The Aquarist

and Pondkeeper

OCTOBER 1963

MONTHLY
Vol. XXVIII No. 7

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
- LIQUIFRY AND INTER-PET PRODUCTS

Angle Iron Aquariums, Frames and Stands a speciality. Despatched in crates charged at 20/- 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 2861 and 2520

PHILLIPS fish food

Fine Grade for Tropicals and Coarse Grade for Cold-water Fish*

Extra high in protein and rich in vitamins and minerals, Phillips Fish Food contains dried shrimp, daphnia, meat meal, white fish meal, alfalfa, milk powder, cod liver oil, wheaten cereal and yeast, scientifically blended to provide a well-balanced, nourishing food.

For all Cold-water Fish - - 1/9d
For Tropicals - - 1/6d

*Phillips Cold-water Fish Food contains
SAPROLEGNIL
to protect against the ravages of "cotton wool" Fungus.

PHILLIPS YEAST PRODUCTS LIMITED, Park Royal, London N.W.10

NOW IN STOCK

"A Simple Pond for the Amateur"
1/6 (post free 1/8)

"The Guppy"
2/6 (post free 2/10)

"Keeping Reptiles and Amphibia"
2/6 (post free 2/10)

"Coldwater Fishkeeping"
2/6 (post free 2/10)

"Exotic Egg-Laying Fishes"
2/6 (post free 2/10)

"Fish Foods and Feeding"
4/6 (post free 4/11)

Obtainable from:

"The Aquarist"
The Butts, Half Acre, Brentford, Middlesex
OR FROM ALL THE LEADING PET STORES

FOLLOW THE PROFESSIONALS!

USE LIQUIFRY QUALITY FOODS FOR BREEDING YOUR FISH!

Start them with LIQUIFRY the *liquid tubed fry food*

Mr. Y. W. Ong, the well-known writer on aquarium topics from Singapore, says "Many breeders of Siamese Fighting Fish use LIQUIFRY as the first food. LIQUIFRY is also used for raising and breeding brine shrimps."

LIQUIFRY No. 1 *(red tube)* for eggLayer fry contains minute food particles and produces natural infusoria in the minimum possible time.

LIQUIFRY No. 2 *(green tube)* ideal for young livebearers. *Price 2s. 6d. per tube*

Rear them on BIOL — *the dried pure plankton culture.* A tremendous help to growing fish — contains 73% protein. If left uneaten, Biol does not foul the tank but produces copious infusoria. *Price 2s. 6d. per vial of 7 grams, or Breeder's pack containing 28 grams for 5s. 3d.*

Then . . . ***keep them fit*** with

PLEASURE granulated conditioning food, price *1s. 9d. per drum* and **BIOL**

LIQUITOX (capsules of Phenoxetol) The proven specific for Fungus and Finrot. ***As recommended by 2 independent Authors in the May issue of the Aquarist.*** Colourless — effective — does not harm the plants. Definite dosage given by ingenious chart.

Before Treatment

After treatment

These photographs were taken by Professor Dr. A. Scolk of Amsterdam University, and show the remarkable effect of LIQUITOX.

Price 1s. 9d. per carton of 2 capsules; Breeder's pack 6s. 9d. per 12 capsules. Each capsule will treat 4 gallons of aquarium water.

Available through your dealer or post free from the

INTER-PET SUPPLIES COMPANY

Please send for our new Catalogue.

Sales promotion division of the Liquifry Co. Ltd.
18 Church Street, Dorking, Surrey
Telephone: Dorking 2566

STORAGE HEATING FOR THE AQUARIUM

PRICE 19/-

. . . AND

THIS IS ONLY ONE OF THE EXCLUSIVE FEATURES AVAILABLE TO USERS OF THE

'FLEXIBLE' 100w SUB-SAND AQUARIUM HEATER

Latest improved model

LEARN ALL ABOUT THE "FLEXIBLE" AND MANY OTHER FINE PRODUCTS IN OUR LATEST 20 PAGE ILLUSTRATED 'BROCHURE & HEATING GUIDE' . . . . . SEND 6d TO COVER POSTAGE FOR A COPY BY RETURN

DON'T DELAY!

AN ESS PRODUCT

manufactured by

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

DISCUS! STILL A FEW LEFT AT THE RIGHT PRICES

Large Adults £6 and £4 each; Medium £3 and £2 each; Small Red Tail Sharks 6/-; Leopard Cats 7/6; Amonieri 5/-, 7/6; 4" Hemiodus 20/-

NEW ARRIVALS

Fantails	4/6 to 7/6
Green Tench	3/- & 4/-
Large Goldfish 7"-8"	10/-
Small Orfe	2/6
7" Calico Comets	15/-
Medium Goldfish	5/- to 7/6
Small Goldfish & Shus.	1/- to 2/6

ALL POND PLANTS STOCKED

THERMOSTATS

	each
Prockter	30/-
Constat External	35/-
Constat New External Type QK	22/-
Wizard External	22/-
Interpet	22/6, 29/6
UNO	
Out/Adj.	18/-
Int/Adj.	15/-
Int/Adj. "Popular"	19/-
"Popular" with neon indicator	12/6
Preset Matic	24/6
Wizard	10/-, 12/6, 18/-

AERATORS

Ex. Summit	21/-
Quicko	22/6
Rena	42/-
Bako	85/-
Zoobeko Twin	75/-
Zoobeko	46/-
Zoobeko Junior	37/6
Montrose Major	28/-
Montrose Minor	21/-
Prockter	60/-
Dyman Mk. I A.C./D.C.	£9 0 0
Dyman Mk. II A.C. only	£9 5 0

PISTON PUMPS

Hy-flo Junior New Super	107/6
Hy-flo "A"	120/-
Hy-flo "B"	165/-
Hy-flo "C"	250/-

Thermometers

Mercury	4/-
Blue Gem	4/6
Mercury Gem	6/-
Dumpy	6/9

Sundries

T Pieces	9d.
Clamps	1/-
Aeration Tubing	9d. yd.
Siphon Tubing	1/9 yd.
Glass Wool	1/-
Filter Carbon	2/-
Halamid	3/-
Aquarimeter	2/6

Filters

Hykro Outside	12/-
Corner	4/6
Outside	18/6
Windmill Hand Rejector	15/-
Windmill Air Rejector	18/-
Consort	18/6
Premier Biological Sub-Gravel Filters	12/6, 15/-
Sodius	8/-
With Bellows	16/-
Slim Jim	17/6
Kleer King	22/6
Bottom Filter	8/3
Rock Filter	17/6

TROPICALS

Large Neons, 6 for £1; 3/6 each

Rosaceus	3/-	Plecostomus	15/-
Angels	2/6 & 3/6	Jack Dempsey's	3/6
White Cloud Minnows	2/6	Large Green Sailfin Mollies	from 5/-
Flames	2/6	Black Angels	10/-
Beacons	2/6	Black Lace Angels	5/- to 10/-
Black Widows	2/6	Tiger barbs	2/6 & 3/6
Platys, various	from 2/6	Glowlights	3/-
Swordtails various	from 2/-	Panguios (each)	3/6
Schuberti barbs	3/-	Bumble Bees (each)	3/6
Scissortails	3/-	Mollies, Black from	2/6 & 5/-
Guppies (pair)	1/6, 3/-	Lemon tetras	4/-
Harlequins	3/-	Glassfish Adult	4/9
Cherry barbs	3/-	Aeneus Cats	6/6
Nigger barbs	3/-	Ocellatus Cats	8/6
Chequer barbs	3/-	Fighters	10/-, 12/6
Red Eyed Tetra	3/-	Serpae	4/-

Thick lip 3/-, dwarf or lyri 3/6, Kissing 4/-, Opaline 3/6, Gouramis.

BREEDERS!

ALL GLASS AQUARIA. 5 sizes, 10 × 6 × 6 to 16 × 9 × 8. Callers only.

BOOK CASE BOW-FRONTED AQUARIUM

48 × 10 × 15	£28 0 0
36 × 12 × 15	£18 18 0

Standard Bow £21, £13 10, £11 5 0

PLANTS

Sagittaria	6d. each	5/- doz.
Vallis. Torta	6d. „	5/- „
Vallis. Spiralis	6d. „	5/- „
Ambulia	6d. „	5/- „
Ludwigia	6d. „	5/- „
Hygrophila	6d. „	5/- „
Cryptocoryne	2/- and 3/-	
Wistaria	1/6 „	2/-
Giant Hygrophila	1/6 „	2/-

By post, add 1/6d.

HEATERS 25w to 150w

Uno	8/6
E.S. Standard	7/6
Wizard	9/6

ADULT RARE FISHES

Pelmatochromis Kribensis	7/6 & 10/- each
Elephant Nose Fish	22/6 each
Black Veiltail Guppy	12/- pair
Cardinal Tetra	8/- each
Knife Fish Nigerian	8/-
Black Cardinal	4/- each
Clown Loach	12/6 & 15/-
Scats from	7/6 to 20/-
Ameniani Cats	7/6
Malayan Angels	7/6 to 15/-
Ramirezi	6/-
Weather Loach	3/-
Silversharks 5"	20/-
Pyrrhulina	4/-
Red Veiltail Guppy	10/- pair
Red Tail Sharks	Large 15/- each
Anostomus 4"-5"	25/-

Our minimum order for fishes is £3, a charge of 15/- is made for container. Carriage charges, by fast passenger train and telegram stating time of arrival. Increase due to telegram charges.

NYLON COATED AQUARIA. STOCK SIZES

24 × 12 × 15	£3 10 0
18 × 10 × 12	£2 7 6
White or black covers	16/6 & 20/-

Larger sizes on quotation

STANDARD AQUARIUMS

(Light Gauge)		(Angle Iron)	
12 × 6 × 6	10/-	24 × 12 × 12	48/-
10 × 8 × 6	8/6	24 × 12 × 15	52/6
14 × 8 × 8	14/-	30 × 12 × 15	70/-
16 × 8 × 8	15/6	36 × 12 × 15	82/6
18 × 10 × 10	21/-	48 × 12 × 15	110/-

COVERS		STANDS	
18 × 10	14/6	18 × 10 × 36	32/-
24 × 12	22/-	24 × 12 × 36	40/-
30 × 12	30/-	30 × 12 × 36	45/-
36 × 12	35/-	36 × 12 × 36	50/-

Aquarium covers sent by post only at customers risk.

FOODS

Exotic Flakes	1/6
Hykro Flakes	1/-
Bromium	1/6 & 2/6
Biovit	6d. & 1/6
Shrimp	6d. & 1/6
Dry Daphnia	6d. to 2/6
Liquifry	3/-
Infusyl	2/6
Elite	2/- & 4/6
Hobby	2/- & 7/-
McLynn's	1/6, 2/6, 6/6, 17/6
Brine Shrimp	2/- & 2/6
Barnett's	1/6 & 2/6
Wardley's	9/-, 4/6, 2/6, 2/3, 1/3
Foodex	3/-
Long Life	2/3 & 3/6
Tetra Min	1/10, 3/-, 6/6, 22/6, 70/-

Add 1/- up to 10/-; 1/6 up to 20/-; 2/- up to £2; 3/- up to £5; over Free

CARRIAGE AT COST ON AQUARIUMS, STANDS, AND TANKS. TERMS, CASH WITH ORDER

THE CENTRAL AQUARIUM

Situated on the A41 Route, opposite Hendon Central Station

391 HENDON WAY, HENDON CENTRAL, N.W.4 Phone: HEN 9700

OPEN 8.00 a.m.—7.00 p.m. Emergency Phone: HEN 9700

THE INTER-PET Super Submersible Combined Heater-Thermostat

- Overcomes all previous objections to combined heater-thermostats.
- A unique combination of efficiency and functional neatness.
- Can be *completely submersed*. Therefore can be hidden behind rocks, etc.
- Price only 29/6. 100w., 125w., 150w.

This Heater-Thermostat is finding great favour among aquarists with decorative community tanks, since the instrument can be completely concealed. Aquarists with heated fish-houses find the instrument ideal for raising one particular aquarium above the fish-house temperature.

Available from your dealer or post free from:—

INTER-PET SUPPLIES COMPANY, Sales promotion division of **LIQUIFRY COMPANY LIMITED,**
18, Church Street, Dorking, Surrey.

