, plus hundreds and hundreds of beautiful colour photographs and descriptions of individual species. The only aquarium book that never gets out of date.

(Looseleaf
edition)

HL-907
170/-

EXOTIC TROPICAL FISHES

Dr. Herbert R. Axelrod
and other Authorities



The compact, permanently bound edition of EXOTIC TROPICAL FISHES. All of the virtues of the world's masterpiece of aquarium literature, but hardbound for true economy.

(Hardbound
edition)

H-907
86/-

ENCYCLOPEDIA OF WATER PLANTS

Dr. Jiri Stodola

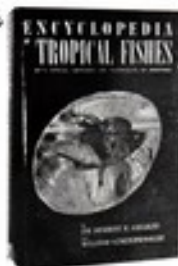


Beautifully illustrated and lavishly colourful, with 200 glass illustrations in full colour. Without question the most valuable informative treatise on aquarium plants and their care ever made available. The perfect guide to aquarium plant identification.

H-929
86/-

ENCYCLOPEDIA OF TROPICAL FISH

Dr. Herbert R. Axelrod &
William Vorderwinkler



A true classic in aquarium literature, this excitingly colourful book is a guided tour through the intricacies of aquarium management and fish breeding technique. An in-demand favourite for many years.

H-905
75/-

AVAILABLE AT YOUR

LOCAL PET SHOP OR BOOKSELLERS

Please mention PFM when writing to advertisers

LIBRARY



... by the world's leading authorities

SALTWATER AQUARIUM FISHES

Dr. Herbert R. Axelrod & William Vorderwinkler



The best book about keeping marine fishes ever published, a superbly dependable reference work for all salt-water aquarium hobbyists. With many excellent colour photographs.

H-914

75/-

EXOTIC AQUARIUM FISHES

Dr. William T. Innes



Page for page, no other book of the same price comes even close to matching the amount of detailed information in this classic. Now updated with many new colour photos.

PS-642

34.6

ILLUSTRATED DICTIONARY OF TROPICAL FISHES

Hans Frey



Unique in its approach, unique in its masterful presentation of colouration about every fish, every plant, every term of interest to aquarists. Illustrated with more than 1000 drawings and photographs in colour and black and white. 768 brilliant pages.

H-904

80.6

HOW TO KEEP AND BREED TROPICAL FISHES

Dr. C. W. Emmens



Provides a delicate insight into the problems of the beginning aquarist. Flips all areas of aquarium management easy to absorb. Fully illustrated in colour and black and white. Available in hard-cover and soft-cover.

H-910

Paper-Back 37.6

Hard-Cover 46/-

DISTRIBUTED IN THE U.K. BY:
T.F.H. PUBLICATIONS (LONDON) LTD.
13 NUTLEY LANE - REIGATE - SURREY Phone: Reigate 47305

"I saw your advertisement in PFM"

**HARROW
GREEN
AQUATICS**

For the largest selection of tropical
fish and accessories
New fish and plants in every week
Call and see our fish selection

**625 LEYTONSTONE HIGH ROAD
LONDON E.11**

Tel. 01-539 1250

**DIAMOND
D/WATER**

Deionized water —
ideal for fishkeepers
in 1 and 5 gallon sachets

**DIAMOND PRODUCTS
MANOR WAY - LONDON E.16**

Phone 01-476 4757

**Get your TUBIFEX
ALIVE AND FRESH from
"TUBIMAN"**

All phone enquiries to 01-677 9074 or
write to: 82 Eardley Road
Streatham
London, S.W.16

● RAIL ORDERS OUR SPECIALITY ●

You are only one

*of thousands who will be reading this
advertisement. Your goods and services
could be brought to the attention of
readers if you advertise in*

PETFISH MONTHLY

Write for details of rates etc., to
Advertising Manager
554 Garratt Lane London, S.W.17
01-947 2805

**Binders for
your copies of
PetFish Monthly**



20s

post free
(\$3.00 U.S.A.
and Canada)

As you receive each issue of
PFM it can be inserted into
the binder, which holds 12
copies (one volume). Stiff
covers, leathercloth bound,
and gold-blocked title.

To PETFISH PUBLICATIONS
554 Garratt Lane
London, S.W.17

Please send _____ Binders for Petfish
Monthly, for which I enclose

P.O./Cheque value _____

Name _____

Address _____

Please mention PFM when writing to advertisers

Silicone **TROPHIX** Rubber
AQUARIUM SEALANT
Manufactured by L.C.L.

