The Aquarist

and Pondkeeper

JULY 1963

MONTHLY
Vol. XXVIII No. 4

TWO SHILLINGS

WALTER R. SMITH

For Complete Tropical and Coldwater Aquaria also Tropical Marine

100 Varieties of fish usually in stock on view in 76 polished stainless steel aquariums

POLISHED STAINLESS STEEL

	Frames	Aquariums
24 × 15 × 12	£7 7 0	£9 9 0
30 × 15 × 12	£9 0 0	£11 11 0
36½ × 15 × 12	£10 10 0	£13 13 0

DISTRIBUTOR OF—

- McLYNN'S FISH FOOD
- ES-ES PRODUCTS ELECTRICAL AND GENERAL
- WATER LIFE, AQUARIST, DITCHFIELD'S AND T.F.H. BOOKLETS
- REJECTORS, SEDIJETS, AND MAINTENANCE EQUIPMENT
- PROCKTER, SUMMIT, STAR AND FAIRY PUMPS
- CONSTAT THERMOSTATS
- AQUAFERN AND COLORFERN PRODUCTS
- HYFLO PRODUCTS
- LIVERINE PRODUCTS
- STOKES FOUNTAINS
- WINDMILL PRODUCTS
- ROCK, GRAVEL, AND STRATA ROCK WORK STUDENTS' MICROSCOPES
- ALL FEEDING AND AERATING APPLIANCES
- MERCURY, SPIRIT AND DUMPY THERMOMETERS
- STUART TURNER WATER PUMPS
- ZOOBEKO AND BIKO PUMPS
- VI-FIT FISH FOOD
- BLACK MAGIC GLAZING COMPOUND
- GLASTICON '303' AQUARIUM SEALER
- AQUAMASTA GLAZING COMPOUND

Angle Iron Aquariums, Frames and Stands a specialty. Despatched in crates charged at 30/- each, returnable half carriage paid. Odd sizes made to order, painted any colour, guaranteed square and free from welds. Stove enamelled Corner Bows, Bow Fronts and Wrought Iron Units.

Send S.A.E. for 20 Page Price List

WALTER R. SMITH

39 Tib Street and 16 Whittle Street
(Off Tib Street)

Manchester 4

Telephone : Deansgate 2961 and 2339

YOU ARE INVITED TO SEE AN

EXHIBITION OF TROPICAL FISH

IN OUR NEW M. & R. AQUARIUM

On Show and for Sale over 100 varieties of Fresh Water, Tropicals, and 15 Marine Tropicals. Fish for personal shoppers only. Club visits by appointment.

M. & R.

466 PAISLEY ROAD WEST, GLASGOW S.W.1

Telephone: Hillhead 3611 Open Sundays 11 a.m.—2 p.m.

SMYKALA (LONDON) LTD.

61 GRAFTON ROAD, LONDON, N.W.5.

Gul. 6681

We can now offer varied varieties of West African species which are colourful, and community living specimens, why not ask your local retail shop to let you see these fishes, which we are sure will add something different to your aquarium.

We are always at your service to give you advice and any information particularly on these fishes at any time.

NEW ! ! !

THE INTER-PET

MINI air pump

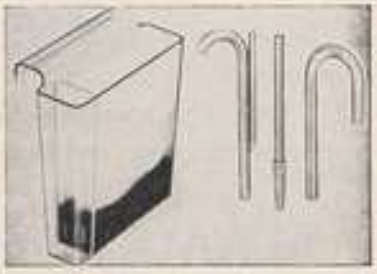
GUARANTEED FOR LIFE!

Specially designed for the Home Aquarist!

Retail price 21/-

THE MINI-PUMP IS IDEAL FOR USE WITH GRO-WEL SUPERIOR AQUARIUM EQUIPMENT

SLIM JIM *Economy outside filter* ..	*17/6d*
KLEAR KING *3-compartment outside filter* ..	*22/6d*
BOTTOM FILTER *Economy internal filter* ..	*8/3d*
ORNAMENTAL ROCK FILTER ..	*17/6d*
WORMS ALIVE *Tubifex Feeder* ..	*9/-*



Available through your dealer or post free from

INTER-PET SUPPLIES COMPANY

Sales promotion division of the Liquifry Co. Ltd.,
18 *Church Street, Dorking, Surrey*

LOOKING FOR A PUMP?

Look at this!

THE

'SUMMIT'

VIBRATOR

AIR PUMP

*

LATEST MODEL

NOW **WITH BOOSTED OUTPUT AND SIMPLIFIED AIR CONTROL**

PLUS ALL THE ORIGINAL SPECIAL FEATURES . . .

- SNAP ON COVER
- LONG LIFE MOULDED DIAPHRAGM
- 100% RUSTPROOFED
- ROBUST CONSTRUCTION
- BEAUTIFUL COMPACT DESIGN
- PLEASING IVORY & RED FINISH
- PNEUMATIC SPARES INCLUDED
- FULLY GUARANTEED

STILL ONLY

21/-

AN

PRODUCT

GOOD NEWS for owners of the old model "SUMMIT". You can convert it in 30 seconds at a cost of only 1/- on application for *"Summit" Conversion Unit" and fitting Instructions* addressed to our Works at :—

THE PRAZE · PENRYN · CORNWALL

The old type is easily recognised—it employs hexagonal nuts above the diaphragm to hold down the washer thereon.

SINGLETON BROS (Electronics) LTD. 53 VICTORIA STREET, LONDON S.W.1.

THE ARBE BOW FRONTED AQUARIUM

The 23 x 12 x 11 Aquarium

5 Standard Sizes

18 x 12 x 11	£8 5 0
23 x 12 x 11	£9 17 6
24 x 15 x 12	£12 17 6
36 x 12 x 14	£16 19 0
36 x 15 x 14	£22 10 0

WHAT IS THE ARBE AQUARIUM?
It is the only aquarium in the world made from 'Perspex'.

WHY IS IT MADE FROM PERSPEX WHICH IS ONE OF THE MOST EXPENSIVE PLASTICS?
Because it is crystal clear and transmits more light than glass. The back and sides of the aquarium are made with pastel green 'Perspex' to provide a cool neutral background for the fish and plants.

HOW IS IT CLEANED OF ALGAE?
Simply by wiping the inside of the aquarium with wet greaseproof paper. A razor-blade must not be used.

IS IT EASILY SCRATCHED?
No more than any other valuable furniture treated with care.

HOW IS IT MADE?
By similar techniques used in furniture construction, all joints are rebated and welded with acrylic resin so that, unless it has been damaged, the aquarium cannot possibly leak.

DOES PERSPEX DISCOLOUR?
No. One of our stockists has had an aquarium on continuous display for over 7 years and it is still crystal clear.

WHERE DO THE LIGHTS GO?
30-watt strip lights fit into the strip light bracket just beneath the lid and behind the top black band. The water level is also hidden by this band.

WHAT ARE THE CONTROLS AT THE SIDE?
A press-button switch for the light, a neon indicator lamp to show when the heater is on or off, and an adjusting screw for the thermostat.

WHERE IS THE THERMOSTAT?
The thermostat is really the aquarium itself, as it warms and cools over a range of ½ °F., it expands and contracts by one thousandth of an inch and this is sufficient to enable the micro switch to switch the heater on or off.

HOW RELIABLE IS THE MICRO SWITCH?
The same switch is used to control safety devices in aircraft. It has a life of 1,500,000 operations, if it switches on and off every half hour that is only about 50 operations a day.

HOW IS THE AQUARIUM WIRED UP?
Simply by connecting the heater to the two-way terminal block provided and the power input cable to the three-way terminal block.

CAN THE AQUARIUM BE USED FOR COLD-WATER FISH?
Yes, the price of the aquarium is reduced by 30/- if the thermostat and neon indicator lamp are not required.

CAN THE AQUARIUM BE USED FOR MARINE FISH?
No, but a half moon aquarium and a corner aquarium containing all these features will shortly be available and will be suitable for marines.

The Corner Aquarium 36 x 15 high. £21 0 0

The Arbe aquarium can be obtained from London's largest stores and most leading stockists. If there is no stockist in your area, the aquariums can be obtained carriage free direct from

ARBE PRODUCTS 22a Kings Road
St. Leonards on Sea, Sussex

SPECIAL PLANT OFFERS

OFFER No. 1
20/- PLANTS FOR 10/-

2 Cryptocoryne Beckettii	4/-
3 Cryptocoryne Haerteliana	7/6
6 Bacopa	4/6
2 Amazon Chain Swords	3/-
2 Micro Sagittaria	1/-
Yours for 10/-	20/-

OFFER No. 2

30 Assorted Tropical Plants	*10/-*
70 Assorted Tropical Plants	*20/-*

Freshwater Fishes of the World
by Professor Gunther Sterba

This up-to-date work on exotic fishes is an absolute must for every aquarist

70/- plus postage 2/6

BOW-FRONTED AQUARIUMS

48in. × 10in. × 15in. bow-fronted aquarium with wrought iron bookcase stand **£28.9.9** complete.
36in. × 12in. × 15in. bow-fronted aquarium with wrought iron bookcase stand **£18.18.-** complete.
Available in penny bronze, black & gold, and cream

WITH PLAIN STAND

Inches 48 × 10 × 15	£21.0.0
,, 36 × 12 × 15	£15.19.0
,, 24 × 12 × 15	£11.10.0

Complete with Stand and Hood
(15in. to centre of bow)

We are specialists in aquarium installations. All sizes and styles to customers' own specification carried out. We have many designs set up in our showrooms. Why not call and let us quote.

We now stock the new rust-proof aquariums with nylon coated frames and plastic covers.

18 × 10 × 13	£4 4 0
24 × 12 × 15	£6 0 0

(Complete with plastic cover)

STANDS

18 × 10 × 36	35/-
24 × 12 × 36	45/-
30 × 12 × 36	90/-
36 × 12 × 36	55/-

REMEDIES, etc.

Aquatonic	3/6	Clarox (Not by post)	2/6
Brossum White Spot Cure	2/-	Liquidex	1/9
Vivo Salts	2/-	Discoxine	2/6
Sea Salt	1/6	Brossum Fertilising Tablets	1/6

Tetrazoate all 4/- each

THERMOSTATS

	each
Constat External	33/-
Constat New External Type QK	25/-
UNO	
Out Adj.	18/-
Int. Adj.	15/-
Int. Adj. "Popular"	10/-
"Popular" with neon indicator	12/6
Rena (with Neon)	21/-
"Ee-Ee" Sentinel	26/6

THERMOMETERS

	each
Mercury	6/6
Gem	6/6
Plastic Backed	6/6
Spare Blue Gem	5/-
"Ee-Ee" Dummy	6/6

FILTERS

	each
"Windmill" Plastic Outside Filter	19/6
"Windmill" Biological Aquarium Filter 12/6,	15/-
"Windmill" Regent Inside Filter	10/-
Corner Filter	6/-
Air Lift	2/6
"Slim Jim" Outside Filter	17/6
"Kleer King" Outside Filter	22/6
Bottom Filter	8/3
Ornamental Rock Filter	17/6
Unu Polyfilter	3/6

AERATORS & PISTON PUMPS

	each
Monroe	21/-
,,	24/-
Fairy	27/6
Star	36/-
Rena	42/-
Zoobeka Total	75/-
Hy-fo Junior	107/6
Hy-fo "A"	130/-
Hy-fo "B"	165/-
Hy-fo "C"	250/-

HEATERS

	each
"QUEENSBOROUGH" 25w., 40w., 60w., 75w., 100w., 120w., 150w.	10/-
Rena (75—200w.)	10/-
"Ee-Ee" Flexible Heaters (100w. and 150w.)	19/-
"Ee-Ee" Thermostatic Heaters, 100w. and 150w.	34/-
Pesset-matic	24/6
Inter-Pet Thermostatic Heater 22/6 and	29/6
Heater Holders	3/-

BACKING PAPERS

STRATA ROCKWORK
PEBBLE BEACH
SEA & SHORE

24in. long × 20in. high, per sheet, or 1/3 per foot. *(post free)* 2/6

LIVE FOODS

Brine Shrimp Eggs	2/6 and 4/6
Cultures of	
Nast Worm 1 oz.	7/6
,, 2 oz.	13/6
White Worm	3/-
Micro Worm	3/-
Tubifex worms	1/6 and 2/9

BOOKS

Guide to Tropical Fishkeeping (J. H. P. Bryant)	36/6
Diseases of Fishes (C. Van Dolp)	15/6
All about Tropical Fish (McInerny)	77/-
Encyclopedia of Tropical Fishes (H. R. Axelrod and W. Vorderwinkler	62/6
Electricity in your Aquarium (L. Warburton)	8/6
Illustrated Dictionary Of Tropical Fish (Hans Frey)	47/6
Exotic Tropical Fishes	15/-
All T.F.H. Books	2/- each
The Book of the Garden Pond (G. F. Harvey and J. Hams)	16/6

FOODS

"Queensborough" Tropical Fish Food	1/6 and 2/6
Exotic Flakes	1/6
Hykro Flakes	1/-
Brossum	1/6 and 2/6
Brossum Frygrain	1/6
Brossum Rovex 6d. and	1/6
Liquifry Nos. 1 and 2	2/6
Infusyl	1/6
Elite	2/- and 4/6
Dried Daphnia — Our pack	6d.
Ground Shrimp — own	1/-
Fish Food — pack in 2 sizes	1/6
Ants Eggs	6d.
Wardley's Treat Pac	1/-
7 kinds of food	8/6
Hi-Glow	4/6
Glow Tabs	3/6
Biol	2/6
O. Barrmann	3/6
Foodex	2/-
Supremix	2/6
Tetramin Flake (all sizes) 1/16, 3/-, 6/6, 22/6 and	70/-
Bumgrow 1/- and	2/-
,, (Dry food)	1/3

SEDIMENT REMOVERS

	each
"Windmill" Air Rejectors	18/-
"Windmill" Hand Rejectors	12/-
Fishtail	3/-
Syphon Tubing	7d. ft
Hand Type Plastic	4/6

PLANTS

	each
Vallisneria Spiralis	9d.
Elodea Densa	9d.
Hygrophila	9d.
Bacopa	9d.
Sagittaria natans	9d.
Sagittaria micro	9d.
Vallisneria torta	9d.
Ludwigia	9d.
Myriophyllum	9d.
Spatterdock 3/6, 5/- and	7/6
Cryptocoryne Beckettii	2/-
,, *Willisii* 3/6 and	5/-
,, *Cordata* 3/6 and	5/-
,, *Haerteliana* 3/6 and	5/-
Water Wisteria	3/6
Giant Hygrophila	2/6
Giant Sagittaria	2/6
Najas Microdon	2/6
Amazon Chain Sword	2/6
Duckweed per portion	1/-
Riccia ... per portion	1/-

SUNDRIES

	each
Breeding Trap	15/-
Aqua Scissors	5/-
Aqua Tongs	3/6
Suckers Knob or Shank	4d.
,, Double	6d.
Planting Sticks	1/3
Dry Floating Rings	1/-
,, Squares	1/6
Hykro (4 in one) Feeder	2/3
Worm Floating Feeders	1/6
Worm Cradle with Stacker	1/6
"Windmill" Diffuser Stones 1/- to	1/6
"T" Piece	1/-
Aerator Tubing Rubber	ft. 4d.
Plastic	,, 6d.
4 Way Piece	1/-
Clamps	1/-
Carbon	1/-
Glass Wool	1/2
Nylon Wool	1/6
Colorfers	1/6
Coloured Chips	1/6
Arbolite Glazing Compound—2 lb.	4/3
Wardley's pH sets	14/6 and 7/6
	Post 1/9 extra
Hykro Leak Sealer	2/-

FULLY-GLAZED AQUARIUMS

Pressed Steel		Angle Iron	
		Aluminium	
Inches	*Tank H'd Refl.*	*Inches*	*Tank H'd Refl.*
12 × 6 × 6	10/6 — 6/6	24 × 12 × 12	50/- 21/- 8/6
14 × 8 × 8	13/6 — 7/-	24 × 12 × 15	85/- 21/- 8/6
16 × 8 × 8	15/- — 7/6	30 × 12 × 15	79/- 27/6 —
18 × 10 × 10	22/6 15/- 8/-	36 × 12 × 15	85/- 32/6 —

Carriage extra

Please add 1/- extra postage on appliance orders up to 10/-; 1/6 up to 20/-; 2/- up to 30/-. Glass, China and Shells sent at purchasers' own risk.

QUEENSBOROUGH FISHERIES

111 GOLDHAWK ROAD, SHEPHERD'S BUSH, W.12
(1 minute from Shepherd's Bush Market)
Telephone: SHE 2730
Hours of Business: MON. to SAT.— 9 a.m.-6.30 p.m. THURS. 9 a.m.-1 p.m.