MARSHALL'S AQUARIA

26 WESTBURY LANE, BUCKHURST HILL, ESSEX *Telephone: BUCkhurst 4708*

It is quite easy to get to Buckhurst Hill. By tube train on the Central Line thirty-five minutes from the West End, and we are three minutes from Buckhurst Hill station. Or by bus routes 20, 34a, 167 to Bald Faced Stag, five minutes walk from there. There is always someone in attendance at the Hatchery so you can inspect during week ends. Hours of Business 10 a.m.-1 p.m. 2 p.m.-6 p.m. Open 7 days each week. Over 150 different species of fish for sale. Fifty varieties of plants available, collected from our hundreds of tanks for each order and sent direct to you, they cannot fail to grow.

We sell, buy, or exchange fish of any kind. We also purchase second hand tanks or complete 'set-ups'.

At the moment we have 10,000 fish in stock. Most of the newer species of fish available are on sale here, notably the new twintail Fighters at 37/6 a pair, Young Red Tailed Sharks at 7/6 each. We have nine species of Aphyosemions and Panchax on offer. Young Lionheads, Pearlscales and Orandas.

It is our policy to stock and offer at reasonable prices all the new species of fish as they become available.

All the plants as listed in our previous adverts are available.

PLEASE NOTE

The books written by Thos. H. Marshall: 'Breeding the Egg-layers', 'Breeding the Livebearers', 'Breeding the Labyrinths', 'Breeding the Cichlids', 'Aquarium Management and Fish Farming', 'Aquarium Plants and Snails', are all available from here at 8/- per volume, post free, or a complete set for 42/6 post paid.

WE GUARANTEE

1. That here you will see a bigger and better display of Exotic Fish than anywhere else in the British Isles, and we do not exclude the Zoo's. The test is to ask anyone who has been here.
2. That our Fish food is the finest obtainable and that it contains a very high proportion of the best liver and young bullocks heart. Sent direct from here so that it is in perfect condition and ensures that it is not adulterated in any way. Your fish deserve the best food you can give them. N.O.F.F. (Natures Own Fish Food) is the best. Any of the Cichlids eat it greedily. A generous sample will be sent post free for 2/6. Try it and give your fish a real treat. Treble quantity 6/-.
3. That our plants (and we offer over fifty different subjects) are the very best obtainable, and that our 10/- parcel of 30 assorted plants are the best on offer and are post paid.
4. That everything we sell is the best on offer. We supply *everything* for the Aquarist in the way of equipment and post free. Our offer of a Thermostat, Heater and Thermometer at 20/- post paid is still open.

We are always prepared to give advice on all phases of fish keeping and typical breeding tanks set up for many different species of fish can be seen in our Hatchery.

At the moment we have many breeding pairs of various fish to offer—several species of Large and Dwarf Cichlid, write for details.

Forty years experience at your service. We have been breeding fish since 1920

A Clean Aquarium For Healthy Fish

Sweeps Clean

Separates Dirt from Gravel

Removes Uneaten Food

Keeps Aquarium Water Crystal Clear

Disposable Filter Bags

WIL-NES

NOW T.F.H. Introduces the NEW WIL-NES® *BATTERY POWERED*

AQUARIUM VACUUM CLEANER

aqua-Vac

As advertised in "The Tropical Fish Hobbyist"

AVAILABLE NOW AT YOUR LOCAL STOCKIST

SEE THEM! TRY THEM! BUY THEM!

No pumps or airlines needed, just press the button and operate immediately.

STANDARD MODEL (1 Battery)	Price 46/8 inc. P.T.
SUPER MODEL (2 Batteries)	Price 56/8 inc. P.T.
FILTER BAGS	Price 4/- per five

(Prices do not include batteries)

NOTE:—The Aqua-Vac is the first of the Wil-Nes quality aquatic items we shall be making available in the U.K. Watch for further announcements.

WIL-NES

America's Leading Brand of Fine Aquarium Products

NEW BOOKS FROM T.F.H.

GARDEN POOLS 6/-

A complete guide to the maintenance of Goldfish and Koi (Japanese Coloured Carp) in your garden pool, with special emphasis on Water-Lilies and other aquatic plants.

AQUARIUM FISH DISEASES 6/-

Chapters on causes of diseases, internal parasites, external parasites, disinfection, treatment, etc.

TURTLES 6/-

Chapters on water Turtles, Tortoises, Terrapins, diseases, feeding, etc. Fully illustrated throughout.

AQUARIUM WATER CHEMISTRY 3/-

Chapters on physical and chemical properties of water, natural waters of fishes, etc.

NEW FROM wardley's

BRINE SHRIMP PELLETS

A new exclusive pellet food containing Brine Shrimp. Extra large pack 5/3.

IMPORTED SUPER FLAKES

A sensational new flake food manufactured for Wardley's by the world-famous VITAKRAFT factory of BREMEN-MAHNDORF, WEST GERMANY, Europe's largest producer of fine Aquarium foods. Extra large pack 4/6.

BRINE SHRIMP KIT

Contains Plastic Shrimparium, Brine Shrimp eggs, special hatching mix, eye dropper, instruction pamphlet, filtration paper and hand lens. Price 8/6 complete.

All the above are distributed throughout the U.K. by

T.F.H. PUBLICATIONS (LONDON) LTD · 59 STATION ROAD, REDHILL, SURREY

(Redhill 5868)

FOR THE BEST FISH-FOOD

McLYNN'S FISH-FOOD

THE FOOD
IN THE PLASTIC BOX
1/6, 2/6, 5/-, 6/6 & 17/6
THE DIET FISH PREFER
CONTAINS EVERY
ESSENTIAL INGREDIENT
WILL NOT FOUL THE WATER

FOR THE BEST BOOK
"ALL ABOUT TROPICAL FISH"
by D. McINERNY OF McLYNN'S AQUARIUM
75/- *Postage* 2/3

McLynn's

FOR THE BEST FISH & PLANTS

McLYNN'S AQUARIUM

CLUBS AND
VISITORS WELCOME
BY APPOINTMENT
11 a.m.—5 p.m. CLOSED
ALL DAY WEDNESDAY
BUY DIRECT FROM
THE BREEDER
ALL STOCK FREE FROM DISEASE
SOLD UNDER A WEEK'S GUARANTEE
S.A.E. FOR LIST WHOLESALE, OR RETAIL

From your Pet Shop or direct from:

McLYNN'S AQUARIUM
EWHURST, Nr. CRANLEIGH, SURREY
Telephone: EWHURST 446

HYKRO PRODUCTS from DENMARK

HYKRO: Fish Foods will keep your Fish in Show and Breeding Condition. The Famous Hykro Flakes 1/-; Breeders Packs 32/6.

HYKRO: Natura for all Fish 8d. **HYKRO:** Coldwater Fish Food 1/- ¼lb; Pack 2/-. Also used for Larger Tropicals. **HYKRO:** Shrimp-meal 10½d. Good for all Fish but especially for Rearing Fry of all kinds.

New Fish Foods appear on the market almost daily but Hykro Foods have stood the test of time **25 years,** and are used extensively all over the world.

HYKRO Aquatic Appliances have also stood the test of time. Breeding Traps, Filters, Feeding Rings, etc. **HYKRO** Ichthyophilos. A wonderful cure for most Fish ailments 1/6. **HYKRO** Nutria Vitalizers 1/- are wonderful for promoting quick growth of Plants and where there is good Plant growth, Fish and other aquatic life will be in good health. **HYKRO** Lines, are stocked by all good pet stores and Aquatic Traders. Insist on the best.

IT'S HYKRO. Reasonable in price and absolutely unbeatable.

JOE GRASSBY (Importer and Wholesale Distributor)
The Hykro Depot, Mobberley, Nr. Knutsford, Cheshire.

Aquaria by QUEENSBOROUGH

(see page viii overleaf)

SPECIAL PLANT OFFERS

EXTRA SPECIAL

Water lettuce, very beautiful plants . . 3/6
Hairgrass 5/- Water Clover 5/-

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/-
Plants for 10/-	20/-

OFFER No. 2

30 Assorted Tropical Plants 10/-

OFFER No. 3

36 Assorted Tropical Plants 20/-
including Cryptocoryne, Wistaria, etc.

OFFER No. 4

30 Coldwater Plants
for your aquarium or pond . . 10/-

BOW-FRONTED AQUARIUMS

[illegible]
Available in penny bronze, black & gold, and cream

WITH PLAIN STAND

Inches	48 × 10 × 15	£21.0.0
"	36 × 12 × 15	£15.10.0
"	24 × 12 × 15	£11.10.0

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

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

18 × 10 × 12	£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	50/-
36 × 12 × 36	55/-

REMEDIES, etc.

Aquatonic	3/6	Haloerol	3/-
Brosiam White Spot Cure	2/-	Liquinox	1/9
Vivo Salts	2/-	Dissmolve	2/6
Sea Salt	1/6	Brosiam Fertilising Tablets	1/6

Tetracures all 4/- each

THERMOSTATS

Constat External	25/-
Constat New External Type OK	22/-
UNO	
Out/Adj.	18/-
Int/Adj.	15/-
Int/Adj. "Popular"	10/-
"Popular" with neon indicator	12/6
Rena (with Neon)	21/-
"Ex-Ex" Sentinel	26/6
Springfield Safety	22/-

THERMOMETERS

	each
Mercury	
Gem	6/6
Plastic Backed	6/6
Spirit Blue Gem	5/-
"Ex-Ex" Diverge	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
"Klear King" Outside Filter	22/6
Bottom Filter	8/3
Ornamental Rock Filter	17/6
Uni Polyfibre	3/6

AERATORS & PISTON PUMPS

	each
Montrose	21/-
"	24/-
Fairy	27/6
Star	36/-
Rena	42/-
Zoobeka Total	75/-
Hy-flo Junior	107/6
Hy-flo "A"	130/-
Hy-flo "B"	160/-
Hy-flo "C"	230/-

HEATERS

	each
"QUEENSBOROUGH" 25w., 40w., 60w., 75w., 100w., 125w., 150w.	10/-
Rena (75—200w.)	18/-
"Ex-Ex" Flexible Heaters (100w. and 150w.)	19/-
"Radio" Thermostatic Heaters, 100w. and 150w.	36/-
Preset-matic	24/6
Inter-Pet Thermostatic Heater 22/6 and	29/6
Heater Holders	2/-

BACKING PAPERS

STRATA ROCKWORK
PEBBLE BEACH
SEA & SHORE
24in. long × 20in. high, 2/6 per sheet, or 1/3 per foot.
(post free)

BOOKS FOR CHRISTMAS

Diseases of Fishes (C. Van Duijn)	15/6
All about Tropical Fish (McInerny)	77/-
Encyclopaedia 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)	67/6
Exotic Tropical Fishes	150/-
All T.F.H. Books 2/- each	
The Book of the Garden Pond (G. F. Hervey and J. Hems)	16/6

FOODS

"Queensborough" Tropical Fish Food	1/6 and 2/6
Exotic Flakes	1/6
Hykro Flakes	1/-
Brosiam	1/6 and 2/6
Brosiam Frygrain	1/6
Brosiam Bovis 6d. and	1/6
Liquifry Nos. 1 and 2	2/6
Infusil	2/6
Elite	2/- and 4/6
Dried Daphnia (Our own pack in 3 sizes)	6d.
Ground Shrimp (Our own pack in 3 sizes)	1/-
Fish Food (Our own pack in 3 sizes)	1/6
Ants Eggs	6d.
Wardley's Trout Pac. 7 kinds of food	8/6
Hi-Glow	4/6
Glow Tabs	3/6
Biol	3/6
G. Baumann	3/6
Foodas	3/-
Supremia	2/6
Tetramin Flake (all sizes) 1/10, 3/-, 4/6, 22/6 and	78/-
Sanagrow 1/- and	2/-
" (fry food)	1/3

LIVE FOODS

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

SEDIMENT REMOVERS

	each
"Windmill" Air Rejectors	18/-
"Windmill" Hand Rejectors	12/-
Flatsol	5/-
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* 2/6 and	5/-
" *Cordata* 2/6 and	5/-
" *Haerteliana* 2/6 and	5/-
Water Wistaria	2/6
Giant Hygrophila	2/6
Giant Sagittaria	2/6
Najas Microdon	2/6
Amazon Chain Sword	2/6
Duckweed per portion	1/-

SUNDRIES

	each
Breeding Trap	15/-
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 Sucker	1/6
"Windmill" Diffuser Stones 1/- to	1/6
"T" Piece	1/-
Aerator Tubing Rubber	ft. 4d.
Plastic	ft. 6d.
4 Way Piece	1/-
Clamps	1/-
Carbon	1/-
Glass Wool	1/-
Nylon Wool	1/6
Testing sets 16/6 and	7/6
Post 1/9 extra	
Hykro Leak Sealer	2/-

FULLY-GLAZED AQUARIUMS

Pressed Steel

Inches	Tank	H'd	R'ff
12 × 6 × 6	10/6	—	6/6
14 × 8 × 8	13/6	—	7/-
16 × 8 × 8	15/-	—	7/6
18 × 10 × 10	22/6	15/-	8/-

Angle Iron (Aluminium)

Inches	Tank	H'd	R'ff
24 × 12 × 12	50/-	21/-	8/6
24 × 12 × 15	55/-	21/-	8/6
30 × 12 × 15	70/-	27/6	—
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 2885
Sundays only from 10 a.m. to 4 p.m.
All postal enquiries to Goldhawk Road address

10 PICTON PLACE, LONDON, W.1
(5 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.

The AQUARIST
AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"

VOL. XXVIII No. 7 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. 6d. 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 privilege 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

Aquarium News from the U.S.A.