**THE AQUARIST'S CLEAR SEAL OF QUALITY
WITH AMAZING STRENGTH**
Will not "dry out" crack or craze
Suitable for Freshwater and Marine
Ideal for constructing All-Glass Tanks

FREE Each box contains a coupon for obtaining step-by-step
instructions for building your own aquaria (These instructions are
issued only in exchange for this coupon)

**THIS SERVICE IS AVAILABLE ONLY FROM TROPHY
PRODUCTS—SPECIALISTS IN ALL-GLASS
CONSTRUCTION**
LARGE 3 oz. TUBE

ONLY 17/6 ONLY
From your local aquatic dealer or pet shop

Manufacturers Note! —
12 oz CARTRIDGES NOW AVAILABLE

Enquiries (p.a.s. please) and orders (17/6 p.a.s.) direct to
Main Distributors
TROPHY PRODUCTS
Laurence Drive
Sower Trading Estate
Yate, Bristol
Tel: Chipping Sodbury 2454

YOUR FISH DESERVE A TROPHY

★ A Cordial Invitation
is extended to you
to visit the **NEW**
KINGSLAND AQUARIA
406 KINGSLAND ROAD
LONDON, E.8

Tropical fish, coldwater fish
and plants **always in stock**

Full supplement of aquarium
tanks and accessories

**ODD SIZES OF TANKS
ON REQUEST**

Pet Foods
Gardening Requirements
Telephone 01-254 9312

FILTER MEDIUMS
FOR EVERY TYPE OF
FILTER

NEW VISTA
GLASS FILTER WOOL

NEW VISTA
GLASS FILTER TISSUE

NEW VISTA
FILTER CARBON

NEW VISTA
AQUARIUM PEAT

NEW VISTA
'MSM' SYNTHETIC WOOL

NEW VISTA
AQUARIUM TONIC SALTS

SURESYNTH
SYNTHETIC FILTER WOOL
SMALL BREEDER GIANT

THE ONLY FILTER WOOL
RECOMMENDED FOR USE IN

EHEIM
POWER FILTERS

SUREKARBON
AIR LIFT GRADE (A.L.G.)
BONE CARBON (B.C.)
POWER GRADE (P.G.)

by **AQUATIC
HOBBY LTD.**

FROM ALL GOOD PET
AND AQUARIUM STORES

"I saw your advertisement in PFM"

Books by post for the fish-keeper

- | | | |
|---|--|---|
| Advanced Aquarist
Dr. FERDZS CHADALLY 37s 6d | Tropical Fish in the Aquarium
J. H. LODIEWUKS 19s | The Marine Aquarium
WOLFGANG WICKLER 10s 6d |
| All about Tropical Fish
DEREK MCINERNEY and GEOFFREY GERARD 85s | | The Marine Aquarium for the Home Aquarist
ROBERT F. O'CONNELL 35s |
| Aquarist's Guide
JIM KELLY 37s 6d | Water plants | The Salt-water Aquarium in the Home
R. P. L. STRAUGHAN 63s |
| Breeding Aquarium Fish
WOLFGANG WICKLER 10s 6d | A Manual of Aquarium Plants
C. D. ROE 27s 6d | Tropical Fishes of the Great Barrier Reef
TOM C. MARSHALL 75s |
| Breeding Aquarium Fishes
Dr. HERBERT R. AXELROD and SUSAN R. SHAW 86s | Aquarium Plants
H. C. D. DE WIT 35s | |
| Encyclopedia of Tropical Fish
Dr. H. AXELROD and W. VORDERWINKLER 75s | Biology of Aquatic Vascular Plants
C. D. SCULTHORPE 6s 6d | General |
| Exotic Aquarium Fishes
W. T. INNES 34s 6d | Encyclopedia of Water Plants
JIMI STODOLA 86s | Aquaria
JIM KELLY 12s 6d |
| Freshwater Fishes of the World
GUNTHER STERBA 90s | Seaweeds and other Algae
C. L. DUDDINGTON 36s | Aquariums
ANTHONY EVANS 6s |
| Guide to Tropical Fishkeeping
J. H. P. BRYMER 50s | Coldwater fish and ponds | Aquarium Care
GUNTHER STERBA 70s |
| Illustrated Dictionary of Tropical Fish
HANS FREY 80s 6d | Garden Ponds
ARTHUR BOARDER 6s | Aquarium Hygiene
HELLMUTH WACHTEL 10s 6d |
| Keeping Tropical Fish
LESLIE B. KATTERANS 21s | Goldfish
ANTHONY EVANS 6s | Aquarium Techniques I and II
A. O. JANZE 12s 6d each part |
| Know How to Breed Egglayers
R. L. COÛTE 7s | Know Your Goldfish
NEIL TEITLER 7s | Cultivated Tropical Fish Show Standards
(F.S.A.S.) 2s 6d |
| Know How to Breed Livebearers
ALBERT J. KLEE 7s | Koi
COLIN D. ROE and ANTHONY EVANS 10s 6d | Diseases of Aquarium Fish
GOTTFRIED SCHUBERT 10s 6d |
| Know How to Breed Tropical Fish
RICHARD HAAS 7s | Marsh Gardens
ERNEST RICHARDSON 1s 6d | Diseases of Fishes
C. VAN DUIN JNR. 47s 6d |
| Know Your Guppies
ALBERT J. KLEE 7s | Pond and Stream Life
JOHN CLEGG 2s | Electricity in Your Aquarium
L. WARBURTON 2s 6d |
| Portrait of the Guppy
LARRY KONIG 12s 6d | Pond Life in the Aquarium
H. JANUS 10s 6d | Food for the Aquarium and Vivarium
WILLY JOCHER 10s 6d |
| Tropical Aquaria for Beginners
JEAN CHRISTIE 7s | The Goldfish
LEONARD BETTS 3s | Functional Design in Fishes
R. H. ALEXANDER 7s |
| Tropical Fish
DEREK MCINERNEY 4s | The Goldfish
G. F. HERVEY and J. HEMS 43s | Know Your Aquarium
RICHARD HAAS 7s |
| Tropical Fish and Fish Tanks
REGINALD DUTTA 4s | The Water Garden
H. C. WITHAM FOGG 3s | Live Foods for Aquarium Fishes
A. LAWRENCE WELLS 2s |
| | Water in the Garden
D. BARTRAM 25s | Looking After Your Tropical Aquarium
JOHN GRAHAM 2s 6d |
| | Marines | Planning and Decorating the Aquarium
WILFRED WEGEL 10s 6d |
| | Exploring the Reef
ROBERT STRAUGHAN 6s 6d | The Complete Aquarium
D. VOOT and H. WERNUTH 25s |
| | Know How to Keep Saltwater Fishes
WILLIAM P. BRAKER 7s | The Life of Fishes
N. B. MARSHALL 63s |
| | Marine Aquaria
L. A. J. JACKMAN 35s | |
| | Salt-Water Aquarium Fish
Dr. HERBERT R. AXELROD and W. VORDERWINKLER 75s | |