QUEENSBOROUGH HOUSE, Ferry Lane, Hythe End, Wraysbury, Nr. Staines
Telephone: WRAYSBURY 2881
Sundays only from 10 a.m. to 4 p.m.

16 PICTON PLACE, LONDON, W.1
(1 minute from Selfridges)
Telephone: WELBECK 0438
Hours of Business: MON. to FRI.— 9.30 a.m.-6 p.m. SAT. 9.30 a.m.-5 p.m.

All postal enquiries to Goldhawk Road address

The AQUARIST
AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"

VOL. XXVIII No. 4 1963

THE BUTTS, HALF ACRE, BRENTFORD, MIDDLESEX
Telephone: ISLeworth 6221

PUBLISHED MONTHLY

SUBSCRIPTION RATES

The Aquarist will be sent post free for one year to any address for £1 8s. 0d. Half-yearly 14s. 0d. Canada, U.S.A. $4.00 yearly; $2.00 half-yearly.

QUERIES

Postal replies are made to all specialised queries accompanied by a stamped, addressed envelope. *This privilage is afforded only to registered readers and direct subscribers.* Subscription forms can be obtained on application. In all cases letters should be addressed to the Editor.

Correspondence with intending contributors is welcomed.

MSS. or prints unaccompanied by a stamped, addressed envelope cannot be returned, and no responsibility is accepted for contributions submitted.

The Editor accepts no responsibility for views expressed by contributors.

Contents

Considering Breeding

FIRST things first. What is known about the kind of fish you are going to try? The thing to do is to read up as much as possible on the fish and their requirements, and if all accounts disagree use a little common sense and set up a tank that will meet as many of the possible contingencies as possible.

What about the tank? Well, if the fish are large, a large tank is a must, but for fish up to about 2½ in. in size there are some advantages in a small tank. It is easier to handle and fertilisation of the eggs is more certain, and it is easier to get food to the fry when they first start to eat. A large tank also has its advantages. There is less danger of pollution of the water through overfeeding and any fry can be left in longer, and there is less danger of damaging fry whilst transferring them to larger quarters at a comparatively early age. Well, whichever tank is selected, it is most certain to need a clean out, and that is the next job, with lots of hot water and perhaps a little potassium permanganate, so that it will contain eventually nothing except the selected and wanted elements that you are going to put in.

Next we come to a suitable bottom layering. What are the alternatives and the pros and cons of the choice? Well, it is possible to have nothing on the bottom, of course, and this is highly suitable for a soft water tank. However, there is a danger of getting too much light reflection from the bottom of the tank unless precautions are taken, and fish are highly uncomfortable with light coming at them from underneath, and most unlikely to oblige by spawning. Then there is a pebble or marble (the glass variety) bottom. This is highly suitable as an egg trap when the fish lay non-adhesive eggs, which will fall to the bottom and might otherwise be gobbled up by hungry parents. Ordinary aquarium compost is generally suitable for all coldwater fishes, livebearers, anabantids, barbs etc., and is a must for the cichlids, who like to shift it about in order to make a suitable hollow where they feel their eggs will be safe.

The merits of well-washed peat for soil spawners like many of the egg-laying toothcarps cannot be put too highly. It also has an acidifying effect on soft water, although it does little for hard water except turn it brown in colour and discourage some of the unwanted bacteria. It is excellent for preventing light reflection from the bottom of the tank, and peovides cover for newly hatched fry of the tetra, rasbora and barb varieties, which lie about on the bottom for a day or two before becoming free-swimming and seem to appreciate the darkness. It is absolutely lethal for sticky fry such as angels. Under the limited space conditions we have in the aquarium it is always best to

wash and sterilise by boiling any of the bottom layerings, to keep as much control as possible on the tank contents.

Coming now to water, which is a subject for specialisation in itself, only a very few difficult fishes need an essential particular water, in which case a good deal of study should be given to the subject. It is very easy indeed to get unsafe conditions for fish, and not at all easy to get exactly the right requirements. For all general purposes it is far more convenient to use water from the tap in the proposed breeding tank, but it does help if it is all allowed to stand for a day or two after the tank is completed before the parent fish are introduced.

There are, of course, several possible spawning mediums, natural and otherwise, but again the best one is one that is suitable for the fish. An up-ended plant pot is completely un-natural but most suitable for some fish. Many small cichlids need rockwork with suitably angled faces on which to deposit their eggs. Angels, of course, need something at about 45 degrees, whether it be plant leaf, slate or other medium. Harlequins must have a selection of leaves which bend through 180 degrees in order that they may turn upside down to lay their eggs on the underside. Of the free-spawning fishes, i.e. those that scatter eggs more or less indiscriminately, and this includes most of the characins, barbs, minnows etc., fine-leafed plants are generally recommended. Substitutes are water-fern, coconut fibre, willow root, nylon mops etc. Nylon mops are very useful as once made they are practically indestructible and can very easily be sterilised for use again by boiling. Placing of the spawning medium is really of paramount importance; most types of fishes show a preference about where they spawn: by pushing through a clump, swimming up into it or swimming over it. When there is no definite guide as to what they might prefer, all three placings can be made in the same tank, and you will certainly learn which is preferred if any spawning is effected. A top and bottom combination is ideal for livebearers and quite large broods can be raised without recourse to a breeding trap. Most of the fine-leaved plants are highly suitable in sufficient quantity for use as spawning medium, and the floating plants, particularly water lettuce and broad-leaf Indian fern are very useful. So also are *Cryptocoryne* roots, shoots, runners etc., which will float and also produce new plants at the same time.

Lighting for spawning is a subject that is quite often overlooked completely. Very many of our smaller tropical fishes come from streams, ponds and ditches heavily overgrown with vegetation and not from open waters. Although it is natural for many fishes to seek the shallows for spawning, this does not mean that they want brilliant lighting. In fact it is only fishes like the zebra and other top-minnows from fast-flowing waters that really enjoy plenty of lighting. Many of the other popular aquarium fishes find it highly unpleasant to be put in a brightly lighted tank, so clean that there is also a lot of reflected light, and consequently they hide and show no inclination to spawn.

It is possible to keep the cleanliness of the tank but cut out the discomfort by the use of several devices or combination of devices to achieve the desired effect. Darken the bottom, by using peat where suitable; cut down side light by blacking out back and sides; use plenty of plants or plant substitute or both; use floating plants even though these are not required as part of the spawning plan. If the tank is then positioned where it receives about ½ hour of direct sun daily, preferably in the morning, it will probably be just right. If the tank is lighted by artificial light, then cut this down to about 15 watts.

Having taken all these things into consideration when forming a plan, put in the selected fish and you deserve success.

Betty Robertshaw

Breeding Habits

by LAURENCE E. PERKINS

(Photographs by the author)

WHILST browsing through my old copies of *The Aquarist* recently I came upon an article under the above heading by W. S. Pitt (in the Silver Jubilee number of May, 1949). Reading it again I was impressed by the variety of conflicting reports made by different observers of the breeding habits of bitterling that Mr. Pitt had collected together within the text of his article. It seemed inconceivable that eye-witnesses should be at such variance with one another and I determined to obtain a pair or so of these interesting and enigmatic little fish and to see which of the accounts subsequently reflected my own observations.

Bitterling Carp

A male and three females were duly acquired together with two mussels (*Unio pictorum*) and all were housed in a 12 in. by 8 in. by 8 in. aquarium. One of the females died within 2 days while I was still endeavouring to obtain live food, still in short supply after the severity of the winter. In lieu of *Daphnia Tubifex* was at length secured and the bitterling were fed liberally over a period of about 3 weeks until their fitness augured well for breeding. Before describing what occurred when breeding commenced it may be as well to supply a short description of the bitterling and its known habits.

Symbiosis (in which two different organisms depend upon one another for mutual survival) is nowhere more remarkably exemplified than by the strange partnership of the bitterling and the freshwater mussel. The bitterling, a small European fish of the carp family, uses the mussel as

Female (left, showing ovipositor) and male bitterling

of the Bitterling *(Rhodeus amarus)*

In the left picture the male bitterling is in position for his swooping dive over the mussel; above, the male has completed the dive and is discharging milt

an incubator for its eggs, which are laid within the mussel by the female. The young bitterling, when they have hatched and are ready to brave the rigours of life among their countless predators outside the sanctuary of the mussel's interior, emerge and go their separate ways. Clinging to bitterling, so it is said, will often be found tiny young mussels, which adopt this method of wide dispersal in the absence of their own ability to travel far or speedily. So much for what is known of this unusual relationship and now for the more contentious part of the story.

Appearance of Ovipositor

With the coming of spring and the imminence of the breeding season the female bitterling develops an ovipositor or egg-laying tube which hangs from the underside of the body immediately behind the ventral fins and measures about 1 inch in length or a third of the fish's total length. The mussel, a bi-valve, possesses two siphons. One is for inhaling water from which to abstract food as well as oxygen for breathing and the other is for exhaling. The inhalent siphon is fringed with tiny tentacles which filter off particles too large to be inhaled, for the mussel subsists on a diet of microscopic organisms. The exhalent siphon resembles a very shortened funnel.

Now it is widely held that the female bitterling inserts her ovipositor into the inhalent siphon of the mussel to deposit her eggs within the mollusc, but there are several perturbing objections to this theory as well as a number of reports by eye-witnesses who state differently. Firstly, the ovipositor is flaccid and appears in no way controllable by its owner and secondly its diameter is barely half that of the eggs it is supposed to convey. Thirdly, it seems

Close-up view of the anterior end of the mussel to show the two siphons protruding between the two shells: the lower inhalent siphon has a fringed appearance; the upper opening is the exhalent siphon

Female bitterling (with male in attendance) just about to strike the mussel with the base of her ovipositor

Enlargement of part of the picture at the foot of page 61. Note that the ovipositor is folded back and curls away behind the fish with its 'elbow' immediately above the mussel's exhalent siphon

unlikely that the mechanism of the mussel's inhalent siphon would afford admittance to such a clumsy affair. Finally, in view of the mollusc's instinctive reaction, when touched or alarmed, to close immediately, it seems likely that the ovipositor would become caught and damaged between the mussel's shells.

At the base of the ovipositor, where it joins the body, there is a separate protuberance and, according to a report of a dissection carried out at the British Museum (reproduced in Mr. Pitt's article to which I have referred), both the ovipositor and this smaller organ are connected with the oviduct. Armed with this mixture of fact and conjecture I prepared to watch and photograph my own specimens when, at length, they began to exhibit great interest in one of the two mussels sharing their aquarium.

Spawning Observed

The larger of the two females developed her ovipositor earlier than the other and this female, accompanied by the male, was observed examining the anterior end of the mussel where the siphons are situated. Circling round and round just above the siphons the two fish evinced signs of great excitement, the male being periodically convulsed with tremors, which appeared to increase the female's excitement. The male then assumed an almost vertical head-down position with his mouth no more than half an inch above the siphons. Then, his whole body trembling, he swooped down in a steep dive, flattening out so that his ventral and anal fins nearly brushed against the inhalent siphon. This was repeated three or four times and between each such sally he would approach the female and attempt to coerce her into emulating his performance. Showing little reluctance, she at length took up a similar position above the siphons and, appearing to take careful aim, suddenly and very swiftly dived down to bring that part of her body to which her ovipositor is joined, forcibly into contact with the siphons. This was precisely what Mr. Pitt had described in his article and with his observations in mind I particularly noted the position of the ovipositor at the time. It was trailing away to the side and quite definitely not within the mussel. For 3 hours I watched this performance, which was continuous, with the fish rarely straying more than a few inches from the vicinity of the mussel. Two colour films were exposed while the observations were made as well as one black and white film. Both fish were still engaged in spawning when I retired for the night.

The male's 'milting' dives seemed to be in a ratio of about seven to one of the females spawning dives, and preceded as well as followed her egg-laying.

The following day both fish were still busily engaged in spawning but by the time I was ready to take my ringside seat once more I had processed the black and white film and made prints. What they revealed entirely altered my outlook and focussed my attention on one particular spot, where, hitherto, I had been trying to watch several facets of the occurrence at once. The speed of the female's deposition during the first session had defied my sensibility to record what occurred exactly, but the speed of the electronic flash had proved its superiority by enabling the camera to record the position of the female and her ovipositor a split second before making contact with the mussel.

Bent Ovipositor

Several successive onslaughts by both male and female were photographed and while two photographs of the female showed her at the end of her dive, where she had landed in the gravel beyond the mussel, some had anticipated her actual contact and all showed the same phenomenon as illustrated in one of the accompanying photographs. The ovipositor was bent sharply back at the point where the auxiliary organ terminated and the 'elbow' thus formed was positioned immediately above the exhalent siphon. Subsequently, the colour film showed the same result.

Armed with a low-power reading glass, I settled down to watch once more and riverted my attention on the exhalent siphon when the female took up her position before egg-deposition. I had brought the mussel right up to the front glass of the aquarium so that I could enjoy a clear view of the side elevation and was able to see the bent ovipositor enter the exhalent siphon. After each contact was made it was noted that while the inhalent siphon remained undisturbed, the exhalent siphon was in a collapsed state, although it quickly resumed its normal position with its periphery rising just above the edge of the shell.

Sitting back to ponder after the fourth egg-laying dive (a full 2 minutes had elapsed), I was startled to see a solitary egg forcibly ejected from the exhalent siphon, and I was privileged to see the same thing occur the following evening after the second female (now ripe for spawning) had made an egg-laying excursion. As I write, both females are taking it in turn with the male to pay court to the second mussel, the first mussel having retired to a corner, where it has almost completely buried itself, loaded, it is to be hoped, with a fertile clutch of bitterling eggs.

Previous Descriptions

The eye-witness accounts previously referred to and quoted by Mr. Pitt are at such variance with one another that it becomes a matter of great perplexity, for the originators of these accounts are reputable persons and one wonders whether all bitterling behave the same or whether we have here a mutation taking place where some bitterling resort to the ovipositor whereas others, more (or less?) advanced, make use of a sub-ovipositor instead of the main one. One account states that the ovipositor is sucked into the inhalent siphon and another says that "a gonopodium-like spiny formation extends along the base of the ovipositor for half-an-inch, else this long flabby organ could not be introduced into the siphon". Another report states that the ovipositor is slid into the siphon and one more says that the ovipositor is rendered rigid by the introduction of urine into it under pressure because of an egg awaiting deposition further down the tube.

Had I not taken photographs which told me what to look for, my initial observations would have agreed in every particular with those made by Mr. Pitt, to whose original graphic account I am now able to add the above.

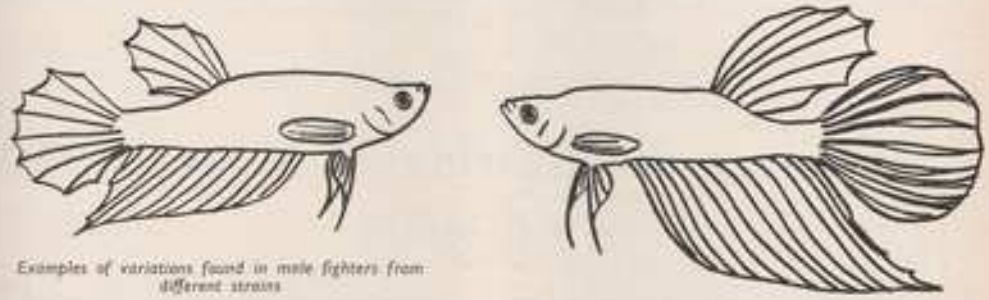
Better Colour and Finnage in *Betta*

by PETER HORN

WHEN I visited England I was surprised how expensive the Siamese fighting fish were, and how quite frequently they were not even of a very high standard. What are the qualities a good fighter should possess? Attractive colour and large fins. These are the two characteristics that the public appreciate and which are within the control of the breeder, and therefore are the accurate measure of his efficiency.

From the breeder's point of view there are more factors to be considered, namely the time taken to produce top-class specimens and the number of really beautiful fish produced per spawning. Fortunately we already know much about inheritance and the possibilities of applying its laws in our breeding activities, so the production of more really good fish with less labour is quite possible.

First let me discuss the problem of colour for the breeder. When mating similarly coloured parents one would expect all the offspring to resemble them. Unfortunately there is only one case where this applies, namely cambodia mated to cambodia.



Examples of variations found in male fighters from different strains

The available fighters at the present are, in the great majority, not pure-bred with regard to colour. Transmittance of colour from parent to offspring is complicated by the fact that dominance plays an important and sometimes disturbing part. For example, the green colour is dominant to the cambodia, partially recessive to the wild, completely recessive to the blue. The only means of discovering whether a fish is pure-bred (homozygous) or not, is to see what progeny are produced by it.