THE American Killifish Association was formed during the last few months of 1961 by contacting aquarists throughout the United States and Canada who were interested in the family Cyprinodontidae, commonly called egg-laying toothcarps, killifish and panchax. The AKA is now in its second year of operation and has been expanded to include killifish fanciers all over the world. Last year the Association imported three different species into the U.S.A. for the first time: *Nothobranchius neumanni* from East Africa and *Aucrofundulus myersi* and *Rachovia splendens* from South America.

The American Killifish Association's members consist of both beginners and experts in the keeping and propagation of killifish. One of the most important of the Association's publications is a quarterly one called *Killie Notes*, which is compiled of articles completely devoted to the keeping, breeding and identification of killifish. A booklet called *Killifish Exchanges* is a manual of methods that can be used for the shipment of eggs and fishes through the mails, from one member to another member throughout the world. Members can contact each other through the listings of eggs and fish available and wanted, which appears each month in a *News Letter*. Any member may list his eggs and fish free of charge. The News Letter also brings members, committee reports and any social news of activities relative to the organisation which would be of interest to its members.

Aquarists interested in this group of fishes and wanting to know more about the Association can write to the International Liaison Chairman, Mr. Edward F. Duffy, 14, Regal Drive, Huntington, Long Island, New York, U.S.A.

PHILADELPHIA Aquarama is one of the newest and most unusual aquariums in North America. Opened in December 1962, it consists of a single, modern building having an area of 45,000 square feet and enclosing a 150,000 gallons freshwater tank, a number of smaller fresh- and salt-water tanks and a 70 foot porpoise theatre tank with stadium-like rows of benches on each side. It is the first comprehensive 'oceanarium'-type institution to be built in a northern climate (although an indoor porpoise exhibit—'Seven Seas Panorama', exists at the Chicago Zoological Park). Of particular interest are the fibreglass

Continued overpage

Pondside Bulbs for Colour Next Spring

by JAS. STOTT

Photo: W. J. Howes

Tulipa kaufmanniana, a short tulip useful at the pondside, should be planted in clusters

IT is surprising how often one finds, as one goes about in the early springtime, garden ponds devoid of that colour in the rock edge and surround which may be obtained by the use of those miniature bulbous subjects often seen in the rock garden of the alpine enthusiast. Some of them are ideal for such a position and will thrive well in the higher pockets of the rock edging in the surround of the informal pond. All they need is good drainage and, in the main, medium to light soil. A light top dressing of bonemeal in the late spring or early summer after flowering will help to keep them well fed and happy. The time is now right for planting and the following subjects can be recommended.

I think for February flowering pride of place should go to *Iris reticulata*, which bears beautiful deep purple flowers with a golden yellow blotch and is scented. They look best when planted in a cluster, allowing about 3 square inches for each bulb. Another iris flowering a little later in the month is *I. histrioides*, which is pale blue and ultramarine and flowers before the leaves appear. Both these species appreciate a little mortar rubble mixed into the soil when planted.

Flowering about the same time as these two irises and in whose company looks so well is an early crocus, *Crocus chrysanthus* and its varieties. They appear in shades of yellow and brownish yellow but, to my mind, for growing with these two particular irises, the variety E. A. Bowles is the best. It is a delicate pale yellow, even in texture and colour.

For March flowering there is much to delight the eye in two or three clusters of *Chionodoxa* set among the rocks at the pondside. Of the several varieties I think *C. luciliae* is the best for our purpose. It is a brilliant blue with a white centre and the loose sprays of flowers are borne in great profusion. The plant has a fairly long flowering period and can carry bloom right into the last days of April. It appreciates a position of moderate sunshine.

Along with *Chionodoxa* is recommended *Puschkinia scilloides* with white flowers, the petals of which are striped with pale blue. It grows well in a similar position.

The Siberian squill (*Scilla sibirica*) is well known for its electric blue flowers in March and is well worth planting, but there is one species which is not so widely known and is, to my mind, the most attractive of them all. It is the squill *Scilla bifolia*, with flowers a lovely deep blue, a blue similar to the colour of *Gentian sino-ornata*. It is long-flowering and easy to grow.

There are two grape hyacinths (*Muscari*) that I should like to mention for they are a little different from the usual *M. azureum*. They are *M. plumosum*, a delightfully plumed and tasselled bright blue variety and the pretty white *M. botryoides alba*. Flowering from March to April and appreciating a sunny position, they also make useful subjects for building up early colour.

Among the early flowering wild tulip species there are two that are worth mentioning because they can, in sheltered places, help us with this early colour at the pondside; they appear in mid-March if planted in a position receiving full sun. They are both small growing and attractive. *T. biflora* has creamy white flowers with pale yellow centres and each stalk carries two or three flowers, star-like in shape. It grows to a height of some 6 in. and is best planted in clusters. *T. kaufmanniana* has cream yellow flowers striped with red on the outer side. This tulip is often called the water lily tulip because of its shape when fully opened. It grows to a height of around 8 to 9 in. This also should be planted in clusters for the best effect.

The miniature daffodils provide three suitable subjects for our purpose: *N. asturiensis* (usually referred to as *N. minimus* in catalogues), a perfect miniature daffodil about 3 in. tall; *N. bulbocodium*, the hoop petticoat narcissus, growing about 6 in. tall; *N. cyclamineus*, another attractive miniature about 4 in. high. All three of them prefer a slightly moist position receiving medium sun.

Finally, the bravest of all the early flowers, the snowdrop (*Galanthus*). The common snowdrop (*G. nivalis*) is known to all but there are many different species. By far the loveliest and the largest is *G. elwesii*.

Aquarium News from the U.S.A.

continued from page 119

THE California Academy of Sciences has announced the reopening of the famous Steinhart Aquarium in San Francisco's Golden Gate Park. It has undergone extensive reconstruction and now contains, among other things, a tank of white-sided dolphins (*Lagenorhynchus*) and a coelacanth tank (Dr. Earl Herald will probably be heading for South Africa to catch one soon).

tanks, designed with six sides, efficient diatomaceous filtration, the novel design of the porpoise tank built with glass sides like a huge fish bowl and the attractive floors, walls and general finish of the building. Manager Frank Powell and Curator Don Wilkie have recently returned from a whaling expedition off Nova Scotia.

An Automatic Time-Switch

by A. JENNO

ONE of the more important considerations when maintaining decorative aquaria in a healthy condition is that it is necessary to switch on the lamps over the tanks for a certain number of hours daily, and, furthermore, it is advisable to switch the lamps on and off at the same time every day. The majority of aquarists spend the best part of the day out at work and therefore are in no position to switch the lamps on and off when required and so a situation often arises where the amount of light the tanks receive varies greatly from day to day. This may harm the plant life in the tank and the condition of the aquaria gradually deteriorates.

This problem can be solved by the use of a small automatic time-switch, which can be quite easily constructed by the aquarist at home. I will describe the construction of such a switch and its initial calibration and setting. Parts required are: (*a*) a small synchronous motor with a speed of 1 rev./24 hours, to work at the same supply voltage as the aquarium lamps (these motors can be bought very cheaply either secondhand or reconditioned); (*b*) a single pole, two-way, leaf-type microswitch; (*c*) a single pole toggle switch; (*d*) a small four-way terminal connector block; (*e*) a cam (*see* below); (*f*) a mounting bracket for the microswitch; (*g*) a baseboard; (*h*) a small cabinet or box to contain the finished switch.

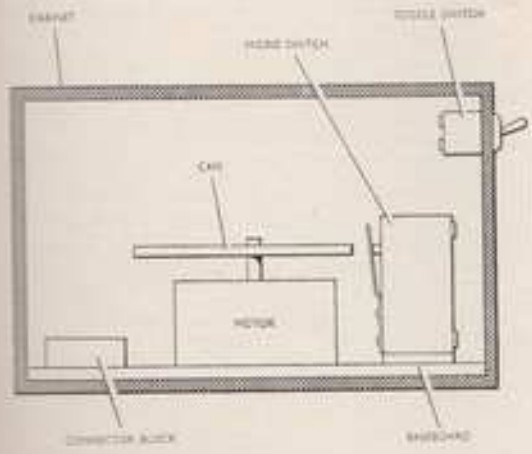
The last three items (*f-h*) can be made by the aquarist from scrap materials and the cam must be shaped to suit the time period required. The method of doing this will be described below. The two switches must have adequate voltage and current ratings to suit the lamps whose supply is to be switched. Total cost of materials should be less than £1.

Construction is shown in the diagram. The motor is mounted flat on the baseboard with the drive spindle protruding vertically upwards. A circular cam is then cut out of hard plastic, bakelite or non-ferrous metal, with a diameter about an inch greater than that of the motor housing so that when the cam is fitted to the drive spindle by a central hole the edge of the cam rides outside the diameter of the motor.

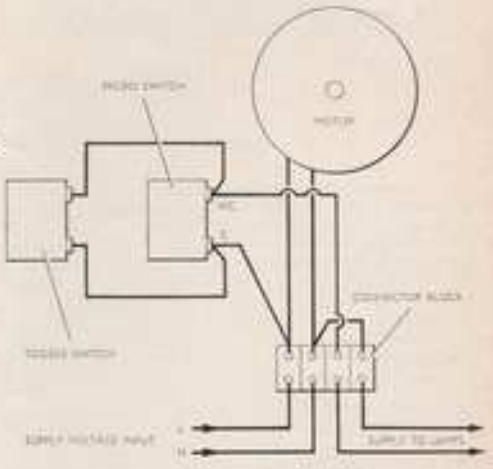
If the microswitch is examined it will be noticed that when the leaf is pressed there is a distinct 'click', which shows that the switch has engaged internally. The switch must be positioned so that the cam holds the leaf in this depressed position permanently. This is best done by making a suitable mounting bracket with slotted holes for the switch fixing screws, to provide fine adjustment of the switch position. The terminal connector block is mounted at a convenient position on the baseboard and the toggle switch either on the front or side of the containing cabinet so that it can be used without opening the cabinet. This switch will be used to over-ride the action of the microswitch as there will be times when it will be necessary to switch on the lights while the cam and microswitch are in the 'off' position.

The wiring connections are made as shown in the diagram and should be carried out with insulated wire suited to the voltage supply and the current drawn by the lamps. The current drawn by the synchronous motor is small enough to be negligible.