Pet Fish publications

When ordering please indicate your name and address clearly and enclose remittance.

554 GARRATT LANE LONDON S.W.17

Phone 01-947 2805

Please mention PFM when writing to advertisers

MARINE BIOLOGY

J. B. CLARK, BSc, FIMSS, G. H. JENNINGS, MBA, FIMSS, T. R. HALL, FIMSS

is our **Vocation**

FACT: KRAKEN MAKES 85% OF BRITISH MARINE PRODUCTS

A FIRM
RUN
ONLY
BY
EXPERTS

KEEPING MARINES IS
REALLY QUITE EASY
WITH OUR ADVICE TO GUIDE YOU
KEEPING MARINES? IF NOT, WHY NOT?

EXPENSE? Not with KRAKEN. Complete units cost less than an equivalent freshwater unit.
DIFFICULTY? Years ago maybe, not now, and especially not if our Marina Units are used. Simple, safe and easy.

FISHES
FROM
OUR
OWN
SUPPLIERS

BEGINNER'S GUIDES ^{3/- direct from} **KRAKEN**

MARINA — REGIONAL STOCKISTS

STAFFS & W. MIDLANDS

G.S.M. Aquatics, 11 Marsh Street, Hanley, Stoke-on-Trent

HAMPSHIRE & THE SOUTH

G.S.L.S. Ltd, 842 Christchurch Road, Bournemouth
Mr Fox, 354 Portswood Road, Southampton

HOME COUNTIES & SUFFOLK

Mickfield Fish Centre, Nr Debenham, Suffolk
Sea of Tranquillity, 71 Riverdene, Edware

LANCASHIRE & N. EAST

Lilliput Aquarium, Holly Hill, Chorley New Road, Bolton

WHOLESALE DISTRIBUTORS

West London Aquatic Wholesale, 158 College Road, Harrow, Middx.
F. Stone, Mayfair Aquaria, Tooting, S.W.18

G.S.M. Aquatics, Stoke
Fonchill Aquaria, London

BY POST Direct from KRAKEN

KRAKEN

A FEW MARINA RANGE PRODUCTS

MARINA 69C SYNTHETIC NATURAL SEAWATER
2½, 5½, 11, 22 and 55 gallons

MARINA 70 RANGE — A new specialist range of waters. 22 gallons

TRACELEMENT SOLUTIONS

pH CONTROL SOLUTIONS

SEAWEED GROWTH SOLUTION

MEDIAHARIN Base medium

MARINA S.G. Filters

MARINALG Test kits

MARINE PUBLICATIONS

TEST KITS for Nitrate, Nitrite, Ammonia, Phenols, Sulphide, Silicate, Junior and Senior pH test