It is quite impossible to predict exactly the colour of offspring simply by looking at the parents. In practice this task is even more complicated simply because the great majority of the available stock possesses a 'wild colour' gene. This frequently appears in a cross, resulting in unattractive progeny.

Now let me deal with the other very important characteristic of our fish, the fins, and leave the breeding methods to be described later. Breeding superior fish involves the improvement of finnage as much as that of colour. At present one may find males with fins practically undistinguishable from those of females, and in contrast males with finnage that seems rather to be a burden to them. Between these extremes there is a tremendous variation in fin size. Between the inheritance of finnage and colour there is no link.

A pair of fish taken at random and mated produce offspring showing a great variation in the ability to develop long flowing fins. Some show good fins at 3 months, some never do, though the environmental factors they shared were the same. It seems probable therefore that the cause of variation is hereditary.

On the other hand there are strains inside which variation is very small. Very often these strains are the products of long breeding work, and the characteristic is more or less fixed. The illustration shows how two males of unrelated strains, although of the same age (3 months) and reared under identical conditions, may vary from each other. Each male, however, may be a typical representative of its strain.

These are basic biological facts concerning the two most important characteristics, which must be taken into consideration before starting to breed brilliant fighters successfully.

The first thing to do is to decide which colour one wants to breed. I would recommend choosing a pure colour (blue, green, red) and trying to reach uniformity of colour within the strain. The attempt to fix a very pretty colour pattern, which is apparently a combination of others, is bound to fail. Mating two such fish will always produce a large number of unpromising offspring that must then be discarded. Only a very small fraction might resemble the parents.

There are two ways of establishing a pure colour strain. One takes a long time, the other produces good results more quickly.

The first way is to select from each generation the pure coloured specimens for breeding stock. Usually this method takes a long time, and has a great inevitable drawback, which is that the other important quality of our fish (the finnage) cannot be improved sufficiently simply because in selecting for colour, the great majority of the fish might be discarded in successive generations.

It must be noted that the response to selection from generation to generation is dependent on the variation of the characteristic on which selection operates. The more extreme examples can be chosen to be the parents of the

next generation, thus giving a greater possibility of improving a characteristic in a shorter time. It is obvious that in a larger number of fish greater differences can exist between individuals, and therefore slection of breeding stock should whenever possible be made from large spawnings.

In our case the effectiveness of selection (for finnage) is reduced by the fact that it is practised only on the males. If selection could be made in both sexes the progress would be approximately twice as great. It is therefore of vital importance to have a pure coloured strain on which selection for two characteristics is reduced to one, the ability to develop good fins at an early age.

Establishing a Pure Strain

Let me describe a method by which a pure green strain was established from completely unknown "raw material" in 4 months.

A green male was mated to a wild-type female. The 96 fish obtained from this mating showed those colours: 19 cambodia, 21 green, 26 wild, 30 wild with more green.

The appearance of the cambodia (recessive) progeny indicated that both parents carried a cambodia gene. Six days after the first spawning the same male was mated to a green female. The 325 resulting offspring were all green. This could only be explained by the fact that the female was pure-bred for green colour. As the male (according to the test) was not pure-bred (cambodia, green) half of the offspring had also the cambodia gene, though there was no possibility simply by observation of discovering which individual was pure-bred and which was not.

To ensure that in following generations no more cambodia occurred the following procedure was used. When the green family was approximately 10 weeks old the most attractively finned males were separated in jars. As the best male of the selected group began to build a bubble nest, he was mated to a cambodia female. Cambodia fry are detectable immediately after hatching as they are much more transparent. The presence of cambodias amongst the progeny would indicate that the male used is not pure-bred for green, and the second best male should be tested in the same way. The females were similarly tested with a cambodia male. The mating of the pure-bred green fish produces pure green offspring and there is no need for further colour selection, so that we can focus our attention on the improvement of the other characteristic.

Two very important points should be noted. The first is that the male used at first should show very big fins. If no attention is paid to this it is possible that the ability to develop brilliant fins will be absent from our strain. If this aspect is not taken into consideration even the most careful selection may prove ineffective. There are strains having wonderful colours where this evidently has happened.

The second vital point is to ensure that the females used initially are completely unrelated to the male, as later matings are very close (e.g. brother to sister), which quickly leads to a highly inbred strain.

Economy in the Rearing of Fighting Fish

by J. H. BLAKEY

I HAVE been breeding *Betta* for 15 years now, and each year during breeding operations I have been searching for a system to keep many males separately without a lot of cleaning-out trouble and to avoid the soaring electricity accounts associated with running large tanks.

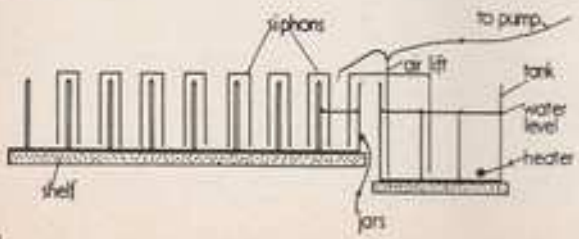
Six months ago I devised a system that I now use. It is very efficient, labour-saving and cheap to run. I use a tank size 15 in. by 8 in. by 8 in., an air-lift, 20 2 lb. jam jars, 15 in. lengths of rubber tubing and one 150 watt heater. All the equipment can be bought very cheaply.

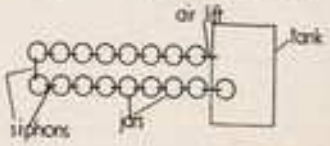
The 20 jars are placed in two rows of ten (two rows of eight are shown in the illustration) and the tank is placed at a level lower than the jars. The position of the tank is determined by placing a 2 lb. jar in the tank. The level of the top of the jar in the tank should be 3 in. lower than the top of the 20 jars outside the tank, which are all level with each other.

Air-lift

After the correct position is found the tank should be fixed securely and an air-lift placed in the tank. The jar in the tank is then filled with water and the tank is filled to within ½ in. of the top of the jar in the tank.

A piece of ¼ in. rubber tubing is placed over the top end of the air-lift and directed into the first jar. The tubing must not go deeply into the jar but just rest on the lip so that water will drip inside. Fill the first jar with water and cut 20 15 in. lengths of ¼ in. rubber tubing. Fill one piece of tubing with water and start a siphon from the first to the





Left, side view of arrangement of jars and heated tank; above, plan view of lay-out

second jar. Then repeat the process of making a siphon from jar to jar along the first row, across the end two jars and down the other row and into the jar inside the tank from the last jar (see illustration).

A check should be made to see that all the siphons are working properly.

The 150 watt heater maintains 82°F (28°C) in the tank and the air-lift is brought into operation so that a steady flow of water is pumped into the first jar. If the air lift is "gurgling" then too much air is being used, and this should be reduced by use of a clamp. It will be found that when the system is working the level of the water in the first jar will be 1 in. from the top of that jar and the water in the last jar will be level with that in the tank.

The difference in temperature between the water in the last jar and that in the tank will be found to be only 3°F (1.8°C).

A sheet of polythene is placed along the top of the jars to retain heat and to prevent dust entering. There is never any need to clean out the jars as the dirt is siphoned along the system and rests in the jar in the tank and can be removed from there. The jar in the tank is also a safety measure in that if all the water was to run out of the tank the level of the water in that jar would prevent water from leaving the jars containing valuable fighters; this is the reason for placing the tubing from the last jar in the jar inside the tank.

No Individual Feeding

When feeding with white worms I do not add them to each jar separately but place a lot of worms in the first jar, and each jar is supplied by the siphon system.

In the illustration only 16 jars are used, but any number can be used provided that the temperature in the last jar does not fall below 75°F (24°C).

The system can be used with confidence and leaves many other large tanks free to be used instead of being cluttered up with jars.

Flame Fish *(Hyphessobrycon flammeus)*

by JACK HEMS

WHAT a delightful little species this *Hyphessobrycon flammeus* is. Usually referred to as the flame fish, the red tetra, or the tetra from Rio, it is one of the showiest members of the family Characinidae you can possibly introduce into a community tank and, aside from its peaceful nature and pretty schooling habits, it is almost always on the go, has a life span of upward of 5 years, and thrives well on any small live or dried food.

Colour

Anteriorly the 1½ in. body is olive on the back shading to greeny-gold on the sides, which, just behind the gill covers, are ornamented with two black vertical bars. Posteriorly it is vivid red. The throat and belly are silvery white. The dorsal, anal and ventral fins are as fiery as the hinder part of the body and marked along some of their margins with black—an adornment more pronounced in a mature male than in a female. Another characteristic of the male sex is a straighter edged and fuller-looking anal fin. The pectoral fins are clear; there is a tiny, rayless, adipose appendage on the back near the tail.

In the wild state the fish is found in many of the fresh waters in the neighbourhood of Rio de Janeiro, a fact which gives the clue to one of its common names. Like some other Brazilian species, it does not need a high temperature, but 70°F (21°C) should be regarded as the minimum, for below that figure the fish is quick to contract white-spot disease or swim-bladder trouble.

Breeding Aquarium

To appreciate *H. flammeus* fully it should be viewed against a plant-filled or dark-coloured background under a bright overhead light. It is also recommended to give it soft, acid water for its normal day-to-day existence and for breeding. With regard to the latter, it is customary to do this in a scrupulously clean aquarium measuring anything from 12 in. by 8 in. by 8 in. up to 24 in. by 12 in. by 12 in. The only furnishings necessary are lots of feathery foliaged vegetation to catch the adhesive eggs, and a thin layer of thoroughly washed compost spread over the glass floor to rob it of its transparency and prevent distracting reflections. Stones or lead bands can be used to anchor the plants to the bottom. A temperature of about 75° to 78°F (24-26°C) should be maintained.

Nothing is more certain to bring an adult pair into spawning condition than separation for a fortnight or so, combined with a generous diet of live food. If live food is hard to come by, offer them as a substitute finely shredded (scraped) red meat, or shredded cooked shellfish such as prawn, shrimp or crab.

As soon as the female shows fuller sides and the male assumes a brighter, sprightlier appearance, it is time to place them together. If everything goes as planned, it will not be long before the male will start to show off and drive the female all over the aquarium. If she is ready for mating she will permit herself to be manoeuvred every now and again into the plants, where she will scatter some eggs. Ordinarily about 100 to 200 eggs are laid at a spawning, which may, with rests in between, take up most of a morning or afternoon.

Separate as soon as Possible

As soon as spawning is over, it is necessary to remove the parent fish to another tank without delay. Neglect to carry out this instruction will result in all the eggs being eaten in a fraction of the time that it took to produce them.

In about 2 days the fry hatch out, and while they are absorbing the contents of the yolk sac, hang head up from the sides of the aquarium and the plant life. Two days later all of them, tiny as the tiniest glass splinters, should be free-swimming and in urgent need for the next week or so of freshly cultivated Infusoria, supplemented if possible with thick green water, blobs of hard-boiled yolk of egg crumbled into a milk-moistened paste, or a branded fry food. Thenceforward brine shrimps, micro worms or tiny *Daphnia*, as well as powdery dried food, can be put on the menu.

With proper care and attention growth is rapid, and under ideal conditions near to full size may be reached within the space of 6 months. The colours in their bodies and fins appear in less than half that time, and a few score of the lively fry in their livery of silver and red and gold makes a truly unforgettable sight.

The Speckled Sleeper (*Dormitator maculatus*)

by Dr. R. O. B. LIST

Popular name: Speckled sleeper.
Habitat: Atlantic coast of tropical America. Sea and brackish water.
Normal adult size: 8—10 in. (20—25 cm.).
Breeding size: 2 in. (5 cm.).
Family: Eleotridae (gobies).

THIS is a pleasant fellow among fishes and is what I would call another one of Nature's oddities. There does not appear to be a great deal of information available on it and I have to thank, once again, those two stalwart friends of mine, Dr. Fugger and Mr. Steingdeffer. From information that I have gathered it does not appear that the speckled sleeper has ever been bred in the U.K. but reports are available from the Continent, and to these I must in this instance turn.

Reports are, however, varied on one point. Some people do not regard *Dormitator maculatus* as a community fish and say that they can be left alone only with large fishes. Others say that it is a peaceful aquarium inmate. So you pay your money and you take your choice. All reports agree that this species is extremely shy and very sensitive to shocks.

Avoid Shocks

The oddity about this fellow is that when shocked, even by a sudden approach or movement in front of the aquarium, the fish immediately begins to gasp very heavily and turns on its back. It also takes a little while for it to compose itself again and the owner may well think that he had lost a specimen! They do, however, gradually recover but sometimes it does take time.

They prefer a very heavily planted aquarium, one giving as much shelter as possible, and like to be disturbed as little as possible. They will accept all forms of live foods. Their full length and maturity is reached not in an aquarium but when free in natural surroundings. A newly caught specimen, when compared with an aquarium inmate, is so different in length and colouring, so clearly diverse, that one finds it difficult to believe that one is comparing the same species.

I can find no reports of the method of spawning, other than that the eggs are laid on rocks and stones, after these have been cleaned by both the male and female. The eggs are somewhat smaller than usual but usually very numerous. Eggs hatch out in anything from 20 to 25 hours at 76—78° F (24—25° C), but cases have been known where hatchings did not commence until after 30 hours at these same temperatures.

When fry rearing is difficult, as with some species, one must usually consider water factors such as pH and degree of hardness, and possibly cleanliness. Rearing fry of *Dormitator maculatus* is considered far more difficult than most of the more difficult species, but I can find no hard and fast conclusions. As the species is so little known it could be that it will tax the efforts of some of the more ardent aquarists, and set them a new series of problems for them to get their teeth into. Not many species have caused us to admit defeat, but before we can grapple with these problems we must await a supply of these delightful fish for us to work on.

Photo Lawrence E. Perkins

It is a very colourful fish, with a background of brown grey and having dark horizontal stripes. A very pronounced black band extends from the gill plate to the base of the caudal. A metallic blue spot is also to be found just behind the gill plates. Fins are dotted with blue and black with pale orange edges. The anal fin has a blue edge, and the ventrals are entirely separate from one another. The dorsal fin is in fact two fins, completely separate from one another, with no resemblance of any join between them.

When I saw some specimens abroad I was struck with two points. The brilliant colouring was delightful in both male and female (the latter being just that little bit less brilliant), and these fish would have looked positively brilliant in our usual aquaria. But here comes the snag, for it appears that you just cannot have everything. The fish do not like clear water. It must be just that little bit cloudy and they require more than the average oxygenation. When specimens do become more freely available, this last point might be regarded as a further obstacle for us to overcome.

Cacti in the Fish House

IT is not generally known that many cacti can be raised from seed and some caused to flower in the second year. Sow the seed finely on top of John Innes seed compost. Do not cover the seed but just press in the larger ones. Give warmth, moisture and shade. A temperature of 70° F is best and this can be obtained by placing the seed pan on the top of a tropical tank. Keep it covered until seedlings appear, then give air but no direct sun. The early part of the year is the best time as the seedlings get a better chance of growing to a useful size before the winter.

Breeding and Rearing Marbled Newts and Spotted Salamanders

Marbled newt (Triturus marmoratus)

by ROBERT BUSTARD, B.Sc.

(Photographs by the author)

THE subjects of this article, as the colour pictures show, possess an attractive coloration, and this they combine with a hardy nature. There is no reason why specimens should not survive in captivity for about 20 years.

The marbled newt (*Triturus marmoratus*), a native of Central and Southern France, Spain and Portugal, grows to about 6 inches in total length and is marked with bright green and black. The green is sometimes suffused with yellow. The ventral coloration is grey-brown. During the breeding season, late spring and early summer, male specimens develop a high dorsal vertebral crest, which dips down at the tail base and is then continued on the tail where it is present ventrally as well as dorsally. The crest of the male is marked with vertical bars of black, green and white. The habits of the marbled newt are similar to those of the great crested newt (*Triturus cristatus*), which is found in Britain. Each spring the adults return to the water to breed, after which, in mid-summer, they return on the land and hide during the day in damp places.

These two species of newts hybridise quite readily, and this takes place in Nature where their ranges overlap. This is possible because both forms have a similar type of courtship display, which is common to the genus *Triturus*, in which males develop a crest and during courtship deposit a spermatophore which the female picks up. Fertilisation, therefore, is internal as the spermatophore ruptures inside the female and fertilises the eggs before they are laid. There is, however, neither copulation nor embrace in this genus.

Aquarium for Marbled Newts

Marbled newts are best purchased during late April or May. At this time of year they should be placed in a 24 in. by 12 in. by 12 in. aquarium. Although this size is quite suitable for keeping them in, breeding is more likely to take place if a larger tank is available. The aquarium should have 1 to 2 in. of compost in which plants are established. It is always preferable to introduce animals to an established aquarium whenever possible, although this is not absolutely essential.