We now come to the most important part of the construction, the calibration and cutting of the cam. The cam is first divided into twelve equal sections or sectors with a



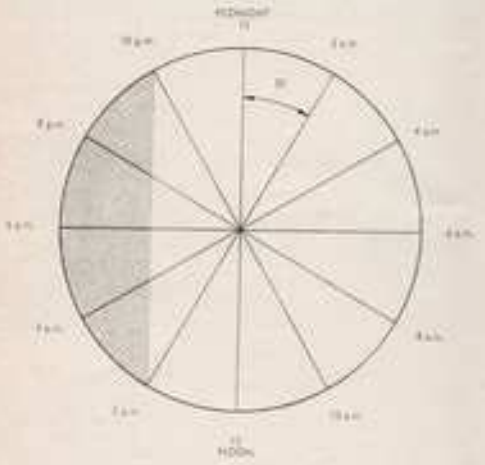
Arrangement of the components (sectional view)



Wiring diagram for the time-switch

protractor and these are numbered from 2 to 24 hours in steps of 2 hours around the circumference of the cam and in a direction corresponding to the direction of rotation of the motor spindle. A straight line is then drawn across the cam from the time when the lamps are to be switched on to the time when they are to be switched off (e.g. from 2 p.m. to 10 p.m.). This portion of the cam is then cut away and the resulting shape of the cam will then be the means of activating the microswitch. This is effected by the cam rotating until the start of the cutaway section reaches the microswitch leaf, which is then released from the depressed position with the result that the aquarium lamps are switched on, and are left on until the cam rotates enough to bring the end of the cutaway section past the microswitch leaf, which will then be depressed and will switch the lamps off again.

It should be noted that to obtain this action the wiring connections to the microswitch must be made to the terminals marked 'common' and 'normally closed'. If the 'normally open' terminal is used the reversed action will be obtained, that is, the lights will be off when they should be on and on when they should be off.



Calibration of the cam, the shaded area showing the part to be cut off

The corners formed by cutting the cam should be rounded off smoothly and the whole of the edge of the cam should be smoothed to minimise wear on the microswitch leaf. The cam can then be fitted on to the motor drive spindle and rotated until the correct time calibration is in contact with the microswitch leaf. All that remains then is to switch on and the switch will then function automatically.

Variations in the shape of the cam can provide many uses for this type of switch. With a little experimenting it can be made to control the supply pressure in the capacity chamber of an aeration system, by switching on and off the pump at preset intervals, or the room temperature achieved by a simple electrical space heating system, to name just two applications that may interest the aquarist. With suitable auxiliary apparatus it can also, of course, provide a means of raising the aquarist from his bed in the early hours of the morning to feed his beloved fishes, before setting off for his day's work.

Fan-footed and

THE family Geckonidae, the geckos, includes several hundred species of lizards, many of which are very different in appearance. The two species which form the subject of this article are specialised for totally different modes of life: the fan-footed gecko is beautifully adapted for life on ceiling and walls and can scale a vertical sheet of glass with ease; the eyed gecko, on the other hand, is a poor climber and hides under stones on the ground. Both are equally interesting to keep and do not require a large vivarium.

The fan-footed gecko (*Ptyodactylus hasselquistii*) measures about 5 inches in total length and is a khaki-brown colour above, white below. There are darker and lighter coloured blotches on the back and limbs which help to camouflage it. This gecko inhabits the eastern Mediterranean, and the specimens shown in the photographs were caught near Jerusalem, Israel.

The vivarium for these extremely active climbing lizards must be escape-proof, and I make it a rule never to open the lid when the light bulb is on and the temperature is high. I provide food and fresh water before switching on the light in the morning, when the temperature is about 60°F (15°C). Even at this temperature they are capable of quite rapid dashes. It is most important to guard against an escape as should this occur recapture is extremely difficult. In addition, they can squeeze into the tiniest crevices, from which it is almost impossible to extract them without injury.

I had personal experience of this some years ago, when a friend who was looking after my collection while I was on holiday, allowed about a dozen *Hemidactylus Frenki* to escape. Brook's geckos are excellent climbers and on my return he had only recaptured a couple of specimens. I recaptured all but one over a period of 3 weeks, and thereafter gecko eggs were found in the strangest places. One annoying trait was that two specimens used to actually run on the outside of their vivarium and would allow me to approach to within about 2 yards before disappearing quicker than the eye could follow.

At the present time I have three fine specimens of the fan-footed gecko living in a 20 in. by 20 in. by 20 in. vivarium, which they share with an eyed skink (*Chalcides ocellatus*), also from Israel. The vivarium has 3 inches of sand on the floor, into which the skink burrows, and some rocks at the back which provide hiding places for the geckos. Both feed out of a small dish sunk into the sand and drink out of another nearby container.

Most geckos are nocturnal, as a glance at their large eyes with vertical split pupils shows, but the fan-footed gecko likes to bask in the sun and my specimens enjoy the warmth from the light bulb for most of the day. The day temperature is about 80°F (27°C).

Mealworms are always present in the dish sunk into the sand and form the basic item of food, but flies, bluebottles and moths are introduced frequently to provide variety. The geckos are certainly easy to keep and my three specimens have almost doubled their weight since arrival. The fan-footed geckos are gregarious but it is inadvisable to keep more than one male in a small vivarium. An Israeli friend, Dr. Werner, tells me that if two or more males are kept together one will 'lord' it over the others, who will go off their food and slowly decline until they eventually die.

It is most important when purchasing these lizards to check the sex carefully. I have two females and one male. The male is easily distinguished by the swelling at the base

Eyed Geckos

by ROBERT BUSTARD, B.Sc.

Photographs by the author

Fan-footed gecko (Pyodactylus hasselquistii guttatus)

of the tail, which is most obvious when compared with a female specimen, in which the swelling is absent. Geckos must be handled with extreme care, as many species have thin skins that are easily damaged. In addition, their brittle tails are easily shed. Both my female specimens have regrown tails, and when I was lifting out the smaller one to photograph her I accidentally touched her tail (touched, not grabbed) and it was shed. Tail fracture takes place at special junctions between vertebrae and contraction prevents bleeding.

The fan-footed gecko, so-called owing to its greatly dilated digital pads, is an excellent species to keep. Young specimens, however, should be housed separately, as the adults might eat them.

The eyed gecko (*Pachydactylus geitje*) is a native of South Africa, where it is common in parts of the Cape peninsula and adjacent Robben Island. It is a small species, measuring about 3½ inches in total length, and its brown body is marked with pale and dark spots and has a sheen like satin. It has a fat tail, which possibly acts as a food store, and its large dark eyes give it a most appealing look. The manner in which it curls and stretches is decidedly cat-like. This attractive little ground-dwelling gecko likes moist (not wet) surroundings and the vivarium floor should be covered with garden soil and have growing moss and stones under

Continued overpage

Eyed gecko (Pachydactylus geitje) with one of the two eggs that were laid and which hatched after incubation at vivarium temperature for about 4 months

Some Experiences with White-Spot Disease

by B. J. TARRY

MAYBE I am not the ideal aquarist, but I do pride myself on knowing how to look after my fishes, and for 10 years managed to steer clear of white-spot disease without once putting new fishes into a quarantine tank.

But, the inevitable happened, and about 3 weeks after purchasing some fish, I noticed the tell-tale spots on many of the inmates of my tank. I remembered the excellent series on the disease by Dr. F. N. Ghadially in the February, March and April, 1956, issues of *The Aquarist*, and after re-reading the series I decided to try treatment with methylene blue.

Methylene Blue Treatment

With only one tank, the treatment had to be *in situ*, so I removed every plant and dosed as prescribed (15 milligrams per gallon), adding more as the colour faded. I raised the tank temperature to 82°F (28°C); no aeration was used, and the whole outbreak was cleared in a fortnight. The only fishes to die during or shortly after treatment were the very old ones, and most certainly death was not due to the drug. That was 3 years ago.

Quite recently, and not having learnt my lesson, I had a further outbreak. This time I decided to leave at least two plants of each variety I had in the tank, to leave the tank temperature at its normal setting (70°F; 25°C), to use aeration via a bottom filter and, using the drug as before, to make a careful study of results. My tank size is 36 in. by 15 in. by 12 in., the water is very hard and its reaction was pH 6.8, the latter reading being obtained by the addition of peat water to the tank.

Under these conditions the drug completely cleared the tank of disease, but, owing to the low temperature, a month was necessary as compared with a fortnight at 82°F (28°C). However, even the old fishes survived this time, and personally I found it far easier to leave the thermostat alone, particularly as it was an internal fitting type. Constant re-setting of this type involves repeated removal of the rubber bung, and hence weakening of its sealing qualities.

Even at normal tank temperature all fishes ate well throughout the time of treatment, but it was the effect of the drug on the plants that was surprising. Overhead lighting was used as usual, and the bottom filter was left on for very long periods to ensure as thorough a circulation of the methylene blue as possible, even to the roots of the plants.

Effects on Plants

Water wisteria was not affected in any way, and grew normally, as did anacharis (*Elodea canadensis*), the latter as a rooted plant and floating. *Hygrophila polysperma* also came out of the test apparently unscathed, but growth was retarded (a blessing in a way as this plant usually needed very frequent pruning).

The two species of *Cryptocoryne*, *C. willisii* and *C. griffithii*, both fared badly. Huge holes appeared in the leaves quite quickly, and further tests in very dilute solutions also caused holing of the foliage. But on return to normal conditions all the plants recovered. *Ludwigia* growth was severely retarded, and afterwards it took a very long time to send out new shoots. *Vallisneria spiralis* was completely shattered by the drug. Leaves dropped within a day or so, and within a week the plants had rotted down to the crowns. However, examination of the roots showed that they were living, but even now, 3 months after conditions were back to normal, fresh growth is only just commencing.

After eradication of the white spot, the tank was half emptied and topped up with fresh water, the process being repeated at weekly intervals until only a very slight blue coloration was noticeable. This was then allowed to clear naturally. The time taken from adding the methylene blue until the final disappearance of the colour was 8 weeks.

Conclusions

Several conclusions can, I think, be drawn from even this simple experiment.

(1) That raising the tank temperature does decrease the time taken for the drug to clear all traces of white spot.

(2) That most species of water plants are affected by methylene blue.

(3) That prolonged exposure to high concentrations of the drug has no serious effect on the fishes. In fact, quite the reverse: my fishes looked far healthier afterwards.

Fan-footed and Eyed Geckos

continued from the preceding page

which they can hide. From time to time the vivarium should be sprayed to keep it moist. The floor area need not be greater than 20 in. by 20 in. as they are not very active.

In captivity eyed geckos become very tame and trusting and can be handled quite easily. They bask in the sun or when the light bulb is on, on stones or moss, and are best fed on winged insects such as flies or bluebottles or small beetles. My specimens did not like gentles.

It is perfectly possible to breed eyed geckos in a vivarium of the size mentioned. The females lay eggs of a comparatively large size, as is shown in the photograph. It is possible that sometimes one egg instead of the usual two may be laid. My specimens deposited their eggs in November and those that I was successful in hatching hatched after 4 months at a vivarium temperature of 75°F (24°C; day) and 60°F (15°C) at night. During incubation, the eggs, although they have calcareous shells like hen's eggs, required to be moistened every few days. Those which were not moistened failed to hatch and dead embryos were found inside. The eggs were placed in a small box in the gecko vivarium containing 1 inch of sand topped with moss and were placed in depressions in the moss. The hatchlings were fed on fruit flies (*Drosophila*). They measure about an inch at birth and are perfect replicas of their parents.

The cost of the geckos described in this article is likely to be about 15s. to 20s. each.

Breeding Neon Tetras on a Commercial Scale

by MARTIN THEIL

In my native land I have bred neon tetras in large quantities since 1950, to the stage where it was a commercial proposition; therefore I trust that the following article will be of some interest and use to you in your future efforts of breeding these fish.

In the last 5 years before leaving Germany I was able to fulfil contracts to supply an average of 30,000 neons per month to dealers in Holland and Switzerland. I have also been fortunate enough to be a member on many an expedition to the Amazon region, in South America, the home of the neon. During the course of these expeditions I was able to study and make field tests of the conditions under which the neon lives in its wild state, and to apply this knowledge, where necessary, to improve the chances of successful breeding for commercial purposes.

A broad outline of the method used in the breeding follows and I feel sure that if the steps outlined are followed, the chances of success are immeasurably increased. Within practical limits this careful and scientific approach will always improve on the "hit-or-miss" methods adopted by so many aquarists—those who state that they have bred the fish but whom later they try to repeat it, cannot explain their failure.

Before outlining the actual breeding procedure, it is well advisable to point out that the best results are obtained when the proposed breeders are acquired when they are very young—about 4-6 weeks of age. These young fish should then be conditioned with the ultimate aim of bringing them to sound maturity, ready for breeding, at 6-7 months.