MARINAREMEDIES

- No. 1 Iodinium. Safe with invertebrates
- No. 2 Whitespot
- No. 3 General Sterile Bactericide
- No. 4 Marina/Nat. system Bactericide
- No. 5 Fungicide
- No. 6 Marinablue Bumper pack
- Cuprimarin 7. Quarantine solution
- No. 8 Actinoremedy

LABORATORIES ALSO SUPPLIED

MARINA PRODUCTS
CARRY THE



SEAL OF APPROVAL

**FREE
INFORMATION
SERVICE**

Just dial
01-263 1776
Write for full lists to

KRAKEN

2 GATCOMBE ROAD
TUFNELL PARK
LONDON N.19

MEANS

MARINES

"I saw your advertisement in PFM"

Shirley Aquatics LIMITED

STRATFORD ROAD · MONKSPATH · SHIRLEY · SOLIHULL
WARWICKSHIRE Phone: BIRMINGHAM SHIRLEY 1300

Water Plant Nurseries and Fish Hatcheries

The Most Experienced Firm in Marine Fishkeeping

Specialists in Unusual Aquarium Plants • Importers of Rare and Beautiful Fishes for all Types of
Aquaria and Garden Pools • Growers of Hardy Plants for Water Gardens



KOI

THE AUTHORITATIVE
BOOK ON THE
FASCINATING
JAPANESE
RAINBOW CARP

By COLIN D. ROE &
ANTHONY EVANS

Profusely illustrated in
colour

PRICE 10/6 PLUS 1/-
POSTAGE

THE AUTHORITATIVE BOOK
ON AQUARIUM PLANTS

A MANUAL OF
AQUARIUM PLANTS
By Colin D. Roe

EXTRAVAGANTLY
ILLUSTRATED
NOTES ON CULTIVATION

Available in 4 languages

Price 27/6 post paid

THE NEW SANDER OZONIZER

Incorporating a new and revolutionary Ozone Chamber
Now Manufactured under Licence by Shirley Aquatics Limited.

What is Ozone?

An unstable molecule comprised of three atoms of oxygen which readily breaks down to release active atoms of oxygen.

What does Ozone do in the Aquarium?

Burns dangerous protein and kills bacteria.
The Cilia of Protozoa are burned thus preventing them from swimming and feeding so that they die.

What is the overall effect? Cleaner, safer water

INVALUABLE FOR MARINE OR FRESHWATER AQUARIA

No. 2. Large enough for 4 sixty gallon aquariums. Price £12 10 0
No. 3. Large enough for 8 sixty gallon aquariums. Price £16 0 0

DIRECT FROM US POST FREE OR FROM ALL GOOD
DEALERS. TRADE ENQUIRIES INVITED

SPECIAL OFFERS OF AQUARIUM PLANTS UNTIL END OF FEBRUARY ONLY

WATER ORCHIDS 8/6 ea. 3 for 20/-
MADAGASCAR LACE PLANT 15/- ea. 3 for 30/-
VARIEGATED JAPANESE RUSH 5/- ea.

For success with Marine Tropicals

NEW TROPIC MARIN

The Ready-to-use artificial sea salt

WITH GUARANTEE

From us Direct or from your Dealer

5 gallon size 9/-
10 gallon size 17/6
20 gallon size 32/6

Postage as follows:

4/6 all sizes

This salt makes artificial sea-water almost indistinguishable
from natural sea-water.

WOODEN AIR DIFFUSERS FOR MARINE AQUARIA GIVE MIST-LIKE AIR BUBBLES

Large 5/6 Small 3/6

MALAWI DWARF CICHLIDS

Labeotropheus trewavasae; male brilliant blue
with scarlet dorsal fin, female mottled brown

Pairs £10-£15 (according to size)

Labeotropheus zebra: brilliant electric blue fish
with navy-blue vertical stripes £10 pair

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, alight at "The Crown," Monkspath.

HOURS OF BUSINESS—Weekdays 10 a.m.—5 p.m. Sundays 10 a.m.—12.30 p.m. for sale of plants only.

CLOSED ALL DAY EVERY MONDAY

TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Tropical minimum order £7 10s., insulated container and carriage 30/-. Coldwater minimum order £5 plus 20/- can and carriage. Plants by post (minimum order 10/-) please add 2/6 post and packing.

PRINTED BY ADLARD & SON LTD., DORKING, SURREY, ENGLAND