My favourite plants for egglaying newts are *Elodea canadensis*, the common Canadian pond weed obtainable from most ponds or slow flowing canals, or, failing this, water starwort (*Callitriche* spp.). Both have leaves which the newts can easily bend over the eggs. The *Triturus* newts lay eggs singly and each egg is wrapped in a leaf by the hind legs. The eggs are sticky and the leaves adhere to them. In the absence of ideal plants even small newts will successfully fold over the leaves of *Vallisneria*. The water should be at least 6 inches deep.

If it is hoped to breed the newts the tank should have fairly good illumination. If exposed to too bright light a protective layer of green algae will soon coat the sides of

the aquarium. The newts should be well fed—earthworms are the best food, and hiding places should be provided in the form of suitably arranged stones placed on the compost bottom. The arrangement of the tank has been mentioned in some detail since it is a key factor in achieving breeding success. By careful tank arrangement the author has repeatedly bred the smooth newt (*Triturus vulgaris*) and the palmated newt (*Triturus helveticus*) in a 10 in. by 8 in. by 8 in. aquarium. The twin aim must be to provide cover so that the newts are at home and to provide open spaces where courtship can take place and so that the males may be enabled to spot the females.

Courtship is interesting to watch: the male bends his body and curves the tail so that the tip is touching his flanks. He then vibrates the tail tip rapidly. This directs a current of water on to the female, whom he may approach and nudge from time to time. The female remains passive but after the male has laid the spermatophore the female picks this up in her cloaca. When the eggs have been laid (a careful search is necessary to detect them) the parents must be removed in about a week to another aquarium. Several weeks after egg-laying, tiny gilled tadpoles hatch from the eggs and feed on small aquatic animals, which are present in all matured water. Suitable food can be cultured by taking a gallon of pond water and adding to this a pint of "soup" made by placing a lettuce leaf in boiling water and leaving it exposed to the air for a couple of days. After about 14 days the pond water can be added to the aquarium at the rate of a pint every other day. Remove any sizeable insect larvae, leeches etc. (but not water fleas such as *Daphnia*, *Cyclops* etc.) before adding the water to the aquarium. Newt tadpoles develop their forelimbs first and after about 3 months the young are ready to metamorphose and measure about 2½ inches. At this stage stones that protrude from the water should be provided and the aquarium must be covered to prevent escapes.

After metamorphosis the young newts live on land like the parents. After the breeding season, when my newts are all on stones out of the water (these are provided after breeding is accomplished), I remove them to their summer quarters—a vivarium 30 in. by 18 in. by 15 in. high. This has 2 to 3 in. of damp soil with moss and moisture-loving ferns growing in it. Stones are provided as hiding places. A small pie dish sunk into the soil is the only water dish and a stone allows easy escape from this. This vivarium is ideal also for spotted salamanders, which can live with marbled newts during their terrestrial phase.

The spotted salamander (*Salamandra salamandra*) is a well-built species attaining a total length of about 8 inches. It has a wide distribution in Central and Southern Europe and Asia Minor. The coloration is conspicuous: it is an aposematic or warning coloration that has protective value to the wearer, as animals learn to avoid it—glossy black with bright yellow or orange blotches or stripes on the upper surfaces. The conspicuous appearance contrasts with the camouflage of the marbled newt, which if placed among grasses would be almost invisible.

Breeding the Spotted Salamander

The spotted salamander is entirely terrestrial, and even the embrace takes place on land. Many spotted salamanders are gravid when purchased and as female salamanders of this species can retain sperm up to at least 3 years after a single mating to fertilise their eggs, a birth is only a matter of waiting. Unfortunately many salamander owners do not realise that the young are born in the water. A small water dish sunk into the soil is essential and ease of partial access must be provided. When the female is about to deposit young she takes a hip bath, and the fully developed, limbed and gilled young are liberated in the water. When born they measure about an inch. One mating can lead to young being born early each summer for several years and a number of young may be born at intervals in any one year. Up to about 30 young at one time is usual.

When discovered the young should be removed to an aquarium with 3 to 4 in. of water. They metamorphose when 2 inches long, after about 4 months. They should be well fed on tiny water creatures and at birth are unable to tackle anything larger than sections of the smallest earthworms. *Tubifex* and other small aquatic life is ideal. The adult coloration appears when metamorphosis takes place and, like the marbled newts, they take several years to reach sexual maturity.

Adult salamanders thrive on earthworms. They will live with little attention provided that they are never overcrowded. Some collectors who breed their specimens successfully lose all of them from a fungal infection resulting from overcrowding. I make it a rule to provide several hiding places equally suitable so that all do not crowd under one stone. In addition I never keep more than three pairs in a vivarium of the size mentioned.

The specimens mentioned above can be purchased for about 7s. 6d. to 10s. each.

Spotted salamanders (*Salamandra salamandra*)

Questions of Interest to Guppy Breeders

Photo: R. Pengilley

with answers by JAMES L. KELLY, *Chairman, Fancy Guppy Association*

I have four tanks in my fish house that I would like to convert to fancy guppy breeding. A friend says I need more than four. How many would you say? What is the ideal size for them?

There is no fixed number of tanks needed to start fancy guppy breeding. It depends whether you are going to 'flock breed' (all together in one tank) or 'line breed', picking the best from each brood to sire the next. Some guppy breeders I know do well with less tanks than you; it depends on your skill. Small tanks become foul very quickly: 18 in. by 10 in. by 10 in. or 24 in. by 12 in. by 12 in. are the most popular.

At different shows I have seen guppies referred to as veiltails, though differing in finrays. Why is this? I thought a veiltail was one distinct type of guppy.

Each Guppy Society has a shape which each thinks is the ideal veiltail. In America the term is applied loosely to any guppy with a large caudal fin.

What should I look for when selecting fish to start a breeding programme?

Choose breeding parents for individual desirable traits, but please remember that feeding and good environment are still necessary to develop your fish's potentialities.

I'm told that sifted *Daphnia* make an excellent fry food. Could you describe an easy way of doing this?

Take a rotary type of can opener (the one that leaves the rim free from jagged edges) and cut out both ends of any medium-sized can. Fasten an old silk stocking over one end with an elastic band. Stand this in your container of *Daphnia* and you will find it will fill up with the finer *Daphnia*, leaving the larger ones in your container for your bigger fish.

Is there a minimum age at which male guppies can fertilise the females?

This is usually accepted to be about 5 weeks, hence the necessity to sex your fish as soon as possible if you want to keep your females virgin for breeding programmes.

Having sexed my fish at an early age I separated them. Now I find some of my females are pregnant despite my efforts to keep them virgin. Why is this?

This can happen for a variety of reasons. Though parthenogenesis (virgin birth) is now accepted as occurring by forward thinking breeders, this type of happening is usually due to perhaps a late developing male appearing unnoticed in your female tank, the unintentional transference of a male when netting your fish, or even to a male jumping from one tank to another. Care and tightly fitting cover glasses are essential to avoid a repetition.

I am told that guppies can give birth to large broods. What is the highest recorded?

My good friend Paul Hahnel in America staked his claim for 170, but now two American breeders have increased this to 181 and 189 respectively. No doubt we shall be hearing of even greater claims. I am satisfied if I can count up to 50!

It seems that different breeders have different names for apparently the same fish; one example is the American half-black veiltail. What do we call this type in Britain?

Most guppy breeders in Britain refer to this as the black

veiltail, but please don't confuse it with the German 'half-black'.

My guppies seemed to be doing well for a time but now they have suddenly taken to lying on the bottom and their usually flowing fins have closed up. What is wrong?

This could happen for a number of reasons: flukes, incorrect temperature, poor tank conditions, overcrowding. Try siphoning off one-third of the tank water and topping up with fresh water brought to the correct temperature.

Please settle an argument. My friend claims that once a female guppy is fertilised by a male she can have up to six broods without having been mated to another male. I say she can have only one.

Your friend is right. A female guppy can have up to six broods from one mating. This often gives rise to claims for virgin birth.

I would like to learn more about keeping guppies. Is there any Society I can join to further this aim?

Britain has two specialist bodies catering for your interests: The Fancy Guppy Association and The Federation of Guppy Breeders Societies. Send me a stamped addressed envelope and I will forward to you more details of each.

The fish I received from a friend in another part of the country recently have died. Now my friend suggests that he sends a pregnant female so that the young can be born in my aquarium water. What do you advise?

That fish born in your tank conditions would stand a better chance of survival is true, but whereas with a virgin female you could cross it with the male of your choosing you will have to rely on your friend's cross for the value of the fry from a pregnant female.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have bought a pair of veiltail goldfish and they have white slimy patches on them. I can wipe them off and have given the fish a bath in salt water for 4 hours each day for 4 days, but they do not seem to improve. What else can I do?

The fish may have a slight attack of fungus. It is hardly good enough to give a salt bath for 4 hours. The fish need to be in the solution all the time for about 4 days before a cure can be expected. The strength can then be lessened by adding fresh water.

How can I rear goldfish fry?

Read my book, *Coldwater Fishkeeping* (2s. 10d. post free from *The Aquarist*) or study the recent articles on breeding fancy goldfish printed in this magazine.

I have a pond 16 ft. by 8 ft. and about 28 in. deep. I was thinking of stocking it with 14 goldfish, 2 golden rudd, 2 golden tench and 6 golden orfe. Is this too many?

Your fishes will need space in which to grow, and so do not overcrowd. Try to imagine a piece of water the size of your pond taken from a natural pond, lake or reservoir. In such a piece of water how many fishes would you expect to find there? Maybe one or perhaps none at all. I used to do a lot of angling and have sat for days at times without getting a bite, dangling a fine active worm, which should have attracted at least one fish somewhere around. I doubt very much whether a piece of water of this area in the average natural water would hold more than one fish on an average.

I have had tropical fish and now intend to use the tank for moors. Shall I need heat for these or for any other fancy goldfish?

It depends on how the fancy goldfish have been bred. Many imported fancy goldfish have been bred under warm or even hot conditions and so they prefer the same conditions here. Usually they can be acclimatised to normal temperatures in the summer.

I have three ponds; two are quite clear but the third one is very green. Would activated charcoal in a filter be of any use to clear the water?

A filter would take a long time to clear your pond. The charcoal would soon be clogged with algae and fail to act. I think that you will find that this pond has less healthy, growing plant life in it than the other two ponds. This kind of thing often happens. I have a dozen coldwater cisterns in my garden, concreted over, in which I rear young fantails. One of these tanks is very green whereas all the others keep very clear. I have placed some underwater plants in the tank in place of the few that were there. These were in a sorry state, being partly covered with blanket weed. I had been away from home for a few weeks and this one tank had become foul. If you change most of the water in the green pond and refill you should find a better state before long, especially if you can put some underwater plants in.

Just over a year ago my wife bought six young goldfish and placed them in a garden pond. A month ago I saw several young fish in the pond. Is this very unusual for goldfish to breed in a garden pond?

It is quite a usual occurrence to breed goldfish in a garden pond. Goldfish can breed at just under a year in age and when less than 3 inches long. I know of a case where some small goldfish bred in the year that they were bought, and over a hundred fry have been counted so far this season.

I made a small pond in the garden and lined it with a motor car cover. I have put some young trout in but they are dying. What is the cause?

From your description of the actions of your fish I think they were poisoned. This may have been caused by foul gases in the water but more than likely through something from the car cover. It would have been better to use concrete for a lining of your pond.

I would be glad if you could tell me how to prevent fin rot from attacking my golden orfe. The pond holds 60 to 70 gallons of water and there are shubunkins and goldfish also in the pond.

Your pond does not appear to be very large and it is probable that you have too many fishes in it for them to keep healthy. Usually golden orfe are very resistant to fin rot. Orfe like plenty of space and very fresh water or they soon suffer. Check the size and number of fishes and reduce if necessary; also clean the pond out and refill with fresh water.

Many fish in my pond, especially the young ones, are attacked by fish lice. Is there anything I can put in the water to kill these?

Fish lice are fairly tough and anything you put in the pond to kill them would probably kill the fish as well. You may have to catch all the fish and give them the Detrol bath treatment as recommended before in these columns. This will clear the lice but another immersion after a fortnight would kill any young lice that hatch out later.

I have just made a pond 4 ft. 4 in. by 3 ft. 4 in.; how many fish can I put in it?

This is not very large and so you will need only about half a dozen fish. If you put too many in they will not thrive and grow. It is far better to have a few healthy fish than to try to overdo it by crowding many in. Fish about 3 inches long overall will be suitable.

Is it possible for a catfish to attack another fish? I have a moor and one evening it was all right but the next morning its tail was torn in shreds. The previous day I had introduced a catfish to the tank. Could it be that the catfish was hungry and went for one of the slower moving ones?

I have often written about the danger of using catfish (coldwater) as scavengers in tank and ponds. These fish can eat any fish up to three-quarters of their own size with ease. If they cannot get the fish in their mouth they can bite the ends from the tail. The tail of the moor will mend in time and a salt bath given occasionally will help.

I have recently set up a coldwater tank with plants and fish. My problem is that the two electric lamps, normal bulbs of 60 watts, will make the water too hot for goldfish. What do you suggest?

There is no need to have 60 watt bulbs on your tank: two of 25 watts will be quite sufficient. Even these can warm the top of the water but I have never found that this harms the fish in any way. I have used such lighting for many years with no ill effects. Have a glass covering, and leave about half-an-inch open at each end. Then see that the lighting cover has some holes at the back to let out some of the heat. There will then be no danger to the fish at all even if the lights are on for 8 hours a day.

GOLDFISH BREEDING

A Sure Method to Obtain Fry

by C. E. C. COLE

IN my last article I promised to tell you how to obtain lots and lots of goldfish fry—the raw material from which to choose your future breeding stock, in conditions where they would escape most of the normal hazards of survival.

First obtain a large container, a large pie dish or baking tin is suitable, able to hold 2 inches depth of water. Put water into this straight from the tap, not from your pond or aquarium. Leave it for 24 hours or such time as your fish are ready for spawning. You can wait, if you wish, until the males begin to push the females around, or you can previously net them and keep apart from the females until the latter are ready.

Stripping Technique

Both male and female must be readily available so that they can be caught within a minute or two of each other. The order of catching is of paramount importance. First catch the male and hold him so that only his vent is immersed in the water in the pie dish. Stroke his sides with a downward movement, from halfway between his pelvic fins and the base of his dorsal, downward and backward to his vent, at the same time moving him backwards and forwards across the dish. Milt will flow from him in an easily visible cloudy stream. Replace him in the pond or aquarium.

Immediately take the female and hold her in a similar position and stroke in the same place and direction. A stream of eggs will be released quickly and easily. Move her likewise backwards and forwards to distribute the eggs over the bottom and sides of the dish. Then replace her also in the aquarium. If no eggs are released when gentle pressure is exerted, on no account press harder to start a flow. The fish is not ready and should immediately be replaced. Very often her movements within your hand will be sufficient to release the eggs—no stroking on your part will be necessary.

On several occasions when I have netted out the female a number of eggs have been released into the net without my touching the fish at all. As an experiment I once suspended the net with the eggs adhering to it in shallow water. I had previously netted the male fish in the same net. Within 4 days I had a healthy hatching swimming in the net! Unbelievably easy, wasn't it?

Advantages of Stripping

The whole process of stripping fish in the manner described can be completed in less than 2 minutes. Compare this with the length of a natural spawning in a pond, which may take half a day or longer.

In plain water, without weeds or compost, the eggs are clean and likely to be free from pests. Remember that

Method of stripping the eggs from a female goldfish. The fish is held partly immersed in a dish of water and the sides are stroked with a downward movement (in the direction of the arrow) towards the vent

By using a diffuser stone and aerator food particles can be kept moving

the only part of the parents' bodies that was immersed in the water was the tiny area around their vents. Body flukes or other ectoparasites could scarcely be introduced except by the merest chance and the greatest bad luck. Nevertheless it is as well when stripping is complete to wait only a few minutes to ensure the maximum fertilisation before swirling the water round and emptying it away, replacing with fresh at the same temperature. The eggs will not fall out for they are semi-adhesive.

High Fertility

Moreover, as they are concentrated, and with nothing to obscure one's view, observation of the eggs is easy and their development can be checked with a hand lens. In the many hand spawnings I did years ago the percentage of fertile eggs was often as high as 95 per cent. When I tried stripping the female first the percentage was less than 10 per cent.

When the Goldfish Society of Great Britain was first founded a lot of work was carried out to find out how many eggs would be thrown by a single female at one time. Stripping females was the only reliable way to find their potentiality. I simplified my egg-counting as follows. Before filling my pie dishes with water (I used white enamel dishes) I marked the bottom and sides by drawing pencil lines vertically and horizontally down and across them, producing about 40 small areas, which were then numbered.