The conditioning tank should be about 24 in. by 12 in. by 12 in. with a glass bottom. It is an advantage to have 2 in. or 3 in. layer of boiled peat covered with about ¼ in. of coarse sand, planted with small clumps of fine-leaved plants such as *Cabomba* or *Myriophyllum*.

The reaction of the water should be no lower than pH 6.00 or 7.00 (from mildly acid to neutral), and the hardness (DH) from 2.5 to 5.00. The temperature should be allowed to fluctuate around 69° and 70°F (21°C). The practice of keeping fishes in a constant unvarying temperature all the time is not good. Moderate fluctuation in temperature will always produce healthier fishes, as these conditions more nearly approximate to those they encounter in their native state.

The main conditioning foods in European countries are Daphnia and Cyclops. *Tubifex*, white worms, and mosquito larvae more than one day old, are not suitable because their tendency to cause over fattening of the breeders is harmful. A good well-balanced dried food would probably offer the best prospects of success, especially if it is supplemented with weekly feedings of micro worms. Brine shrimps are also useful if fed occasionally, but they should be well washed beforehand to prevent an accumulation of salt in the tank. Kept under such conditions, your prospective breeders should be ready at 6-7 months old.

The small breeding tank should be about 10 in. by 6 in. by 7 in. deep, with all sides and bottom made of close-fitting glass; no cement is required (as a matter of fact it is harmful to the development of the fry). The tank should be sterilised beforehand with a 10 per cent solution of potassium permanganate, allowed to stand in it for ½ hour to 1 hour. In a similar solution place a medium sized clump of *Myriophyllum* and a small glass bar with which to weight the plant.

The tank is then set up with clean sterile water (DH 2.5 to 5.00 and pH 6.5). Commercially softened water is recommended in preference to rain water because of its consistent reaction; rain water is inclined to vary overmuch for successful results. After well sterilising your hands in a solution similar to the one above, wrap the *Myriophyllum* about the glass rod and place it carefully on the bottom of the tank in such a way that a short tunnel is formed through the middle of the plant.

A well-rounded female is selected and placed in the tank just before dusk. A good likely male may be added at the same time, or before first light next morning—it does not seem to make such difference when. The tank is positioned away from direct light, as strong light has a harmful effect on the eggs. Generally, if conditions are suitable for the breeders, the spawning will take place at first light or occasionally just on dusk. For breeding the temperature should be within the range 71-72°F (22°C); this is important.

From this time on you will need to be alert and watching the breeders constantly. The first reaction is for the female to make periodic darts through the plant tunnel, inviting the male to co-operate. When he starts to drive her this will continue for an hour to an hour and half, during which time 120 to 180 eggs will be laid. At the end of this time both fish will have a tendency to stay in the one place, recovering their strength, sometimes in the corner of the tank, often just at the top of the plants. They should then be removed immediately with a small sterile net. Once the pair have spawned they should be removed to separate tanks for further conditioning. It is better for the health of the fish if they are regularly spawned every 6 or 7 days, and kept separate unless actually being spawned.

After the removal of the parents from it, the tank should be masked completely from all light and kept at 71° or 72°F (22°C) for the next 6 days. During this time it will be necessary to control your curiosity, for even a stray light falling on the eggs at any time will be fatal. At the end of the sixth day the tank can be uncovered and placed in a position away from direct light. Feeding with Infusoria is commenced immediately. Watch carefully the amount of light which falls on the fry tank, because too much will encourage the growth of excess Infusoria, which will seriously deplete the supply of oxygen in the small tank; the young fry are very susceptible to oxygen fluctuations.

After the third day the feeding of newly hatched brine shrimp or *Cyclops* (when available) is commenced. In addition a previously sterilised aeration stone is now added to the breeding tank and very gentle aeration started. After 3 weeks a red spot of colour will appear, which gradually spreads to form the tropical glowing red neon stripe. At this time, when the line commences to develop, fine dried food can be fed and with continued growth the fish should reach saleable size in about 10 to 12 weeks. After the third week you can be reasonably certain you have no further feeding problems.

Such then is a method that has worked for me, and I think that careful attention to all the steps listed above will bring success to you.

From the Queensland Gold and Tropical Fish Society's Bulletin.

Twintail Goldfish

by C. E. C. COLE

ALL the variations of the common goldfish so far discussed in this series of articles have had one thing in common—a single tail. Now we start to talk about goldfish with 'twin' tails and 'twin' anals. Why should any goldfish develop two tails and two anals? The simple truth is that none does! Such a statement sounds like nonsense, for are not the two tails there—plain for anyone to see? Not really, as close examination will show.

Next time one of your goldfish dies, cut off its tail at the roots and leave it to dry for a day or two. Then look at it with the aid of a hand lens. You will find it is composed of a number of long, bony rays, each of which is made up of a lot of small, brick-like segments joined end to end. Above the topmost ray, firmly embedded in the caudal peduncle, are two smaller, rigid rays, which act as powerful suspension brackets for the rest of the tail. There are no similar short rays beneath the lowest long ray. Having noted these points, look now with a more powerful lens at the end section where the rays leave the caudal peduncle.

This will reveal that each long ray is in fact composed of two parallel and similar portions, one situated slightly above and to one side of the other, the two bound together by a thin layer of connective tissue. The two parallel rays are stronger and more flexible than a single, bulkier ray would be.

Somewhere, at some time, a mutation occurred which partially destroyed or changed the nature of the connective tissue between the parallel rays so that they began to separate. Thus started the early twintails. In good specimens every ray is separated for its entire length, forming in effect two almost identical half-tails. Similar changes have affected the anal fin. Even to-day, however, after many years of selective breeding, no one has been able to establish a strain in which every young fish develops a good twintail and completely divided anals. Not only this, but the rotund body and exaggerated remaining finnage which is deemed desirable are also comparatively rare.

Both the Federation of British Aquatic Societies and the Goldfish Society of Great Britain have compiled ideal standards for twintails. Although there are differences between the two show standards, it is still possible for the same fish to take the premier awards at exhibitions no matter who organises them. There are several twintails bred in this country, each with its own circle of admirers.

Fanciers who wish to purchase show specimens will find them extremely expensive. It is useless to expect anything but 'discards' for a copper or two. By far the best way is to invest in some eyed ova from a reputable breeder of twintails (if he can be persuaded to part with any!). In this way you are in exactly the same position as that reached by the breeder. He has to sort his fry into good and bad—you can do the same with eggs from his specimen fish.

Under a microscope it is often possible to see which embryos are developing twintails, but I am not suggesting that you take a microscope with you to the hatchery. Wait until you get home for examinations of this kind—it gives less annoyance.

The division of the tail into two separate halves makes each portion much weaker. This has to be considered when breeding specimens that are expected to carry their tails proudly and well spread. Even a little overdevelopment will make it a physical impossibility for the fish to lift the tail into the 'proud' position. Not only this, but remember that the rays are composed of small segments. The junction of each segment is a potential weakness. Overdeveloped finnage may cause these to give way at any point along the length, but most frequently this occurs nearest the caudal peduncle.

The first fancier's twintail is the famail goldfish. As it is expected to carry its tail proudly and well spread it follows that weight must not be excessive. Therefore development is medium—the length about half the rest of the fish's body. The F.B.A.S. Standards booklet states "more than half as long", but this is asking a great deal.

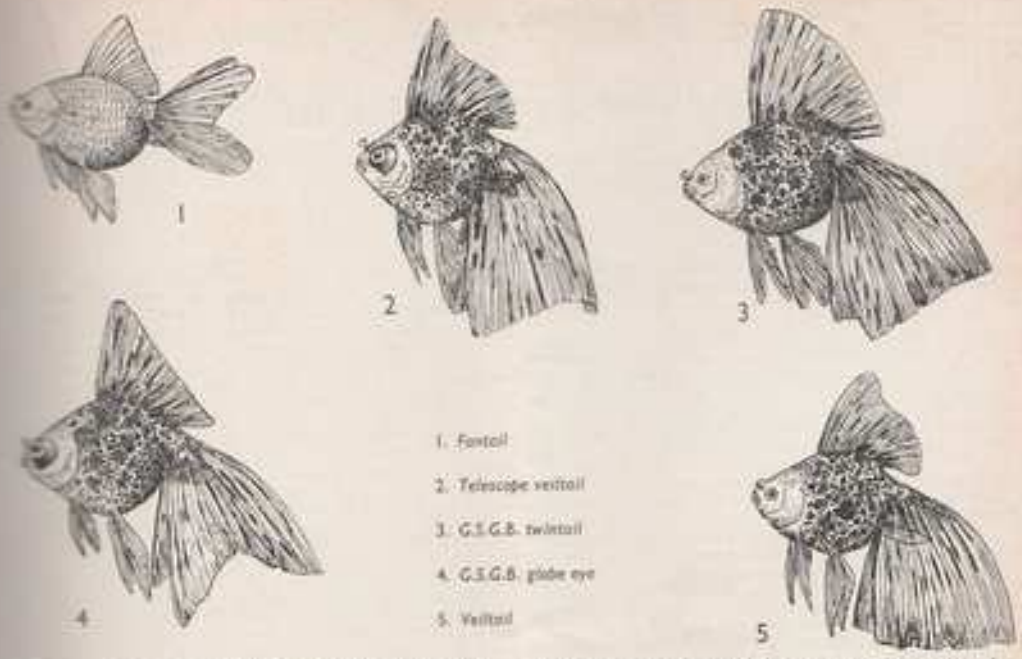
The body of the famail is short—about equal in depth to the length of the fish's trunk. It seems most fancied in the metallic scale group, but both nacreous and matt fishes exist and are quite attractive.

The rotundity of the body, coupled with the extra finnage, prevent graceful swimming. Movement consists largely of excessive wiggles. Fantails cannot move anything like so fast as singletails, and are at a disadvantage when feeding time comes if kept in the same aquarium.

Increase the body depth, add greatly to the development of the tail and other fins, and we have the veiltail of the

Views from above of left, single tail and right, twintail

Sections through the bases of left, single tail and right, twintail



1. Fantail
2. Telescope veiltail
3. G.S.G.B. twintail
4. G.S.G.B. globe eye
5. Veiltail

F.B.A.S. or the twintail of the Goldfish Society of Great Britain. The only differences between the two standards are in the contours of the fins—all except the caudal, which is the same for both Societies.

I have tried to show these in the accompanying drawings, based upon the outline drawings in the two Societies' show standard booklets.

These are most striking fish, creating a deep impression wherever seen. It is hard to imagine that they have developed from a common goldfish. The extreme rotundity of the body and the enormous development of finnage is a severe handicap when swift movement is desirable. Consequently veiltails are not very active, preferring to, or being forced to, take life easily and very, very gently indeed.

Further mutations in some of the more 'advanced' goldfish occurred, causing some normal eyes to begin to protrude. A fleshy protuberance grew out from the head, with the normal lens and pupil surmounting it. This new character is still not fixed. That is to say that fish bearing the character, if bred together, do not produce 100 per cent (or anything approaching it) offspring showing protruding eyes.

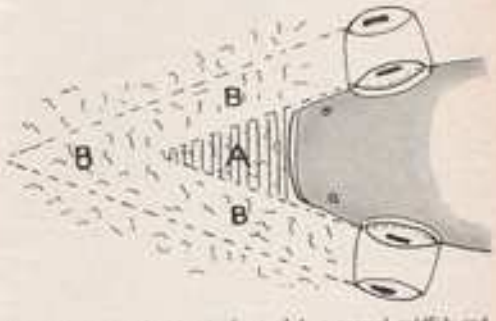
Both interested groups, the G.S.G.B. and the F.B.A.S., set-up ideals for this new development. The G.S.G.B. have tried to fix it upon a very rotund fish with highly developed finnage and a deeply forked twin tail. The F.B.A.S. have simply declared that veiltails may have either normal or protruding eyes.

It was at one time thought that fish with protruding eyes were purblind. It is true that they blunder round snuffling out food, instead of going straight to it and sucking it in like their normal eyed relatives. But this is not because they are near-sighted; actually the reverse applies. Reference to the accompanying diagram will show that owing to the fact that the eyes are set further apart the ability to focus on food near enough to their mouths to reach easily has been lost—there is a comparatively large area immediately in front of their snouts in which they can see nothing without slightly turning their heads or bodies.

The name 'telescopic-eyed' fish, given by the F.B.A.S., is as good and descriptive as we are likely to get. The fact that they have a large blind area, owing to the position of their eyes, renders them unlikely to see near objects against which they might blunder and damage the eye lens. For the same reason they must be handled with extreme care.

There is an all black variation, given the name moor,

Please turn to page 131



Areas of restricted vision in front of A, a normal goldfish and A plus B, a telescopic-eyed goldfish

STARTING RIGHT WITH THE COLDWATER AQUARIUM

The Furnished Aquarium for Exhibition

by A. BOARDER

WHEREAS the normal coldwater aquarium can have some time to settle after being set up and is intended to last for many years without having to be disturbed, the exhibition tank must be so set up that it is in its prime perhaps a few hours after having been assembled and will usually have to last not more than a few days. At most shows the tanks for furnished aquaria entries will be provided, and they will be either 24 in. by 12 in. by 12 in. or 24 in. by 12 in. by 15 in. First make sure that the front glass is free from blemishes (the tank may be turned round to give the clearest glass to the front).

Shingle is usually provided but I would advise exhibitors to take their own or at least an amount to form a good covering for what is provided. The main difference in preparing this tank is that there must be no soil of any kind at the base of the tank. Any compost must be thoroughly washed until it leaves a very clear water behind. Whatever rocks are being used it is important to see that they are suitable and have no sharp edges on which fishes could be injured. The compost should match the rockwork; nothing detracts so much from the look of a tank if, for example, nicely weathered greyish rocks stand on bright yellow compost. A good idea is to crush some of the rock into various sizes and sprinkle the small pieces on top of any ordinary sand.

For your selection of fishes 5 points are allotted, and they will only be given if fishes are included which, in the opinion of the judges, are likely to thrive in such a tank. Then 8 points are given for size. This is a very debatable subject with some judges. I find that most tropical fish judges will only give full points if the fishes are quite adult and fully grown. With coldwater species this is quite an impossible system to use, and I personally give my points with regard to whether the size of the fishes is in keeping with the size of the tank. Obviously one would not put a fully grown golden orfe or tench in the tank! I consider that not more than three fishes of an overall length of 3 inches each is sufficient. For quality the fishes can obtain 12 points.

For the selection of water plants 10 points are allowed, and, of course, only those permitted by the Federation of British Aquatic Societies are recognised. I do not agree with all these findings, as *Hygrophila* is not allowed in a coldwater tank by the F.B.A.S. and yet this plant has been my best grower and looker for very many years in a cold tank. Again, the very attractive water crowsfoot (*Ranunculus aquatilis*) is not allowed, but with its pretty, branching under-water leaves and the glossy water-lily-like leaves on on the surface it is very attractive, especially when it produces its buttercup-shaped white flowers in profusion. For quality the plants can be awarded 15 points, and naturally any holes made by water snails will lose points, as also will broken tops of plants.

Points are allotted for design and originality. This latter can be a headache to judges at times as often the only original idea is one where the design and permanency are ignored. The lay-out of the rocks is most important, and the large single rock in the centre of the tank is likely to cause a heavy loss of points. If the rocks are flat it is advisable to lay them to resemble natural strata. Rocks should be of differing sizes, and can be arranged in decreasing heights from one end. Points are also allotted for planting, and in this the exhibitor must see that no roots are showing on plants that normally have their roots below surface. Care should also be taken to see that the tall ones are to the back of the tank, and if the back corners can be hidden completely this will be an advantage. For clarity the tank can receive 5 points, and this will be given only if the water is crystal clear. Any murkiness will cause loss of points.

If after planting and filling the aquarium the water looks cloudy, the tank should be emptied after a time and then refilled very carefully so that nothing is disturbed at all. To try to fill such a tank directly with a hose is foolish. However, the experienced aquarist will know by the look of the water that if the tank can be left undisturbed overnight it will present a far different appearance in the morning before judging takes place. The front of the glass must be cleaned thoroughly and any loose pieces of plant must be removed. The advantage of using small fishes is now apparent, as large ones might well upset most of the plants before the judging takes place.

As for the actual judging, I know only too well that judges have varied opinions about which is the better looking tank, and it is not often that all the judges (there may be two or three at any large show) will agree. Some of the judges I have worked with will give points almost exactly the same as myself. Some judges, however, will argue for hours about one special aspect and will never give way, and so the exhibitor may find that whereas the one type of furnished tank will win with certain judges the same tank would not do so if other judges were employed. Although sets of points have been allocated there is no means by which a judge can be made to assess against his own particular likes and dislikes.

It is permissible to place a back cover to the tank, perhaps in a dark green shade, as long as nothing is allowed to protrude beyond the tank's edges. There is nothing to prevent an exhibitor from arranging a raised platform, say a third from the top of the tank, with suitable small growing plants thereon. Such a tank may well get the maximum points for originality and as long as there is sufficient swimming space for the fishes all should be well. All kinds of objects have been included in these tanks from time to time, such as large roots of plants, lumps of coal, submerged wrecks and even candle grease to imitate stalactites and stalagmites. On one occasion I saw such a tank arranged for tropical fishes, but the warmth of the water melted the grease with disastrous results! The best type of tank is the one that immediately catches the eye of the judge when he gives the row his first cursory glance. Plenty of colour is always a great help, whether it be in the plants, rockwork or fishes. Also if the fishes can be chosen which move about a little instead of skulking behind the plants the whole time, this will be an advantage, as judges may become tired of waiting and returning time after time to a tank to see if there are any fishes in it to be judged!

Questions from Guppy Breeders

answered by JAMES KELLY

The guppies in my tank, males that is, chase the females mercilessly and seem to give them no peace. Should I separate the males from the females occasionally to give them a rest?

You don't say in just what proportions you keep males and females together. It is always advisable to keep two females with each male; this way one female gets a rest from the advances of her suitor.

I am a beginner to the hobby and sometimes see guppies referred to as Cyprinodontoidei and sometimes as Poeciliidae. Are both right? What do they mean?

Both names can be applied to our little friend. They are simply the names of the order and family that they belong too, rather like surnames and forenames. Here they are for future reference: order, Cyprinodontoidei; sub-order, Poecilioidea; family, Poeciliidae; genus: *Lebistes*; species, reticulatus (the latter always has a small initial letter and like the genus name is printed in italics).

As a gardener and a fish-keeper I have come across the symbols pH. The more I try to learn about this the more confused I become. Can you explain it simply? What is the best pH reading for keeping fancy guppies in?

All you need to understand as a fish-keeper is that the pH value is simply the excess of acidity over alkalinity (or vice versa) of your tank water. The scale used goes from 1 to 14, with 7 being the halfway or neutral value. The figures below 7 indicate acidity, and those above denote alkaline conditions. Most town water supplies are slightly alkaline, around pH 7.2. Guppies have been found to do best in water which is a little on the acid side, around pH 6.8, as this condition tends to reduce the presence of infusorians and bacteria.

A new variety, the leopard guppy

Would you please explain to a mere beginner the terms 'inbreeding' and 'outcrossing'?

Inbreeding consists of the mating of individuals related by common blood lines, but guppy breeders generally are so vague about its significance that you will find they are divided about its usefulness. Inbreeding is a means of retaining or developing certain characteristics aimed for by the breeder. One thing we all seem to agree on is that prolonged use of this method can also bring out and emphasise undesirable traits, therefore vigorous culling of fry is essential. The remedy is to 'outcross' after a few generations of 'inbreeding', to a non-related or distantly related similar type of guppy.

I recently saw some 'leopard guppies' for sale. Are these a new variety, or just a dealer's name for an old one?

This type of guppy was bred by Mr. Abe Abrahams, F.G.A., of Bedford, who experimented for 2 years with the wild 'lace' variety. He wanted to fix the beautiful 'leopard' markings on the body of this small fish but to add size and finnage associated with the more fancy types. He finally, after much effort, succeeded and it is shown in the photograph on this page.

It seems that live brine shrimp are good for feeding young guppies, but surely continued use of this food will increase the salt content of my tanks. Is this salt increase harmful?

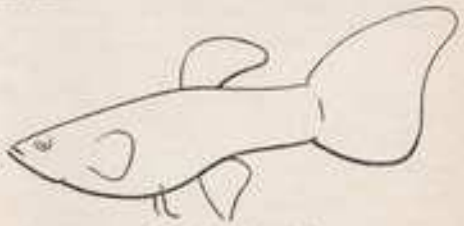
Don't let the problem of the salt content increasing in your tanks put you off using this excellent food. Wash the freshly netted shrimp under the tap to remove most of the salt; regularly changing one-third of your aquarium water will take care of the rest.

If I can produce a new guppy would the two British guppy organisations recognise it? Could I show it at aquarium shows? Does it cost much to join a recognised guppy society?

Guppy societies in Britain issue Standard Handbooks that describe and illustrate the various types they recognise. You would have to furnish them with proof of your breeding over a period, and then if it met with the approval of their Judges and Standards Committees you would stand a good chance of having it recognised. You could, of course, show it before this either in breeder's classes or as a single fish in 'any other variety'. It costs just a few shillings a year to become a member; drop me a line (care of *The Aquarist*) for details.

In a recent American Show Schedule I noticed a class for female guppies classified as 'shark's tail'. What type of female is this, and do we have a similar shape in Britain?

Yes, we do have such a female in Britain, only we know it as 'superba'. Our American friends call it shark's tail because of the similarity between the shape of the caudal fin and that of the shark. The drawing will illustrate this for you.



Superba female guppy

I have read somewhere that the president of the Fancy Guppy Association, Mr. W. G. Phillips, keeps guppies in a garden pond! On the strength of this could I keep them in an unheated tank in my living room?

Mr. Phillips does keep guppies in an outside pool during the summer months, but as to the second part of your query, without knowing the temperature variation in your room it would be difficult to predict the success you might

have. The guppy is not very demanding of temperature but does best between 71° and 73°F (22-23°C); although it can be kept at much lower temperatures it will not tolerate below 64°F (18°C) for long. Modern aquarium equipment is both reliable and inexpensive; it just isn't worth risking a tank full of fish on the whims of our weather.

Why is it that every time I am successful in raising a brood of fancy guppies the tails always seem to fray and split?

You can take cold comfort from the fact that even the experts experience this from time to time. Many explanations have been put forward: acidity of the water, food deficient in calcium and phosphates, vitamin D deficiency, use of plants such as *Sagittaria* and *Vallisneria*, whose sharp edges cut the fins during the courtship dance. When this happens to me I break down the tank, thoroughly cleaning everything, because I suspect that a build-up of harmful bacteria contributes to split finnage.

Is there any truth in the theory that to get big fish you must keep them in big tanks?

No doubt you will get some aquarists who will subscribe to this and even back it up with proof; fish grow according to their environment, but I don't see any relationship at all between tank size and finnage growth. As long as your guppies are given their fair share of space, good feeding, and sufficient attention has been paid to their family trees I wouldn't worry. Ten gallon tanks are most favoured by guppy breeders in Britain.

The Truth about Raising Fish Fry

by J. D. LOADER

IT is hoped that this article, which is the result of much experimentation in raising batches of fry, will be of help to the serious aquarist who wishes to raise a maximum number of good fry to maximum size in minimum time. Fry raised by these methods include zebras, beacons, white cloud mountain minnows, fighters, dwarf, three-spot, opaline and leeri gouramis. As many aspects of the subject of raising fry as possible are covered under the headings given below. It must be pointed out that my views do not necessarily agree with those of anyone else, and it is admitted that many hundreds of fry are being raised daily under conditions different from those described below.

Fast Growth in Early Stages

At one stage of my experiments some fry (zebras) were kept at around 20°F (21°C) in a tank small for the number of fry and fed with dried food only. After 1 month they were placed in a large tank at 75°F (24°C) and fed continuously with live food, but they did not grow to full size and several developed swim bladder trouble.