After stripping, the number of eggs in each area was counted, and the total noted on a piece of paper against the number of the square. Also noted was the number of fertile eggs and the number of infertile ones, although the count of these had to be delayed until it was obvious which were which.

I can therefore repeat confidently that if all the fry of a single female reached maturity our ponds would be solid with them.

Feeding the Fry

We now have a dish full of fertile eggs—what do we do next? If we have not already done so we can start some cultures of Infusoria going. The classic way to do this is to boil some chopped hay and strain off the water. To this liquid add a little dry, chopped hay. A scum will appear after a few days, and it is beneath this scum that the infusorians collect in quantity. It can be moved aside a little when removing the infusorians for feeding to the fishes, but should not be broken up if the culture is to continue active.

It is unlikely that we can culture sufficient infusorians to satisfy the appetites of our hundreds of fry. Supplementary food should be added in the shape of small quantities of dried egg, or the yolk of hard-boiled egg. Little and often is the rule to be followed. More of the egg is likely to be eaten if it is kept moving near the water surface where the fry tend to congregate.

The suspension of a diffuser stone just beneath the surface of the water, slowly emitting bubbles, will keep the particles of food suspended in the water for an appreciable time—long enough for most of it to be snapped up.

For the first 10 days after hatching the fry will come to little harm if fed in the pie dish, but after this they should be distributed in larger containers—preferably aquaria, but, if these are not available, in polythene or enamel bowls. *Daphnia, Cyclops* and brine shrimp can all be used to give a ration of live food, and gnat larvae and pupae and mayfly larvae all form excellent foods.

As soon as they are large enough to be seen easily, every fry should be closely examined. Among such a vast number there will be all sorts, good, bad and indifferent. Choose only the ones that show promise of the characters you most desire to see, and dispose of the rest. To do any good you just have to make up your mind what you want. For instance, you may like deep-bodied fish, or slim, pencil-like fish, fish with pig-like snouts or streamlined head profiles without a bump where the head joins the trunk.

Later you can select the earliest colouring fish and discard the slow or never-colouring kind, or vice versa.

Whatever you decide it will be best if you can ensure that the young fish spend their first autumn and winter in ice- and frost-free conditions, in water of a sufficient warmth to encourage them to keep eating. Then, as soon as conditions permit in the spring or early summer, they can be safely put into a previously prepared outdoor pool, stocked with plenty of natural live foods, where, accidents barred, they will never look back.

DISEASES OF FISHES

Tape Worms

Tape worm (Ligula species)

THE tape worms (Cestoda) that live in the belly of their host grow to such vast proportions that the internal pressure causes the belly of the victim to split open. The swelling is quite distinctive from that caused by other ailments such as dropsy, constipation etc., as there is a noticeable "cave-in" around the region of the heart. Spiny-headed worms (Acanthocephala) cause the death of their host by perforating the intestine.

Thread worms (Nematoda) cause the death of their host by inducing a serious inflammation of the internal organs such as the intestine, pancreas, liver etc.

There are no apparent symptoms during the early stages of infection, except a loss of colour and general debility, and by the time something serious is suspected, too much damage has been effected for there to be any chance of recovery. The kindest thing to do is to kill the affected fish, for nothing at all will be achieved by keeping the creature alive.

R. E. Macdonald

Aquarium Electrical Installation

by A. JENNO

ALL aquarists who maintain aquaria heated by individual immersion heaters with thermostatic control need to know how to provide the heaters with a safe and adequate electrical supply, and having provided it in the correct manner, to keep the system in proper working order.

This article will therefore describe a system suitable for a batch of aquaria, with additional supplies for lighting and aeration. Let us assume that an aquarist wishes to provide power for a batch of ten aquaria, each of which will use a heater, a thermostat and a lamp, and in addition power for two pumps that will provide aeration for the aquaria.

The first essential is to know the maximum total current that the circuit will draw from the supply. This is calculated by adding up the wattages of all the appliances in use and dividing this total by the supply voltage. If we assume that the heaters are 100 watts each, the lamps 60 watts each, and the pumps 10 watts each (thermostats, of course, draw no current), then the total wattage for our example will be:

Heaters	10 × 100w	= 1000w
Lamps	10 × 60w	= 600w
Pumps	2 × 10w	= 20w
Total wattage		= 1620w

Assuming the supply voltage to be the normal 240 volts, then the maximum total current will be: 1620w/240v = 6.75 amperes.

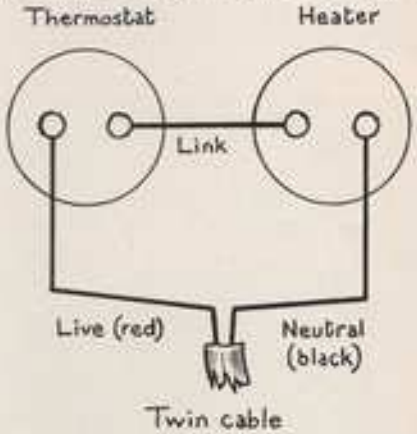
It is normal electrical practice to install a system that will carry rather more current safely than is actually required, so in this case a 10 ampere supply would be used. The first part of the circuit required then will be a connecting cable from the electricity authority's supply terminals to bring the voltage supply to wherever the bank of aquaria is to be situated. For a 10 ampere circuit this cable will need to be what is termed '10 amp. twin core with earth', which consists of two 10 ampere, insulated, current-carrying wires and an earth wire, the whole cable being covered by a second insulating sheath.

This cable should be run from a position near the aquaria to the electricity authority's terminals but should not be connected to them, for reasons which will be explained later. At the other end the cable should be connected to a switched fuse box, which in this case should contain two 5 ampere fuses, a common neutral point, an earth terminal and a double-pole isolating switch. This switch will allow the aquarium circuit to be switched off safely without causing inconvenience to other circuits in the building, and the fuses will enable us to split the 10 ampere total circuit into two 5 ampere circuits, one for the heaters and the other for the lamps and pumps. By using this method the supply to the heaters will be maintained should a fault occur in the other circuit since only the lamp and pump circuit fuse will be blown.

The heater circuit will be considered next. There are various methods for connecting the heater and thermostat to the supply. One very common method is to use small terminal blocks or connectors to join the leads. This system has its limitations, however, and tends to encourage the use of odd pieces of wire of various sizes and can become dangerous when used by persons whose electrical knowledge is limited. I would like therefore to suggest two alternatives that are much more dependable.

The first method is to substitute for the connector blocks a proper plug and socket assembly. This is a better method but the drawback is that if the plug and socket assembly is allowed to hang freely with the wire, as it normally is, and the wires are disturbed, the plug may drop out and the fault may not be discovered until too late.

The other method, which I strongly recommend, is to use two supply sockets mounted on the wall behind the aquaria and to connect the sockets in such a way (see diagram) that the heater and thermostat can be plugged directly into these. This then eliminates junctions in the wiring between the supply socket and the aquarium.



Method of connecting two sockets to receive heater and thermostat adapters

One point always to remember when wiring up aquaria or any electrical appliance is that the live side of the mains supply should always be the side which is switched by the thermostat. This is recognised electrical practice and should always be adhered to for safety, as if an appliance has its neutral lead switched instead of the live lead, then the appliance will still be 'alive' even though switched off, with obvious possible results. If two sockets are used in the manner described above, the 5 ampere size will be found necessary to make the connections efficiently with the mains cable used in this example, as its thickness prohibits its use with smaller sockets. The sockets should, of course, be fitted to a mounting board and this firmly fixed to the wall behind the aquarium.

When all the heater supply units have been made up and connected together with 5 ampere twin-core cable, the circuit can be joined into the switched fuse box, which

should be mounted firmly on a wall and in a position where it will not be accidentally switched off. The live side of the heater supply cable (that which is connected to all the thermostat sockets) should be connected to one of the fuses in the switch box and the other side of the cable (connected to all the heater sockets), should be connected to the common neutral point, also in the switch box.

The lighting and pump circuit can now be wired up. In this case it will also be a 5 ampere circuit and will also use 5 ampere twin-core cable. It is recommended that a batten lampholder be fitted to the wall behind each aquarium and the lead from each reflector connected into this by means of a normal household bayonet plug. This allows a lamp to be inserted when the reflector is removed from the aquarium and provides light for cleaning and other aquarium maintenance.

Two 5 ampere sockets will also be required in the circuit at convenient points to supply power to the pumps, a single-pole switch for switching the current to the lamps and a small junction box so that the pump sockets can be connected into the circuit in front of the lighting switch and thus be supplied with power whether the lamps are on or off. Having wired up the circuit, the live side of the supply cable (that connected to the lighting switch) should be connected to the second 5 ampere fuse in the switch box, and the other side of the cable should be connected to the common neutral point.

The only things now remaining to complete the installation are the earthing system and the connection of the mains supply cable to the electricity authority's terminals. It is unfortunate that many aquarists just do not bother to earth their tanks. It does entail a certain amount of trouble, but it is desirable that any article containing water, in which electrical appliances are used, should be efficiently and effectively earthed. *(It is recommended that advice should be obtained from the aquarist's local electricity authority before this is attempted.*—EDITOR.) One of the best methods is to clean off the paint from part of the underside of the aquarium frame and also clean off a similar area on the metal supporting stand if one is used. A small copper plate can then be inserted between tank and stand and will be held in position by the weight of the tank. The earth wire should be soldered to each of the copper plates in turn and finally joined into the switched fuse box at the earth terminal.

The circuit will now be complete, but must be inspected by the electricity supply authority, who will then join the mains supply cable into their supply terminals. This is necessary because while the electrical circuits in any building are the responsibility of the owner, the incoming cable and its terminal box are the property of the electricity authority and must not under any circumstances be interfered with by the consumer.

A final point to remember when the circuit is in use is that wherever there are several aquaria, there will probably be a certain amount of condensation present. The circuit should therefore be protected against this as far as possible and all plug sockets and lampholders not in use should have plugs or 'dead' light bulbs fitted in them to help prevent the entrance of water, and also the aquarist's fingers!

HOUSE-PLANTS IN THE FISH HOUSE

Aphelandra squarrosa Louisae

THIS striking plant was first introduced to this country a few years ago and won immediate acclaim for its striking appearance. The upright habit is well illustrated in the accompanying photograph. The leaves are dark green, striped with cream, and the yellow flowers are surrounded by greeny yellow bracts. This Brazilian plant is an ideal plant for the fish house, as it thrives in a warm humid atmosphere, but it prefers diffused rather than direct sunlight. A minimum winter temperature of 50°F (10°C) is necessary if attacks of fungus are to be avoided, for this plant requires more water in the colder months than most other house plants.

Aphelandra, like other forest shrubs, needs a good peaty compost. A good mixture is 2 parts of loam, 1½ parts of peat or leaf mould, 1 part of well-rotted cow manure, ½ part of sand and a little bone-meal. The showy yellow flowers are produced only when the plant is allowed to become pot-bound, and liquid manure feeds should be avoided until the buds are advanced. Aphelandra is a perrenial plant and requires re-potting each spring.

Cuttings may be taken from the shoots which develop in the axils of the leaves as a result of the dead flower heads being removed. They mature quickly in a temperature of between 65° and 75°F (16—23°C), and when a good root ball is produced they should be potted in a 5½ in. pot. Small insect pests have a tendency to attack the leaves and bracts and spraying with a good insecticide may be necessary if this occurs.

Barry R. James

A JUDGE'S THOUGHTS ON JUDGING FISH

Condition and Deportment

by FRANCIS BARRATT

HAVING dealt in previous articles with the more obvious parts of judging, we come to the final part of the 'five twenties'—condition and deportment, and this is the part of judging that is least understood by exhibitors. Indeed, I know that some judges choose either to ignore this section altogether or to use these points as a kind of balance to bring the points to a total decided beforehand.

A lot of thought and many years of judging experience went into the compiling of the 'standard method of pointing' and no part of it can be ignored without imperilling the possibility of a fair result. Of the 20 points, it is usual to give 10 to condition, which is soundness of body and fins, and 10 to deportment, which is swimming activity and carriage of fins.

Condition

First we examine for disease. Any obvious diseases will, of course, have been noticed before reaching this stage and the entry disqualified. What we have to do now is to decide if what looks like a slightly frayed fin is actually the first stage of fin-rot; if the dulling open eye is due to old age or cataract; if the suspicious bulge of a female is over-ripeness or early dropsy. Though it is generally recognised that these and the other diseases of fungus, white spot, velvet, pop-eye etc. are cause for disqualification it is very hard to find confirmation in any rules. Exceptions are the Federation of British Aquatic Societies in their Standards for goldfish and the Goldfish Society of Great Britain in their Handbook, who both rule that any fish showing signs of deformity or disease shall be disqualified.

Next we look for damage to fins, such as splits, frayed ends or pieces missing, taking care not to punish again for faults down-pointed under fins, such as deformed rays or holes. It is very difficult to make a scale of points to be deducted for these faults. A slight split is usually a very temporary trouble and not serious, but a split right to the base of the fin makes a much more disagreeable sight, even though it may heal quickly. Frayed ends, being slow to repair, we can treat more seriously.

The body is searched for cuts, bruises and damaged or missing scales. These can be caused by injudicious handling when catching to bring to the show, and are often overlooked by the exhibitors. Fresh wounds of a very slight nature may just merit loss of points, but a cut that is open and showing tissue below the skin must disqualify. It is no exaggeration to say that such wounds will appear in fish in the show tanks; a fish with one eye hanging on its cheek was exhibited some time ago, the eye having been caught in the net on release of the fish into the tank.

Abnormal conditions of the gills are nearly always of a serious nature as far as pointing is concerned. Short gill covers will have been noted under 'body' as being a fault of development, and very bad cases will have been disqualified. 'Gaping', a condition where the gills do not close properly, is usually a sign of age or ill-health and seldom disappears. The appearance of red gill membrane often accompanies this condition as a further sign of trouble. All these faults are ugly, and we cannot allow prizes to go to such specimens even though they have high points in other sections.

When assessing the number of points for condition we should think of all the faults this fish has and decide whether the total effect is 'good', 'fair', 'poor' etc., just as we did for body, colour and fins, but this time only half of the points are given to each grade. If no fault can be found 10 points are given, 9 or 9½ for 'very good', 7½, 8 or 8½ for 'good' and so on, down to no points for 'bad'.

Deportment

Deportment is another source of argument between exhibitors and judges. Often a large, well-shaped beautifully coloured fish will be sitting on the bottom of the tank or jar with fins half-closed. This can cost the exhibit most of the 10 points under this heading, and as the first four places in a good class are often covered by 5 points, there is going to be some controversy if the implications are not properly understood by all.

To get full marks for deportment an exhibit should have all fins extended fully and be moving about the tank in a manner typical for its species. The kind of fin carriage to look for is what we see in courtship displays by most males, and mostly the females respond by similar action.

The ideal manner of swimming can vary so much from species to species that no amount of written description can be adequate. Danios are a constant blur of erratic movement; barbs are only slightly more sedate. Cichlids are likely to hang quietly for a spell before moving to a fresh position, gouramies glide smoothly round, with an occasional peck at the surface for air. Catfish are the real problems here, because so many of them are by nature nocturnal, or are shy and retiring. In jars most of them are hopeless, and will sit on the bottom all closed up. We ought not to make allowance for this when pointing, but if one of the less active species is alert, fins well spread and erect, yet not moving about, we can be fairly generous with the points. When the points out of 10 for deportment have been decided, add them to those for condition, and enter the total in the appropriate space on the judging sheet.

We now add up our figures and arrive at the "moment of truth". Has the one we had our eye on for first place got the most points? So often it has not, and so often it is only by the odd point or two it could have had if it was swimming about a bit, or had its fins erect. The odds are that we have two or three with the same number of points, and we have to decide which one to take up as winner. The accepted course is then to give a careful look at all the pointing, and if adjustment is indicated by a second look, do so; otherwise give the benefit to the one with most points for size.

If these are equal, continue down the paper until one is found to have the most points for body, colour, fins or condition and deportment. It is very, very rare for two fish to be equal all the way down, and if it is necessary to separate them it is best to come back after a little while, when one will be a bit brighter or a little more active than the other.

If we are satisfied that our points for each factor of

Continued overpage

Our Readers WRITE

Chemicals for the Aquarist

CONGRATULATIONS on Mr. J. D. Loader's article on "The Use of Chemicals for the Aquarist", published in the May issue. There is one point which I think should be made, however.

For the salt treatment, Mr. Loader mentions lump salt and non-iodised cooking salt. For the cut-lump salt the Table of equivalent measures on page 28 is reasonably accurate, but in many parts of the country cut-lump salt is no longer obtainable, and instead of it cooking salt is sold in 1½ lb. and 3 lb. bags. Users of this salt will find that one heaped tablespoon could weigh as much as 4 oz., and even a flat spoonful will weigh 2 oz., instead of the ½ oz. quoted in the Table. The result might be a solution between 400 per cent and 800 per cent of desired strength.