Temperature

Temperature is considered by the writer to be one of the most important aspects of raising good fry and this applies not only to egglayers, but to livebearers as well. Although many people have informed me and many books instruct that tropical fishes grow bigger and better if kept at around 70°F (21°C), my personal experience shows that they feed better and grow larger if kept at 75°F (24°C) or a little more for the first 8 weeks at least. After this age, when growth slows down, 70°F (21°C) may be adequate. When running several tanks on one thermostat, at one time a batch of zebra fry were raised inadvertently at a continuous 80°F (26.7°C). These fry received only two feeds a day, and ended up very small hollow-bellied specimens. With maximum attention and many feeds a day these fry may have done very well, but as most people unfortunately have to go to work and cannot feed more than two or three times a day, 75°F (24°C) is considered an optimum temperature.

Space and Change of Water

It remains an undisputed fact that fry will be stunted if allowed to remain in water polluted by them for long. Growth will be inhibited and death will ultimately result. In Nature water is continuously changing, through rainfall, even in ponds. One-third of the water of every tank of fry is replaced weekly, if possible, with mature tap water. One well-known breeder changes this amount daily; perhaps this is why his fishes grow faster than mine.

A small hint which may or may not be obvious is that tanks of young fry can be siphoned successfully through an aeration stone or fine material tied around the end of the siphon tube. Fresh water is added by siphoning from a tank above with a small bore siphon tube; no casualties have ever resulted from this procedure.

My growing-on tanks measure 30 in. by 15 in. by 9 in. deep and I limit the number of fry in them to about 100, reducing this to nearer 50 at 6 to 8 weeks of age. This gives a surface area of 9 square inches per fish.

Aeration

Shallow tanks are favoured by the writer; these are regularly siphoned and not over-stocked. Therefore very little use is found for aeration. However, some of the labyrinth species spawn so prolifically that aeration may be used for them. Also aeration is a help if *Daphnia* is given in excess. No pronounced difference in size or condition has been noticed between an equal number of fishes in two similar uncrowded tanks with and without aeration. Crowded tanks are a different story: fishes will not grow to full size under these conditions anyway.

Bare or Planted Tanks?

The majority of aquarists who raise fry consistently in any numbers use a bare tank, no plants, no gravel. The reasons for this are easy to see: a bare tank is so much easier to keep clean, gravel cannot become fouled and fry can be culled more easily. I used to believe that livebearers did better in a well-lit planted tank, as they had a little algae to continuously feed on, but I have since proved that they do equally well or better in a clean bare tank when fed alternately on *Daphnia* and Grindal worm. The truth of the bare tank versus planted tank controversy is that you have to specialise in fishes or plants. If you specialise in plants you may use some compost under the gravel inimicable to fishes. One 5 ft. 80-watt fluorescent tube will light economically a bank of eight bare growing-on tanks. If daylight is not available this may be used 12 to 14 hours a day so as to give enough light for the fishes to see to feed continuously.

Foods and Feeding

This is one of the most important aspects in raising good fry. Many types of Infusoria have been tried, including commercial substitutes, egg powder and yeast. At the present time green water containing mainly *Euglena* is much favoured in my fish room. As many as six quart jars are

given to a batch of fry daily. These are stood in the tanks to reach tank temperature and then poured in. It is easy to see when more is required and no *fry* are lost through fouling of the water such as occurs with other foods. During the summer green water is easily obtainable from almost any tank exposed to direct sunlight. In the winter, a pure *Euglena* culture can be obtained from dealers and biological supply houses.

After a few days, newly hatched brine shrimp is recommended but the green water feeding should be continued for a week to 10 days after the fry are free-swimming. This is where many aquarists fail, and lose the smaller fry. Micro worms can be alternated with brine shrimp, giving excellent results. It is not generally realised how much food the fry can eat at this stage. All living things follow an 'exponential curve' of growth, and eat out of all proportion to their size when young. Another point well known to swordtail and mollie breeders is that the fishes which reach maturity latest usually grow largest: this is because growth slows down at maturity.

Insufficient brine shrimp can be raised for proper growth of fry if it is raised in 2 pound jam jars or similar containers floated in a tank, unless one has 12 or more jars per batch of fry. A more practical method is to use an old 12 in. by 6 in. by 6 in. or 14 in. by 8 in. by 8 in. tank divided one-quarter of its length by a piece of glass or Perspex, leaving a gap about half an inch from the bottom of the division. Brine shrimp eggs are placed in the smallest part of the tank in the correct saline solution. This part of the tank should be darkened and pure brine shrimp free of husks can be easily netted from the larger part of the tank in the light. Base heating with a small 15 watt bulb is easiest and adequate. A few more eggs are added every time some brine shrimp are netted out, which may be three or four times a day. The same brine solution will last long enough to feed a batch of fry for about 2 weeks, when a falling off will be noticed in hatching, the brine becoming cloudy at this time.

By now fry can be introduced to sifted *Daphnia* alternated with Grindal worms and will really forge ahead in growth. Whilst live food is available, I use very little dried food for fry. During the winter, when *Daphnia* is not available, chopped *Tubifex* worms may be substituted.

Penguin Fish *(Thayeria obliqua)*

SINCE its introduction into this country in the late 1930s the penguin fish has gained a great deal of popularity, principally, I think, because of its peculiar swimming motion. Whilst swimming it maintains a horizontal position, but when relaxed assumes a position at an angle of 45 degrees.

The general body colour is a bright silver with a black stripe running from the gill plate to the tail. The eyes are black, circled with a golden ring. Sexing is extremely difficult, and once two fish are seen "going through the motions" they should always be kept apart so that they can be identified easily when they are required for breeding. This species accepts a wide variety of foods, including dried food, though like most fishes they prefer live food. They are generally peaceful, though not averse to taking a nip at other fish's fins.

They are not easily induced to spawn, so they should always be separated for 3 weeks, and fed liberally on such live foods as *Daphnia*, white worms (an excellent fattening food) and *Tubifex*. The breeding tank, which if possible should not be less than the standard 24 in. by 12 in. by 12 in., should contain neutral or slightly acid water (pH 6.8 to 7.2). The aquarium should be thickly planted with bushy plants such as *Elodea crispa*, hairgrass etc. to assist in the breeding of these fish. The water should be maintained at 80°F (26°C).

The fish may now be introduced into the tank and it is quite possible that neither male nor female will show any interest in breeding. The breeder should not be discouraged by this; in my experience this has happened many times. They should be separated once again and conditioned for a further week on the same diet.

Once more upon introduction they may show no interest, and naturally they should again be separated and tried a week later. This may happen many times but if the breeder has patience (and a true pair of fish) they will eventually reward him by breeding.

Breeding commences with the male chasing the female through the plants, until, when exhausted, they quiver side by side and the female expels several dull brown coloured eggs, which are immediately fertilised by the male. Spawning continues for about an hour, when approximately 100 eggs will have been duly fertilised. Both parents should now be removed.

The eggs hatch in about 30 hours, when the minute fry will be seen clinging to the plants. The fry become free-swimming on the third day and for the first fortnight their diet should consist of Infusoria, the finest dried food or newly hatched brine shrimp. As they grow micro worms and finely sifted *Daphnia* can be given. Within 6 months they will have grown sufficiently to be given the usual adult foods.

All in all the penguin fish provides an interesting addition to the community tank, and it will be found well worth the time and trouble involved in breeding.

M.J.P.

Twintail Goldfish

continued from page 127

in which every trace of metallic lustre is obscured by an intense superficial layer of pigment, which extends into the fins.

An exhibition aquarium containing half a dozen moors is a sight one will never forget. Good specimens are extremely rare—and worth their weight in gold. This is a fish for wealthy collectors rather than the average fancier, unless obtained as outlined above, from the purchase of eyed ova.

I remember many years ago receiving a letter from a delighted breeder of moors saying that he had followed my advice on hand-spawning his fish and now had a small tank in which were heaped fertilised eggs—he had never seen so many all at once. Two days later I received another letter: all the eggs were dead—the stench was appalling!

Questioning revealed the fact that after stripping all his males into the small aquarium, he had similarly stripped the females, but he had failed to wash out the aquarium after fertilisation was complete, so the unused milt polluted the water and all embryo fish perished.

Breeding the Ten-Spined Stickleback

by JAMES McM. URE

THERE can be few aquarists in this country who have not at one time or another bred the three-spined stickleback (*Gasterosteus aculeatus*), yet very few have ever attempted to keep, let alone breed, the ten-spined species (*Pygosteus pungitius*). Probably the main reason is that this species is not very common.

The ten-spined stickleback, like its cousin, is nidificatory. It builds its nest out of pieces of plant, blanket weed or even dead leaves, generally among thick clumps of vegetation, and invariably off the bottom of the stream or pond. It shows the same parental care for the offspring as does the three-spined stickleback, only this phase does not generally last as long.

I had brought my specimens over from Ireland the year before, and had been feeding them up over the winter months in preparation for the attempt at breeding in the spring. At the time, I was rather pressed for space, owing to various experiments I was carrying on, and was forced to use two extremely small tanks, each 14 in. by 8 in. by 8 in. I put my male in one of the tanks and the two females which had survived the journey and the rigours (to indigenous fish) of spending the winter in a centrally heated room in the other. As can be seen, I was handicapped from the start in having a limited number of fish available. Luckily, however, there were no further casualties, and the breeding turned out to be fairly successful.

I first noticed the male building its nest towards the end of May, although it had assumed the black courting livery as early as the middle of April. I would suggest that this is rather late for ten-spined sticklebacks to breed normally, perhaps because of the rather unnatural conditions experienced during the winter. First of all, it pulled pieces of blanket weed together to form an anchor on the nearest plants. Then, taking enormous trouble, and with a meticulous eye for detail, it fashioned the nest itself. To keep it together, the stickleback secretes an adhesive substance from within its body, a very necessary addition when one imagines the tremendous stresses this flimsy structure has to withstand. After the completion of the work, it settled down in front of the entrance to guard. By placing a small mirror on the side of the tank I had a good view of the threatening antics of the male on seeing a "rival". This can be extremely amusing, but care should be taken to make sure the fish does not damage itself on the side of the tank.

At this point in the proceedings I introduced the two females, hoping for an early spawning. In this I was particularly lucky, as the male took an instant liking to one of the fish, and the courting began. He paid no attention whatever to the other female, who was subsequently removed from the tank. For the first day the male was content to chase the female in and out of the weeds, but on the second day he started forcing her to enter the nest. It was quite amusing to watch, as she invariably swam out the other side. Eventually, late in the afternoon of the second day, the mating finally took place. Unfortunately I did not witness the actual spawning, but on my return I spotted the eggs lying in the nest, guarded by the male, while a considerably thinner and very hungry looking female looked on. I removed her to another tank and, as a further experiment, introduced the second female I had taken out earlier. I had never really believed up until that time that a stickleback's spines could cut deeply or injure another fish. I only had the female in the tank for a matter of seconds at the most, yet it never recovered from the injuries inflicted by the male, and died a week later. Although it is possible that this was just an isolated case, it certainly substantiates the theory that the ten-spined stickleback is monogamous.

The male hardly moved from his position just in front of the nest, fanning the eggs with his pectorals. I noticed that he would not travel further than 2 inches from the nest, and all food had to be dropped carefully within that area.

The female had laid about 20 eggs, and out of these 18 hatched out. This may not seem a particularly large hatching, compared with those of the goldfish, cichlids or even the guppy. However, one must bear in mind the paternal instinct of the stickleback. The mortality rate in the fry of goldfish etc., especially in the wild, is enormous, and therefore since the fish has so many enemies, it must provide adequately for the continuance of the species. Hence such fishes lay enormous quantities of eggs, or, as in the guppy, have a medium number of fry at frequent births. Sticklebacks, on the other hand, protect their fry, thus keeping them safe from most of their natural enemies, at least during the early period, and therefore more fish reach maturity.

However, the paternal instinct in the stickleback is at best a rather superficial duty, as I found to my cost. Reckoning by my experience with *Gasterosteus aculeatus*, I thought that the fry would be safe with the father for about 14 days. I was therefore extremely suprised and disappointed to come down to breakfast on the eighth day after the hatching to find a very fat smug looking male, and six fry.

The survivors were immediately removed to another tank, but, of course, by then the damage had been done and I was left with only a third of my hatching.

One interesting point emerged from the hatching of the fish, in connection with an investigation I was carrying on into the variations in the ten-spined stickleback (described in *The Aquarist*, vol. XXVII, no. 10). Of the 18 fish that hatched out, as far as I could tell, only one had less than the normal number of spines found in the species, having only nine.