I think that you will agree that this is important enough to be mentioned.

L. C. Noble,
Nailsworth, Glos.

IN your May issue there was an article on "The Use of Chemicals for the Aquarist". As a beginner I avidly read this, and applied the treatment for fungus, using common salt. In the "Treatment and notes" column it stated that there would be no effect on plants. I found that although I followed the instructions exactly, quite a few of my plants went brown and died.

As a beginner I look to your magazine and articles in it for information and guidance, and I am very surprised and disappointed at this misleading information.

K. J. Nowlan,
Tongham, Surrey.

New Zealand Request

MR. Bill Freeth, public relations officer of the Auckland Aquarium and Pond Society Inc., has written to ask us to solicit the co-operation of British aquarists' societies with his organisation. His idea is for societies to make tape recordings, of 15 to 30 minutes playing time, of members discussing any aquarium or pond subjects, the tapes to be exchanged with similar ones from the New Zealand aquarists. "After use by our Society we would pass the tapes on to the 14 other societies in this country" writes Mr. Freeth, who would also like to know if anyone has films or slides on aquarium-keeping for sale. His address is Box 1578, Auckland, New Zealand.

Condition and Deportment

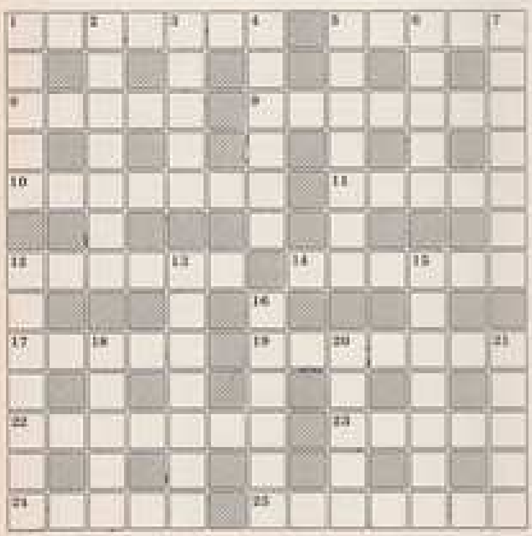
continued from page 75

judging are fair, then the result will be a fair one. Remember that any fish which has been considered "good" has for each factor received 15 or more points, each time, a total of 75 to 85 points—usually enough to be 'in the cards' in a good class. More than 85 is unusual and over 90 very rare indeed.

It may be that some people consider the use of the formula I have given a bit complicated. I find the reverse to be true. The first thing to enter our mind on looking at a fish critically is 'good', 'poor', fair', 'very good' and so on, and this formula is simply a table to convert these grades into points. Try it yourself and see what good results you get.

The AQUARIST Crossword

Compiled by L. BRADLEY



CLUES ACROSS

1. One-eyed fish food? (7)
5. Black ones belong to the goldfish group (5)
8. No area producing gas (5)
9. Minute pond animal (7)
10. Origin of sea cave (7)
11. Rather big among spectacular genus (5)
12. Restore to the original red rise (6)
14. Season before nativity (6)
17. Of Ionia (5)
19. State definitely that it was the last newspaper (7)
22. *Actinia equina* (7)
23. Sheepshead ——— (5)
24. The place we live in (5)
25. Told (7)

CLUES DOWN

1. Many own this funny man (5)
2. Hybridised (7)
3. The honour points to the fat (5)
4. *Ceratopteris thalictroides*, the water variety (6)
5. Spotted a traveller in a mixed model (7)
6. To make a proposal (5)
7. A present form of snake (7)
12 and 13. *Pelmatochromis kribensis* (7-7)
13. See 12 *down*.
15. The graceful catfish? (7)
16. Used to keep the aquarium at 75°F (6)
18. Lack of gas (2, 3)
20. A gem of a gourami? (5)
21. Strangely enough one can sit in it (5)

Solution on page 78

News from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 15th of the month preceding the month of publication.

AT the May assembly of the **Guest Keen & Nettlefold's Pond and Aquarium Society** the Chairman welcomed visitors from Tipton, Wolverhampton and Walsall Societies. The main item was an Inter-Society Table Show with the Walsall Society, classes being 1, Barbs; 2, Livebearers; 3, Characins.

The judge for this show was Mr. P. Stokes (Wolverhampton) and the results were as follows:—Barbs: 1, T. Lowe (GKN); 2, Mr. Pinches (Walsall); 3, J. Taylor (GKN). Livebearers: 1, P. Hatch (GKN); 2, E. Hyde (GKN); 3, G. Davies (Walsall). Characins: 1, T. Lowe (GKN); 2, C. Richards (GKN); 3, B. Pickering (Walsall). The Best Fish in Show was awarded to Mr. T. Lowe (GKN). G.K.N. won the show by 15 points to 4 points and so retained the trophy.

There was also a Table Show for Guppies for G.K.N. members. The judge for this was Mr. H. Williams (Wolverhampton) and the result was as follows:—Males: 1, C. Richards; 2, H. Fellows; 3, E. Hyde. Females: 1 and 2, E. Hyde; 3, H. Fellows. Best Fish in Show was awarded to Mr. E. Hyde.

* * *

AT a meeting of the **Loyne Aquarists** a very interesting talk was given by Mr. Preston of Kirkby Lonsdale on the Breeding of Siamese Fighting Fish and he demonstrated a unique method of feeding the baby fish during the hours of darkness to promote rapid growth and make better fish due to the increased feeding hours. Many questions were asked by members and answered by Mr. Preston who was later thanked for an interesting lecture by the Chairman Mr. D. James.

Mr. J. Mercykel and Mr. M. Cropper tendered their resignations as Secretary and Treasurer respectively due to being transferred by their employers to Birmingham and Leeds. The resignations were accepted with great regret as both were founder members of the Loyne A.S. and they will be missed by all members. Mr. J. Mills, was appointed Secretary and Mr. E. Riley was appointed Treasurer. Future meetings during the summer months will be held on the last Thursday of the month.

* * *

THE results of the second Annual Show of the **Thorne A.S.** were as follows:—Livebearers: 1, Mr. F. A. Filbger (Derby); 2, Mr. M. C. Davies (Derby); 3, Mr. E. Smith (Notts. & District). Anabantids: 1, Mr. Duckitt (Skipton); 2, Mr. Revell (Hull); 3, Mr. J. Gray (Thorne). Danios, Rasboras and Minnows: 1 and 2, Mr. H. Grainger (Don Valley); 3, Mr. K. Brant (Thorne). Cichlids: 1, Mr. F. A. Filbger (Derby); 2, Mr. Duffield (Rotherham); 3, Mr. C. Walker (Oseam). Catfish and Loach: 1, Mr. C. Walker (Oseam); 2, Mr. M. Hobson (Thorne); 3, Mr. Wilson (Worksop F.K.). Characins: 1, Mr. P. Reynolds (Leeds); 2, Mr. Duckitt (Skipton); 3, Miss Mitchell (Hull). Egg-Laying Tooth Carps: 1, Mr. D. Smith (Tadcaster); 2, Mr. Duffield (Rotherham); 3, Mr. Cranswick (Featherstone). Barbs: 1, Mr. H. Grainger (Don Valley); 2, Mr. McGill (Lincoln); 3, Mr. M. C. Davies (Derby). Fighters: 1, Mr. S. Hardy (Tadcaster); 2, Mr. H. Goodwin (Oseam); 3, Mr. Cranswick (Featherstone). A.O.V.: 1, Mr. M. C. Davies (Derby); 2, Mr. F. A. Filbger (Derby); 3, Mr. Lindley (Notts. & District). Breeders Egg-Layers: 1, Mr. Pemberton (Tadcaster); 2, Mr. G. Lowe (Thorne); 3, Mr. Whitlock (Tadcaster). Breeders Livebearers: 1, Mr. K. Hardwick (Thorne); 2, Mr. Baxter (Tadcaster); 3, Mr. G. Lowe (Thorne). Marine: 1, Mr. F. Mulgrill (Hull). Best Fish in Show: Mr. M. C. Davies, of Derby Show Group.

* * *

RECENTLY **Newport A.S.** were invited to compete in a four way inter club show held at Llantarnam Major. Several awards were won and included the following:—Cichlids A.O.V.: 1 and 2, Mr. J. Wall. Guppies A.O.V.: 1, R. Harris. Several other awards went to Messrs. G. James, C. Salmon, G. Thomas and D. Boyce.

At a table show held in Newport awards were won as follows:—1, G. James, 2, 3 and 4, Mr. R. Kelly.

* * *

THE result of a challenge table show between **Chingford A.S.** and **Tottenham A.S.** was a win for Tottenham by 18 points to 2. The Class of Characins was won by Mr. Clements, second being Mr. Knight and third, Mr. Clements.

In a Class for Catfish, Mr. Barnes was first, Mr. Clements being second and Mr. Bundle was third. The judge for the evening was Mr. Meadows. A most enjoyable game of Criss Cross quiz ended the evening's entertainment. New members, beginners or otherwise, can be sure of a friendly welcome and every effort will be made to assist them to enjoy the hobby.

Meetings are held on the second and fourth Thursday in the month at the T. I. and R. Club, 604, High Road, Tottenham, N.17.

* * *

THE meetings of the **Wolverhampton and District A.S.** are held on the third Thursday in each month at "The Mitre," Victoria Street, Wolverhampton. Old and new members will be welcomed. The Secretary is Mr. F. Bolton, 22 Arnhem Road, Willenhall, Staffs.

* * *

THE **Stourbridge and District A.S.** have changed its meeting venue. Future meetings will be held at the "Crispin Inn," Stourbridge (near Library) commencing Wednesday, 19th June, 8 p.m. and fortnightly thereafter. At the recent Annual General Meeting the following committee members were elected: Chairman: Mr. W. T. Smith. Vice Chairman: Mr. J. Bennett. Show Secretary: Mr. H. Oliver. Treasurer: Mr. B. Baker. Librarian: Mr. N. Morris. Secretary: Mrs. V. M. Clinton, 44, Dunstall Road, Hasbury, Halesowen, Worcs., from whom all information can be obtained.

* * *

MEMBERS of the **Dewsbury and District A.S.** enjoyed a very interesting talk by Dr. G. Cust, a former member of the Society and now resident in St. Albans. Dr. Cust gave a very interesting talk illustrated with slides on "Cichlids." Recently Mr. D. Dunford, a society member, spoke to other members on the Jordanella Floridae, and described their breeding habits as he had observed them. All were agreed that it was a most interesting evening.

The Perrin Cup, awarded annually for single fish, any variety at one of the monthly table shows, was won by Mr. G. Cooke with a beautiful Bedotia Geayi, Mr. A. A. Brown was second and Mr. A. Bradley third.

* * *

THE third meeting of the recently formed **Leamington and District A.S.** was held in May and again the attendance was good. Mr. Price gave a lecture on setting up an Aquarium which was enjoyed by all. The results of the first table show were:—1st Class: 1 and 3, Mr. D. Lunn; 2, Mr. Turner. 2nd Class: 1, 2 and 3, Mr. Russell.

* * *

AT the annual general meeting of the **High Wycombe and District A.S.** the Officers elected were as follows:—President, Mr. Gillett; Chairman, Mr. K. Morgan; Vice Chairman, Mr. Nicholson; Secretary, Mr. D. V. Lewell, 27, Cambridge Crescent, High Wycombe, Bucks.; Editor, Mrs. F. Wass; Show Lecturer, Mr. D. Chadburn; Treasurer, Mr. T. Wilkinson; Librarian, Mr. E. Chatfield; Committee, Mrs. A. Greenhill, A. Smith, R. Baynton. The Open Show will take place on the first Saturday in September and all friends of the Society are welcome.

* * *

THE results of the Open Table Show of the **Bradford and District A.S.** were as follows:—Livebearers: 1, Mr. Smith (Nottingham & Dist.); 2, Mr. Fletcher (Bradford); 3, Mr. Taylor (Blackpool). Barbs: 1 and 3, Mrs. Kelly (Manchester); 2, Mrs. Riley (Nottingham & Dist.). Characins: 1, Mr. Duckett (Skipton); 2, Mrs. Lindley (Nottingham & Dist.); 3, Mr. Reynolds (Leeds). Carps and Minnows: 1, Mr. Reynolds (Leeds); 2, Mr. Ford (Bradford); 3, Mr. Mills (Nottingham Tropical Fishkeepers). Anabantids: 1, Mr. Gray (Thorne); 2, Mr. Duckett (Skipton); 3, Mr. Glidden (Don Valley). Fighters: 1, Mr. Cranswick (Featherstone); 2, Mr. Pemberton (Tadcaster); 3, Mr. Baxter (Tadcaster). Cichlids: 1, Mr. Crook (Blackpool); 2, Mr. Pemberton (Tadcaster); 3, Mr. Liddle (Middlesboro'). Catfish and Loaches: 1, Mr. Hoover (Halifax); 2, Mr. Firth (Bradford); 3, Mr. Holmes (Bradford). Toothcarps: 1, Mr. Cranswick (Featherstone); 2, Mr. Greenall (Tadcaster); 3, Mr. Wilman (Blackpool). A.O.V.: 1, Mr. Moorhouse (Bradford); 2, Mr. Holmes (Bradford); 3, Mr. Mills (Nottingham Tropical Fishkeepers). Breeders Livebearers: 1, Mr. Baxter (Tadcaster); 2, Mr. Fletcher (Bradford); 3, Mr. Smith (Nottingham & Dist.). Breeders Egg-Layers: 1, Mr. Whitlock (Tadcaster); 2, Mr. Pemberton (Tadcaster); 3, Mr. Lowe (Thorne). Coldwater: 1 and 3, Mr. Moorhouse (Bradford); 2, Mr. Booth (Bradford). Best Fish in Show: Mr. H. Cranswick of Featherstone with a Red Fighter. The Inter-Society Match between Blackpool and Bradford resulted in a win for Bradford the score being Bradford 28 points, Blackpool 17 points.

* * *

THE members of **Leith Aquarium** Club were entertained recently by an extremely fine film show given by the George Heriot School Sub-Aqua Group on their latest exploration in the Orkneys and the underwater shots were excellent as was the colour.

There were two table shows held recently and the results were as follows:—Egglayers: 1 and 2, Mr. C. Barr; 3, Mr. D. Paterson. Livebearers: 1, Mr. C. Barr; 2, J. Hemmingway. Breeders: 1 and 2, Mr. Paterson; 3, Mr. J. Duncan. Egglayers: 1, Mr. A. Halliday. Livebearers: J. Hemmingway. Breeders: 1, J. Evans. Minnows: 1 and 2, D. Shade; 3, E. Stuart.

* * *

THE **Willesden and District A.S.** recently played host to the Hounslow Aquarist Club, in the First of a series of competitions to be held this season.

Hounslow provided stiff opposition and won the show by 30 points to Willesden 10. Mr. F. Riddle judged the show. The results of the competition were as follows:—Barb Class: 1, Mr. Pratt of Hounslow with a Spanner Barb. Catfish Class: 1, Mr. Porter of Willesden with a Clarias Catfish. Labyrinth Class: Master C. Smith of Hounslow with an Opaline Gourami. Toothcarps: Mr. Pratt (Hounslow) with a Limia. Best Fish in the Show Award: Mr. Porter with a Clarias Cat. New Members would be very welcome.

* * *

THE first annual open Show of the **Don Valley A.S.** proved highly successful, there being a total of 229 entries. The results were as follows:—Livebearers: 1, M. Fletcher (Bradford); 2, D. Wells (Thorne); 3, E. Smith (Sunbury). Barbs: 1, B. Moss (Leeds); 2, J. Hobbs (York);

3, H. Grainger (Don Valley). Characins: 1, H. Grainger (Don Valley); 2, B. Bruce (Staithes); 3, P. Reynolds (Leeds). Carps and Minnows: 1, C. Holmes (Don Valley); 2, H. Grainger (Don Valley); 3, G. Sweeting (Thorne). Fighters: 1 and 2, M. Baxter (Tadcaster); 3, S. Hardy (Tadcaster). Anabantids: 1 and 2, H. Grainger (Don Valley); 3, N. Gabbitas (Thorne). Cichlids: 1, H. Grainger (Don Valley); 2, Mr. Banks (Goole); 3, B. Bruce (Staithes). Catfish and Loach: 1, D. Hunt (Leeds); 2, G. Holmes (Bradford); 3, G. Sweeting (Thorne). Toothcarps: 1, G. Holmes (Bradford); 2, Mr. Greenhall (Tadcaster); 3, W. Jackson (Don Valley). A.O.V.: 1, G. Holmes (Bradford); 2, P. Reynolds (Leeds); 3, N. Guy (Don Valley). Coldwater: 1, D. Sandiford (Staithes); 2, J. Hurst (Staithes); 3, Miss Bruce (Staithes). Breeders L.B.: 1, M. Fletcher (Bradford); 2, Mr. Hardwick (Thorne); 3, Mr. Baxter (Tadcaster). Breeder E.L.: 1, Mr. Greenhall (Tadcaster); 2, E. Whitelock (Tadcaster); 3, Mr. Baxter (Tadcaster). Best Fish in Show: Severum Cichlid, Mr. H. Grainger (Don Valley).

The Jackson Challenge Trophy was offered to the club obtaining most points at the Show. Points were Don Valley, 24; Tadcaster, 15; Bradford, 14; Staithes, 10; Leeds, 9; Thorne, 7; Goole, 2; York, 2.

* * *

THE annual open table show of the **Association of Yorkshire Aquarist Societies** was staged by the Goole Society and was extremely successful with 297 entries.

At the annual general meeting, Mr. L. Greenall (Tadcaster) became President and Mr. G. Lowe (Thorne) was elected Vice-President. Mr. D. Dunford (Dewsbury) was re-elected Treasurer and Mr. A. A. Brown (Dewsbury) was elected Secretary.

* * *

THE following officials were elected at the annual meeting of the **Nelson A.S.**—President: Mr. B. Richards; Secretary: Mr. R. J. Dickens, Salem House, Scotland Rd., Nelson; Treasurer: Mr. T. Scott; Asst. Secretary and Show Secretary: Mr. Crick; Press Officer: Mr. B. Richards; Chairman: Mr. P. Singleton.

After having a successful past year the Society is looking forward to a still better and more varied programme this year. A junior Section has been formed and another open show is being planned for October.

* * *

THE results of the open show held by the Yorkshire section of the **Fancy Guppy Association** were as follows:—Veiltails: 1, Mr. D. Tattersall (Pennine); 2, Messrs. Berresford Jeffrey (Manchester); 3, Mr. V. Partington (Manchester). Females: 1, Mr. V. Partington (Manchester); 2, Mr. A. Bates (Yorkshire); 3, Mr. F. Whitham (Pennine). A.V. Swordtails: 1, Mr. D. McCracken (Pennine); 2 and 3, Mrs. C. Kelly (Manchester). Breeders: 1, Messrs. Berresford Jeffrey (Manchester); 2, Mr. D. McCracken (Pennine); 3, Mr. V. Partington (Manchester). Matched Pairs: 1, Mr. V. Partington (Manchester); 2, Mr. De Groot (Manchester); 3, Mrs. C. Kelly (Manchester). A.O.V. Females: 1, Messrs. Berresford Jeffrey (Manchester); 2, Mrs. M. Lawrence (Pennine); 3, Mr. T. A. Schofield (Yorkshire). Colour Class: 1, Mrs. C. Kelly (Manchester); 2, Mr. V. Partington (Manchester); 3, Master A. Lawrence (Pennine). Shortail: 1, Mr. K. Riding (Yorkshire); 2, Mr. P. Rushworth (Yorkshire); 3, Mr. F. Whitham (Pennine). Non. F.G.A. Member: 1, Miss A. Cherry, 82 points; 2 and 3, Mr. Markin, 80 points. The results of the first leg of the 3 corner match between Manchester, Pennine and Yorkshire sections of the Fancy Guppy Association were:—Manchester, 26 points; Pennine, 14 points; Yorkshire, 8 points.

* * *

THE Table Show of the **Dundee Aquarium Society** was Scott Trophy A.S. Anabantid (except Siamese Fighters) and A.O.S. The results were:—A.S. Anabantid: 1, A. Hastie; 2, W. S. Russell; 3, A. Inach. A.O.S. (10 entries): 1, Miss S. Clark; 2, W. S. Russell; 3, J. McGoughie.

At the A.G.M. which followed, the following Office-bearers for Season 1963-64 were appointed: President, Alex. Robertson; Vice-president, J. McGoughie; Show Manager, Alex. Cross; Secretary and Treasurer, G. B. Kirkland; Committee, Messrs. W. S. Russell, F. McNaughton, A. Inach, P. N. Greening and W. Cockburn.

* * *

THE members of the **Tipton District A.S.** held a Table Show recently for characins and rasbora's. The judge was Ron Brown of Stourbridge and the results were as follows: Section A. characins 1, H. Williams (Leporinus Fasciatus); 2, H. Williams (Congo Salmon); 3, W. Davison (H. Rubrostigma). Rasbora 1 and 2, J. Dempton (R. Elegans); 3, G. Cadd (Harlequin). Section B. characins, 1, L. Sharman (A. Anomalus); 2, C. Whitehouse (Penguins); 3, R. Turner. Section B. rasbora 1, and 3, J. Ratcliffe; 2, J. Vickery.

The membership is still increasing, and there are now over 50. The secretary is Mr. W. Davison, 2, Shaw Road, Tipton, Staffs. and new members will be welcomed.

* * *

AT the last meeting of the **Peterlee A.S.** the competition was for Guppies, and the result was as follows: 1, F. Harrison; 2, J. Hewitson; 3, D. Heslop; 4, J. G. Herring. In connection with a future competition each member has received two guppies fish to raise and exhibit at the end of the year. An encouraging response has been received regarding the formation of a junior section and a programme will be arranged shortly.

* * *

THE **Coventry Pool and A.S.** recently received a visit from Mr. T. L. Dodge who spoke on "Garden Pools". An experienced fishkeeper, Mr. Dodge's talk contained numerous practical hints and tips which were invaluable to all prospective pool owners, and in fact to all coldwater fishkeepers. The Bulletin also contains news of the formation of an inter-society league the four clubs interested being Atherstone, Coventry, Leamington and Rugby.

* * *

NEWS from the **Nottingham & District A.S.** gives details of three table shows. In the Barbs the result was 1, Mr. A. Lindley; 2, and 3, Mr. G. Wood. Characins: 1, Mrs. A. Lindley; 2 and 3, Mr. J. Mills. Cichlids: 1 and 2, Mr. G. Wood; 3, Mr. G. Dyer. In the Sheffield and District Aquarist's Show, Nottingham gained 7 firsts 2 seconds and 3 thirds and also won the "Best Fish in the Show" award. The annual open show will be held on Sunday 15th September at the Drill Hall, Derby Road, Nottingham.

SECRETARY CHANGES

ASSOCIATION of Yorkshire Aquarist Societies (A. A. Brown, 15, Ullswater Close, Dewsbury, Yorks.). Leyme Aquarists (J. Mills, 15, Brookfield View, Bolton-Le-Sands, Carnforth, Lancs.). Nelson Aquarist Society (R. J. Dickens, Salem House, Scotland Road, Nelson). High Wycombe and District A.S. (D. V. Sewell, 27, Cambridge Crescent, High Wycombe, Bucks.).

NEW SOCIETIES

A NEW society, **Chapeltown & District A.S.** who hold their meetings the fourth Wednesday of each month at the Midland Hotel, Chapeltown, Nr. Sheffield, elected the following officers at their last meeting: Chairman, Mr. S. Barnshaw; Vice-Chairman, Mr. M. Crellin; Secretary, Mr. R. Crofts; Treasurer, Mrs. J. Anson.

A warm welcome is offered to all new members and any information can be obtained from the Secretary at 61, Burncross Rd., Chapeltown, Nr. Sheffield.

* * *

THE formation of a new society comes from **Harwich and District A.S.** New members will be welcome and should contact Mr. D. F. Margerom, 788, Main Road, Dovercourt, Harwich, Essex.

AQUARIST CALENDAR

27th July: Bracknell and District A.S. Open Show at Victoria Hall, Bracknell.

6th-10th August: Portsmouth A.S. Open Show at Portsmouth Community Centre. Details and show schedules are available from Mr. W. Ryder, 493, Commercial Road, Mile End, Portsmouth, Hants.

16th-18th August: Middlesbrough and District A.S. Open Summer Show, R.A.F.A., H.Q., 24, Newcomen Terrace, Redcar. Schedules from Show Secretary, Mr. Keith Whittam, 18, Devonshire Road, Linthorpe, Middlesbrough.

28th-31st August: Midland Open Aquatic Show, Princes Hall, Bingley Hall, Birmingham. Full details from Mr. J. Edwards, 6 Arey Terrace, Osler St., Ladywood, Birmingham, 16.

30th-31st August: Bristol Tropical Fish Club Annual Open Show, Congregational Church Hall, Newton Street, Stapleton Road, Bristol. Schedules obtainable from Mr. J. H. Brown, 78, Pearl Street, Bedminster, Bristol, 3.

6th-7th September: Bethnal Green A.S. Annual Show. Show Schedules available soon.

7th September: Blackburn & District A.S. Annual Show. Schedules obtainable from Mr. G. Smith, 773 Whalley New Road, Blackburn.

7th September: Wycombe A.S. Particulars and schedules from Show Secretary, D. Gadbury, Pinecroft, Marlow Hill, High Wycombe, Bucks.

14th September: East London Aquarists and Pondkeepers Association. Closed Annual Show to be held at Ripple School, Ripple Road, Barking, Essex. Open Classes for Breeders and Furnished Aquaria. Schedules from Mr. W. Bunnage, Show Secretary, 91, Boundary Road, Barking, Essex.

15th September: Nottingham & District A.S. Open Show at Drill Hall, Derby Road, Nottingham. Apply to Show Secretary, Mr. A. Lindley, 65, Sedgwick Street, Jacksdale, Notts.

15th-21st September: Leeds & District A.S. Annual Open Show. Details from R. Moss, 39 Hilton Road, Harehills, Leeds 8.

20th-21st September: Bristol A.S. Open Show and Exhibition for Coldwater and Tropical Fish, Bishopston Parish Hall, Gloucester Road, Bristol, 7. Schedules obtainable from Mr. E. Dunstan, 11, Sandyleaze, Westbury-on-Trym, Bristol.

27th-28th September: Three Counties Show, Gas Social Club, Gasworks Road, Reading. Schedules from Mr. C. Masters, 12, Patrick Road, Caversham, Reading.

28th September: First Annual Dinner of the British Ichthyological Society in Glasgow. Information from the Secretary General.

28th September: Kingston and District A.S. Inter-Club Show.

29th September: Blackpool and Fylde A.S. Open Show at 87 Station Road, South Shore, Blackpool.

16th-17th November: B. A. F. Show, Belle Vue, Manchester. Schedules are now obtainable from Show Secretary, Mr. G. W. Cooke, "Spring Grove," Fieldhill, Batley, Yorkshire.

Crossword Solution

C	Y	C	L	O	P	S	■	M	O	O	R	S
L	■	R	■	B	■	P	■	O	■	F	■	E
O	Z	O	N	E	■	R	O	T	I	F	E	R
W	■	S	■	S	■	I	■	T	■	E	■	P
N	A	S	C	E	N	T	■	L	A	R	G	E
■	■	E	■	■	■	E	■	E	■	■	■	N
R	E	D	U	C	E	■	A	D	V	E	N	T
A	■	■	■	I	■	H	■	■	■	L	■	■
I	O	N	I	C	■	E	X	P	R	E	S	S
N	■	O	■	H	■	A	■	E	■	G	■	T
B	E	A	D	L	E	T	■	A	C	A	R	A
O	■	I	■	I	■	E	■	R	■	N	■	N
W	O	R	L	D	■	R	E	L	A	T	E	D

BUYERS' GUIDE

The firms listed are wholesalers or retailers or both in fishes, tanks, plants, appliances and accessories, reptiles and amphibia. Abbreviations: **W.**—Wholesale only. **R.**—Retail only. **WR.**—Wholesale and Retail. **C.**—Coldwater. **T.**—Tropical. **P.**—Plants. **AA.**—Appliances and accessories. **R. & A.**—Reptiles and Amphibia. **E.C.D.**—Early closing day.

BERKSHIRE

The Reading Aquarist
64, King's Road, Reading
Telephone: Reading 53632
E.C.D. Wednesday. R. C.T.P.AA.

BUCKINGHAMSHIRE

Grange Pet Stores
Well Street, Buckingham
Telephone: Buckingham 3216
Open every day. R. C.T.P.AA. R.&A.

CHESHIRE

Grassby, Joe., F.R.H.S.
"The Glen" Fisheries, Mobberley, Nr. Knutsford
Tel.: Mobberley 3272 W. C.T.P.AA. R.&A.

DEVON

Plymouth Tropicals
127, North Road, Plymouth
Telephone: Plymouth 62663
E.C.D. Tuesday. R. C.T.P.AA.

DURHAM

Metcalf, G. R.
2, High Northgate (near A.B.C. Cinema)
(On main A.1 road) Darlington
Telephone: Darlington 5991
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Powell, M.C.
The Honey Pot,
Claypath, Durham City
Telephone: Durham 2108
E.C.D. Wednesday (All day). R. C.T.P.AA. R.&A.

The Fish Bowl
Burdon, Sunderland
Telephone: Sunderland 71026
E.C.D. Wednesday (All day). R. C.T.P.AA. R.&A.

ESSEX

Goodmayes Aquaria
Shaftesbury Parade, High Road, Chadwell Heath
Telephone: Goodmayes 2594
E.C.D. Thursday. R. C.T.P.AA.

Skilton, C. J., Aquarist
"Ridgeway", 139, Galleywood Road,
Chelmsford
Telephone: Chelmsford 56878. W. C.T.P.AA.

The Hamlet Aquaria
14, Saint Helens Road,
Westcliff-on-Sea
Telephone: Southend-on-Sea 44724
E.C.D. Wednesday. R. C.T.P.AA.

GLOUCESTERSHIRE

Patricia Preece (Prop. Mr. B. R. James)
10, Suffolk Parade, Cheltenham
Telephone: Cheltenham 24949
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

HAMPSHIRE

Arundel Aviaries & Fisheries
241/243, Arundel Street, Portsmouth
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Wingate Zoological Supplies
7, Market Street, Winchester
Telephone: Winchester 2406
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

HERTFORDSHIRE

Cura, L. & Sons
Water End, Hemel Hempstead
Telephone: Water End 44
E.C.D. Saturday. W. C.P. R.&A.

KENT

Kingsfisheries Aquarium
138, Croydon Road, Beckenham
Telephone: Beckenham 3716
E.C.D. Wednesday (all day). R. C.T.P.AA.

Sherwood Pet Stores
(Proprietors, Fairbairns Aquaria, Ltd.),
252, Sherwood Park Avenue, Sidcup
Telephone: Bexley Heath 7217
E.C.D. Thursday. R. C.T.P.AA. R.&A.

LANCASHIRE

Hornby's
Trafford Bar, Old Trafford,
Manchester, 16
Telephone: Trafford Park 2989
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Letty Kremner
13, King Edward's Building,
Cheetham Hill Road,
(opp. Woolworths), Manchester, 8
Telephone: Cheetham Hill 3246
E.C.D. Wednesday. WR. C.T.P.AA. R.&A.

Liverpool Aquaria Company
23, Sir Thomas Street, Whitechapel, Liverpool, 1
Telephone: Central 4891
Closed Wednesday. R. C.T.P.AA. R.&A.

LONDON (North)

Philip Castang Ltd.
91, Haverstock Hill,
Hampstead, N.W.3
Telephone: Primrose 1842 and 9452
E.C.D. Saturday. W. T.P.AA. R.&A.

Paramount Aquarium
95, Haverstock Hill,
Hampstead, N.W.3
Telephone: Primrose 1842 and 9452
E.C.D. Thursday. R. C.T.P.AA. R.&A.

LONDON (South)

Aquatic Suppliers Co. Ltd.,
7, David's Road, Forest Hill, S.E.23
Telephone: Forest Hill 3816
(Open every afternoon and all day Saturday).
WR. C.T.P.AA.

Fairbairns Aquaria, Ltd.
15, Well Hall Parade, Eltham, S.E.9
Telephone: Eltham 5859
E.C.D. Thursday. R. C.T.P.AA. R.&A.

The Jaynor Organisation
(James North (London) Ltd.)
316, Lee High Road, Lewisham, S.E.13
Telephone: Lee Green 3577
E.C.D. Thursday. W. C.P.AA.

"Our Corner"
310, Lee High Road,
Lewisham, S.E.13
E.C.D. All day Thursday. R. C.T.P.AA.

South Western Aquarists
2, Glenburnie Road, Trinity Road,
Upper Tooting, S.W.17
Telephone: Balham 7334
E.C.D. Wednesday. WR. C.T.P.AA. R.&A.

Tachbrook Tropicals
244, Vauxhall Bridge Road, Victoria, S.W.1
Telephone: Victoria 5179
(Open all week except Sundays).
WR. C.T.P.AA. R.&A.

LONDON (West)

Aquapets
17, Leeland Road,
West Ealing, W.13
Telephone: Ealing 2748
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Owen Reid's, Aquarium Dept.
12, Spring Bridge Road, Ealing Broadway, W.5
Telephone: Ealing 3259
E.C.D. Wednesday. WR. C.T.P.AA. R.&A.

NORTHAMPTONSHIRE

The Aquarium
192, Wellingborough Road,
Northampton
Telephone: Northampton 34610
E.C.D. Thursday. R. C.T.P.AA. R.&A.

The Pet Shop
120, Kettering Road,
Northampton
Telephone: Northampton 841
E.C.D. Thursday. R.C.T.P.AA.

OXFORDSHIRE

The Goldfish Bowl
9, East Avenue, Cowley Road,
Oxford
Telephone: Oxford 41825
E.C.D. Thursday. W.R. C.T.P.AA. R.&A.

STAFFORDSHIRE

Walsall & Wolverhampton Aquatics
46, Stafford Street, Walsall and
147, Horsley Fields, Wolverhampton
Telephone: Walsall 21783 and Wolverhampton 24147
E.C.D. Thursday.
W.T. AA. R. C.T.P.AA. R.&A.

SURREY

Thameside Tropicals and The Pet Shop
Brassey House, New Zealand Avenue,
Walton-on-Thames
Telephone: Walton 24076 R. C.T.P.AA. R.&A.

SUSSEX

Fin and Feather
14, Ocklynge Road, Eastbourne
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Preston Aquarium
44, Beaconsfield Road, Brighton
Telephone: Brighton 29620
(Open all week). R. C.T.P.AA.

Regency Aquaria (Prop. R. A. Bassett)
40, Surrey Street (outside Brighton Station),
Brighton
Telephone: 29940. R. C.T.P.AA.

WARWICKSHIRE

The Coventry Aquarist (Prop. W. Dymond)
43, Melbourne Road, Earlsdon, Coventry
Telephone: Coventry 72772
E.C.D. Thursday. WR. C.T.P.AA.

Fanday Aquaria
Fanday House, 129, Stratford Road, Sparkbrook,
Birmingham
Telephone: Victoria 3537
E.C.D. Wednesday. WR. C.T.P.AA. R.&A.

WORCESTERSHIRE

The City Aquaria, Bird and Pet Supplies
(Proprietor: Mrs. M. Hemming)
34, Friar Street (opposite Union Street), Worcester
Telephone: Worcester 22005
E.C.D. Thursday. R. C.T.P.AA. R.&A.

YORKSHIRE

The Corner Shop (Prop. J. Wilde)
526, Abbeydale Road, Sheffield, 7
Telephone: Sheffield 54172
E.C.D. Thursday. R. C.T.P.AA. R.&A.

SCOTLAND

Aquarists' Rendezvous
164/168, Albert Drive, Pollokshields, Glasgow, S.1
Telephone: South 4258
E.C.D. Tuesday (1 p.m.) WR. C.T.P.AA.

Forbes, James L. (Prop. P. N. Greening)
176, Blackness Road, Dundee, Co. Angus
Telephone: Dundee 66409
E.C.D. Wednesday. R. C.T.P.AA.

NORTHERN IRELAND

Ulster Aquatics
15, Montgomery Street, Belfast
Telephone: Belfast 27144
E.C.D. Wednesday. WR. C.T.P.AA. R.&A.

PREPAID ADVERTISEMENTS

5d. per word (12 words minimum) Box number 2/- extra

FOR SALE

GLAZED aquaria in all sizes including 36 × 15 × 12, 70s. 0d.; 18 × 10 × 10, 17s. 6d.; 24 × 12 × 12, 39s. 6d., tanks despatched to any part of Britain, carriage extra. Plants, Accessories, Fish. Wright's, 10, Lorne Road, London, N.4. Phone Archway 3620.

PERRY'S for Plants. 1st and 2nd Awards British Aquarists' Festival. Assorted selections Tropical or Cold 5s. 6d.; 7s. 6d., 10s. 6d. Val. Torta, Sagittaria Nanses, 6s. per dozen. Cryptocoryne Cordata 1s. 6d. to 2s. 6d.; Willisii 2s. 6d.; Beckettii 1s.; Haerteliana 2s. 6d.; Seven assorted 10s.; Water Wisteria, Giant Hygrophila 2s. 6d. Post 1s. All Advertised Accessories. C. R. Perry, Professional Aquarist, 615, West Street, Crewe. Holidays 20-27th July.

PERFECT Specimens, Lime Bred Blue Scarftail Guppies 15s. per pair; Blue Acaras and Marigold Platies 4s. each; Madagascar Rainbows 4s. 6d. each, carriage 3s. 6d. C. R. Perry, Professional Aquarist, 615, West Street, Crewe.

JaMeL cods only 9d. per dram (No. 2 and 3) and 1s. 6d. for fry food.

EASY TERMS. Extend your hobby the easy way. Air Pumps, Heaters and Thermostats, Filters, Breeding Traps, Nets, Thermometers, Frames and Stands and all accessories. Send a stamp for list "A" Joseph Sealey Ltd., Church Hill, Northfield, Birmingham 31. Phone PRIORY 4030.

AQUARIA FRAMES. For quality and accuracy buy direct from the manufacturer. 1 × 1 × ⅛ steel angle, 36 × 15 × 15, 26s., 36 × 12 × 12 24s., 30 × 15 × 15, 23s. 6d., 30 × 15 × 12, 23s., 30 × 12 × 12, 22s. 6d., 24 × 12 × 12, 20s. 6d., also 18 × 10, 13s. 6d., 18 × 12, 15s., from ⅛ × ⅛ × ⅛in. angle. All mitred and welds ground flush. Any size to order. Immediate despatch carriage paid. C.W.O. Money refunded if not satisfactory. For complete list, stands, shades, etc., S.A.E. J.H. Hennery, 52, Charter Street, Accrington.

WHEN IN STOKE visit Evenny's for tropical fish, plants and accessories. Finest selection for the aquarist in the Potteries. 16, Harnhill Road, Stoke-on-Trent. Phone 46358.

CHELTENHAM. Largest selection of Tropical and Coldwater fish in Gloucestershire. Equipment, Plants, Polythene, Plastic, Fibreglass Pools, Houseplants. Patricia Preece (Prop. Mr. B. R. James), Florists & Aquarists, 10, Suffolk Parade, Cheltenham. Tel. Cheltenham 4949.

GUARANTEED Quality Plants—Anubias, Hygrophila, Bacopa 6d., 2s. 6d. dozen. Indian Fern Broad, Fine. Dwarf Amazon 1s., Water Wisteria, C. Haerelliana 2s. each, Post 9d. all orders. 120 varieties tropical and coldwater fish, fibre glass ponds, personal shoppers only. Closed Wednesdays. Kingfisheries, 158, Croydon Road, Beckenham. BDC. 3716.

DAVIDS ROAD, Forest Hill, S.E.23. For the best Tropical Fish in South London. Aquatic Suppliers Co. Ltd., 7, Davids Road, London S.E.23.

GUARANTEED thermostat, heater and thermometer, 30s. post paid. 36in heater wattage. Sterling Fisheries, 62, Mayes Road, N.22.

TROPICAL FISH. Over 60 varieties in stock always, plants, equipment, etc. D. Brighouse, "Freshfields" Roe Park, St. Asaph, North Wales.

JaMeL for value, for vigour, for vitality—for all fish.

TIME SWITCHES, jewelled movement, reconditioned, guaranteed, 1 amp Vernier 25s., 5 amp Vernier 32s. 6d., 10 amp A.C. Hermmatic 39s. 6d. Post paid. R. Batchelor (A. Degn.), 4, Park Road, Bromley.

TAYLOR'S AQUARIUM, 78, Manchester Road, Burnley. Tel. 6242. Top quality tropical fish and plants. Full range of equipment, including ornamental, bow-fronted, stands, etc.

SHREDDERS (Stainless Steel)

Have you tried Shredded White Worm or Tubifex for your baby fish, also the Bartfaworm. You need not bother with Infusoria, it can be dangerous and pollute the water. Super Shredders, 16s. Coarse-tooth Shredders, 12s. Post 1s. Aquatic Developments.

GIANT SAGITTARIA

Suitable for tropical, coldwater aquaria and pond. Young plants, 6s., 8s. 6d. dozen. Larger plants, 1s. 3d. and 1s. 6d. each. Postage and packing, 1s. 3d. Aquatic Developments.

SHUBUNKINS

Bristol type from my prizewinners. Send your enquiries S.A.E. Fish can be seen by appointment only. Aquatic Developments, 143-145, Bure Lane, Christchurch.

SPARKLING clean tank; it's CLEAR for users McLynn's fish food.

CALLING ALL AQUARISTS. Call and see our large selection of Tropical and Coldwater fish, Plants in variety. We also stock all accessories at "The Aquarium," 192, Wellingborough Road, Northampton. Phone 34610.

THE LANSBURY AQUATIC NURSERY, 2, Lansbury Road, Enfield. Phone: Howard 6633. Open all week-ends after 2 p.m. Saturday. Tropical and Coldwater fish and Plants in variety. Also various coloured fishes, Daphnia and Tubifex. Breeders' surplus always required. Callers only.

THERE was a young lady from Stroud
Who's Mollies produced a fine brood,
They grew to such sizes
She won all the prizes
She fed 'em of course, McLynn's Food

"AQUA-LIFE" for tropical fish, plants and accessories. Fresh water and Marine. 2, Mandeville Street, Clapton, E.5. Open 5-7 p.m. weekdays, 2-7 p.m. Saturdays, 10 a.m.-3 p.m. Sundays.

EAST LONDON aquarists visit "Aqua-Life" for all your needs. We always have a good stock of tropical fish. Why not pay us a call? No obligation to buy. We have a few new Leopard Danios in stock.

BEGINNERS—call at "Aqua-Life." We shall be pleased to help you in any way, all advice is free, and we stock everything you may need. Compare our prices.

JaMeL. No. 1, fry food. No. 2, tropical food. No. 3, goldfish food.

AQUARIA FRAMES. Guaranteed Square 1 × 1 × ⅛ steel angle. Stands to take two tanks 18½ × 12 × 36 ins. high 30s.; 24½ × 12 × 30 ins. high 33s.; 30½ × 12 × 36 ins. high 39s.; 36½ × 12 × 36 ins. high 45s. Frames 24 × 12 × 12 ins. 20s.; 24 × 15 × 12 ins. 23s.; 30 × 15 × 12 ins. 23s.; 36 × 12 × 12 ins. 24s.; 36 × 15 × 12 ins. 25s.; 48 × 15 × 12 ins. 1½ × 1½ × ⅛ in. steel angle 40s.; 60 × 15 × 12 ins. 48s. Glazing compound 1s. 4d. lb. despatched only with frames and stands. Any size made to order, prompt despatch. Money back if not satisfied. Carriage paid. C.W.O. Hackney (Engineer), 50-52, Somers Street, Leeds, 1. Tel.: 2506 1.

FANCY Goldfish fancy McLynn's fish food.

AQUARIA FRAMES, glazed aquaria, ornamental stands, bow fronted aquaria, all over covers. Send for our free price list. F. C. Atkinson, Engineers, 177a, Sharp Street, Hull.

TROPICAL fish for sale. Nights after 6 p.m. 598, Bury Road, Breightmet, Bolton.

VALLIS TORTA, Myriophyllum, Ludwigia 5s. doz., add 1s. post orders under 10s. Young Mosers 5s. Carriage 5s. Tropical fish, callers only. 21, Roman Road, Middlesbrough.

JaMeL the new wonder fish food.

DEALERS send for Trade Lists, large selection of birds, animals, reptiles for immediate dispatch. Newmarket Bird Farm, Newmarket, Claycross, Chesterfield.

WHITEWORMS—Generous culture and instructions—2s. Baker, 32, Cleveland Road, Brighton.

YORKSHIRE Aquarists should visit Keith Barraclough. Over 100 varieties of tropical fish, plants, air pumps, heaters, thermostats, tanks, stands, in fact all accessories. Coldwater fish, fibre glass pools, etc. Pets galore. 215, Great Horton Road, Bradford, 7. Phone 73372 or 74845 after 7 p.m. S.A.E. list.

TROPICAL fish, fully quarantined, over 100 species offered at lowest prices. All aquarists' requirements supplied. Personal shoppers only. Sterling Fisheries, 62, Mayes Road, Wood Green, N.22.

JaMeL contains everything necessary for health, growth and colour. If you want the best ask your stockist for JaMeL. Manufactured by JaMeL, St. Helen's, Warren Hills, Coalville, Leicester.

PLAQUES, SHIELDS, ETC.

R. HOLTOM & SON, 309, Oldbury Road, Smethwick, 40. Plaques, Shields, Medals, Cups and Medallions for Aquarist and Bird Societies. Tropical and Coldwater fish centres in full colour. Write for details as above.

SITUATIONS VACANT

AN excellent opportunity occurs for a person with interest and experience in breeding tropicals and growing aquatic plants in large quantities, on south coast. Please write Box 1741, *The Aquarist*, The Butts, Brentford, Middx.

YOUNG MAN required for Garages Aquaria. Excellent opportunity to learn all aspects of the trade. Please apply: Staff Manager, Gamages, 101, Hatton Garden, London, E.C.1.

Shirley Aquatics Ltd.

WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: SHIRLEY 13

Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

INTERESTING TROPICALS IN JULY/AUGUST

CHARACINS

Congo Salmon (Phenacogrammus interruptus) each 15/-; Red-Eyed Congo Salmon (Arnoldichthys spilopterus) sexed, pairs 35/-; Phantom Tetra (Megalamphodus megalopterus) each 7/6; Dusky Tetra (Hyphesobrycon georgetti) each 7/6; undetermined small glass tetra from Peru each 10/-.

ANABANTIDS

Colisa chuna (Honey gourami) sexed pairs 15/-; Ctenops pumilus (jewel gourami) each 7/6.

BARBS

Barbus Melanamphyx (ember barbs) sexed pairs 37/6.

TOP MINNOWS AND ANNUALS

Aphyosemeon australe (lyretails) 7/6 and 10/- pair; Aphyosemeon beauforti (new and brilliant) 17/6 pair; Aphyosemeon sjoestedti (red pheasant) 20/- pair; Aphyosemeon bivittatum 15/- pair; Aphyosemeon calabaricus 12/- pair; Notobranchius guntheri 15/- pair; Notobranchius rachovi 20/- pair; Aplocheilus grahami 15/- pair; Fundulus chrysotus (Parrot fish) 17/6 pair.

DWARF CICHLIDS

Nannachromis nudiceps 7/6 each; A. agassizi 7/6 each; A. ramirezi 7/6 each; A. curviceps 5/- each; P. kribensis 7/6 each.

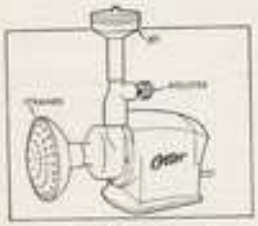
VARIOUS

Spiney eels 8/6 each; Synodontis catfish (various species) 7/6 each; Loricaria parva (Whiptails) 17/6 each.

Plus our usual variety

THIS MONTH'S INTRODUCTION IN PLANTS

Vesicularia Dubyana (Java Moss) lovely and decorative, small bunch 5/- each, 3 for 12/6.



THE NEW OTTER

Submersible pump complete with either fountain or water-fall kit

£8 8 0 post paid

Both kits include the "Otter" submersible pump complete with 10 feet of sealed cable fitted. The Fountain Kit has in addition, an inlet strainer with filter mesh insert, flow adjustor and fountain jet, whilst the Water-fall Kit provides an inlet strainer, 10 feet of ½ in. plastic tubing, and hose clip.

Additional cable to reach back to the nearest source of mains electricity is supplied separately, with a rubber-shrouded connector for connection to the cable sealed into the pump.

Additional cable 6d per ft. Weatherproof Connector 7/6 each.

Pond fishes for callers. Quantity of quality fishes to choose from—Breeding pairs still in good supply

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 Bull Ring, Birmingham, passes the door, alight at "The Crown," Monkspath.
HOURS OF BUSINESS—
Weekdays 10 a.m.—6 p.m. Summer, 10 a.m.—5 p.m. Winter. Sundays 10 a.m.—12.30 p.m. (Also Sunday Afternoons June-July Only)
CLOSED ALL DAY EVERY MONDAY
TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Tropical minimum order £3, insulated container and carriage 10/-. Cold water minimum order £1 plus 10/- case and carriage. Plants by post (minimum order 10/-) please add 1/6 post and packing.

Printed and Published by BUCKLEY PRESS LIMITED, London and Brentford