Hendon Convention

AN illustrated talk on tropical freshwater fishes from the amateur and professional breeders' points of view, by Mr. A. van den Nieuwenhuizen of Holland, will be the highlight of the Aquarists' Convention to be held in north London on 23rd November. This is being arranged by Hendon and District Aquatic Society. Mr. van den Nieuwenhuizen is particularly noted for his fine colour photographic work with fishes. Details of the Convention can be obtained from secretary Mr. K. L. Purbrick, 3, Holme Way, Stanmore, Middlesex.

our readers write

Readers are invited to express their views and opinions on subjects of interest to aquarists. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.

Address letters to The Editor, *The Aquarist*, **The Butts, Half Acre, Brentford, Middlesex**

Softening Water

MR. E. D. Bumstead, in his article "Soft or Hard?" (*The Aquarist*, August) advocates the use of water softeners by town-dwelling aquarists who are unable to obtain supplies of clean rain water, but I cannot agree with him.

The normal domestic water softeners do indeed remove the salts of calcium and magnesium from hard waters but they only replace them with the salts of sodium. The water delivered by such a softener is indeed soft but the total dissolved solid content of the water is not affected much, in fact it is slightly increased.

Suppose we pass a volume of water containing 136 parts by weight of calcium sulphate through a softener the softened water will contain 142 parts by weight of sodium sulphate. Now, how many of our fishes live naturally in waters containing more than slight traces of sodium salts? A water containing 300 parts per million (p.p.m.) of hardness calculated as calcium carbonate will, after passing through a softener, contain 318 p.p.m. of sodium carbonate (washing soda): a nice soft water for doing the family wash but hardly a natural water for fishes.

The main difficulty experienced by aquarists in understanding the hardness of water as applied to aquaria arises from the fact that they believe that a soft water contains very little in the way of dissolved materials, but this is not necessarily so. Admittedly distilled water is soft but this is due to its lack of calcium and magnesium salts, not the fact that it is a very pure water.

A soft water is one which by definition contains little if any of the salts of calcium and magnesium and gives a ready head of foam with a small quantity of soap. Waters containing calcium and magnesium salts form a scum with soap and will not foam until the soap has removed all the calcium and magnesium salts in the form of this scum; this is why we need to use far more soap in hard water than in soft water to form the same amount of lather.

Soap is the sodium salt of acids derived from various animal and vegetable fats, and the scum is the calcium and magnesium salts of these acids. Perhaps soaps' action in hard water is best shown in this way:

Calcium sulphate + sodium soap → calcium soap + sodium sulphate
(hardness) (scum)

With water softened in a softener:

calcium sulphate + sodium zeolite → calcium zeolite + sodium sulphate
(hardness) (active agent in softener) (spent agent)

No! The usual type of household softeners produce a water containing sodium salts, not one devoid of dissolved solids. There are some kinds of softeners (or more correctly in this case de-ionisers) which remove all the dissolved solids, but as far as I know they have never been offered to the general public and are much more expensive than the softeners of the zeolite-containing Permutit type.

Keep the softened water for the weekly wash: it is ideal for this purpose but hardly natural for fishes. The only way to reduce the dissolved solids of aquarium water is to add clean rain water, or, if for city dwellers this is not available the only alternative is distilled water (unless you would like to try the method of softening and lowering the pH at the same time with phosphoric acid, as I outlined in my article in the March issue).

P. F. CAPON,
Billericay, Essex.

Gastromyzon Species?

THE man who suggested that the fish described in the article "Peppermints, Plecosoles—or What?" (*The Aquarist*, September) were *Gastromyzon* may not have been very far wrong. *Gastromyzon* is restricted to Borneo, but the family Homalopteridae, of which it is a member, is distributed over the whole of S.E. Asia, including China. It seems to me highly probable from the photographs that the fish are Homalopteridae, but it is impossible to decide the species (or even to be entirely sure that they are Homalopteridae) without seeing specimens. The Homalopteridae, incidentally, are not catfish, but are related to the carps and loaches.

Dr. R. McN. ALEXANDER,
Bangor, Caernarvonshire.

Bronze Catfish Spawning

WE have eight adult catfish: a pair each of bronze, *Corydoras arcuatus*, *C. rabauti* and leopard. We don't keep them as scavengers; they are usually kept in a 25 gallon tank and share it with 15 swordtails and some

platys and guppies. One night we noticed that the bronze catfish were very brightly coloured. The next morning we noticed that one of the bronze cats was lying at an acute angle on a rock. There was a very large swelling which would not permit her to lie on an even keel; there had been no sign of it the night before. Then we noticed that there were three patches of eggs on the glass (about a hundred eggs).

Two and a quarter hours later the fish had finished spawning and we counted the eggs. There were 21 patches on the glass and more on the heater and on plants. The patches varied from three to 58 eggs each, with an average of 30. We counted 580 that we could see properly. After 2 days we could see movement in the eggs with the aid of a magnifying glass, and they started hatching toward the end of the third day. Over the next 2 days all but 17 of the eggs hatched. All fish but the bronze catfish were removed as soon as we saw the first eggs, and the parents as soon as they had finished spawning.

About 3 days after they hatched the babies turned from pale grey to a light brown with brown spots. Now they are just over 3 weeks old and the largest, about half an inch long, are losing their spots and turning green.

As can be imagined, the tank is 'alive' with them, and they are a beautiful sight. We are trying to clear another tank to take some of them as they grow up.

R. Nuls,
Sheffield 50.

Junior Aquarists' Group

OVER the last 18 months, we have had a great many enquiries from young readers of *The Aquarist* about membership of the British Ichthyological Society. Such a large response from the younger generation has indicated that a special section for juniors might prove worth while. We have therefore formed a special Junior Branch for young people between the ages of 12 and 16, with a special reduced subscription of 10s. a year (including *Journal* subscription) and no entry fee. The Junior Branch secretary is Mr. David W. Park, 13, Fernoe Road, Crowborough, Sussex, and we cordially invite juniors to apply to him for further details.

James McM. Urr,
Secretary General,
British Ichthyological Society,
Glasgow, S.4.

Platy Survival

WITH all the plants in my aquarium covered with blanket weed I decided to remove them, wash and replace them in the aquarium. On the same day I noticed that one of my male wagtail platys was missing. I searched in the aquarium, underneath the rocks and in the outside filter. I still could not find the platy and thought I would never see this fish again. Three days later I saw that the filter had no water in it so I topped up the water of the aquarium and went to start the filter again. I noticed a red thing in the intake pipe; I pushed it out and found it to be the platy! I replaced it in the aquarium and immediately he mated with the female black mollie!

R. Levitt,
Hounslow, Middlesex.

Water Pollution Reports

REPORTS and papers of the Water Pollution Research Laboratory from 1947-60 have now been published (in common with various other reports and technical papers of the Department of Scientific and Industrial Research) as microfiches and microcards. The object of recording and republishing them in this form is that the material they incorporate can be made more readily available. Further details are available from the publishers, Micro Methods Ltd., East Ardsley, Wakefield, Yorkshire.

The AQUARIST Crossword

Compiled by M. W. SAUNDERS

CLUES ACROSS

1. A colourful freebooter (5, 4)
5. Tank plant described as a 'delicate green carpet' (10)
9. Water for a French aquarist (3)
14. Force 8 wind disturbs most of the algae (4)
15. Occasionally comes to a patient angler (4)
17. Slippery pools mostly (4)
18. May be required on a trip abroad (4)
21. Consumed but not quite beaten (5)
23. Under pressure to keep the gas back (3)
25. Direct result of direct sun rays (5, 5)
27. A very uncolourful freebooter (5, 7)

CLUES DOWN

2. May be boosted in the goal-mouth (3)
3. This spot is not for angels (5)
4. A wooded hollow (4)
5. Common name for *Pordaxella floridae* (4, 4)
6. On the thumb that's hit with the hammer? (4)
7. Old salt might be found here (3)
8. Not a fish you'd care to join for dinner (3, 5)
11. River located in Leeds—just about (3)
12. This seaman can (4)
13. Sail around to find a girl . . . (4)
16. . . . but she comes out only at night (3)
19. Immediately we take the cap off tins and make it bottom (4)
20. Sold in bottles, salted and eaten mainly (3)
22. Thrown in when you're not two well, though partly (3)
24. If a fish has one it certainly doesn't show (4)
26. Animal from a brewery; no wonder she feels sheepish (3)

Solution on page 136

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.

THERE were 102 entries at the members show of the **Bradford and District A.S.** The best fish in the show was Mr. G. Holmes's [illegible]. Results: Livebearers (Bradford Cup) Mr. H. Fletcher; 2, Mr. H. Fletcher; 3, Mr. Berry. Characins (Alfred Cup) 1 and 2, Mr. A. Firth; 3, Mr. Hooper. Barbs (F. Gill Cup) Mr. A. Firth; 2, Mr. D. Atherton; 3, Mr. C. R. Wilson. Cichlids (Luther Wright Cup) Mr. R. Winterburn; 2 and 3, Mr. G. Holmes. The AOV Cup: Mr. G. Holmes; 2, Mr. A. Firth; 3, Mr. C. Holdsworth. Fighters (Thornley Cup) 1 and 2, Mr. C. Binns; 3, Mr. C. Holdsworth. Coldwater (Wainhouse Cup) Mr. C. Holmes; 2 Mrs. A. Firth; 3, Mr. P. Moorhouse. Plants (The Aquatic Plants Trophy) Mr. R. Winterburn; 2, Mr. H. Fletcher; 3, Mr. P. Moorhouse. Anabantids (The Smith Cup) Mr. A. Holmes; 2, Mr. A. V. Firth; 3, Mr. Hooper. Breeders Egg Layers (The Taylor Cup) Mrs. Firth; 2 and 3, Mr. C. R. Wilson. Barbs and Minnows (Barrett Cup) Mr. P. Moorhouse; 2, Mr. Murgatroyd; 3, Mr. G. Holmes. Breeders Livebearers (Livebearers Cup) Mr. C. R. Wilson; 2, Mr. P. Moorhouse; 3, Mr. D. Atherton.

AT the August meeting of the **Ilford and District Aquarists' and Pondkeepers' Society,** members had an informal evening which included a quiz competition and the monthly table show for Barbs and Characins.

Results of the show were: Barbs: 1, Mr. Cook; 2, Mr. Price; 3, Mr. Cook; 4, Mr. Price. Characins: 1, Mr. Stebbing; 2, Mr. Ruth; 3, Mr. Ruth; 4, Mr. Price.

RECENTLY **Smethwick and District A.S.** won second prize at the Midland Show, and have also staged a display at a local fete. It is hoped to hold an all-colour film-show with sound shortly. The subject matter will include Salmon-Fishing, Coarse Fishing, and Sea-Fishing. In all probability, this will be held at the Red Cow Hotel in Smethwick.

Prospective new members are always given a warm welcome at the club and full details are available from the secretary, Mr. R. P. Biddle, [illegible] Road, Smethwick, 40, Staffs.

THE results of the recent table show for [illegible] held by the **Tipton and District A.S.** were as follows: Section A: 1, G. Gadd ([illegible] Fighter); 2, W. Davison (Colisa [illegible]); 3, J. Cook (Siamese Fighter). Section B: 1, C. Whitehouse (Siamese Fighter); 2, [illegible] Baker (Opaline Gourami); 3, R. Turner ([illegible] Gourami). Mr. C. Whitehouse's Siamese Fighter was adjudged to be the best fish in Show.

MEMBERS of the **Leamington and District A.S.** on their club night in August had an outing to an extensive fishhouse at Stockton owned by two of the members. A good variety of fish were on display. The president, Mr. D. [illegible] showed several fish at the Midland [illegible] Aquarium Show and gained several awards.

Meetings are held on the third Wednesday in the month at the Oddfellows Rooms, Warwick Street, Leamington, at 7-45 p.m. The secretary is Mrs. M. Harris, 89, Lean [illegible], Leamington Spa, Warwickshire.

THE July meeting of the **Chapeltown and District A.S.** had a good attendance for the main attraction which was a table show for the Livebearers, the results being: 1, Mr. Holden (Guppy); 2, Mr. Tinney (Swordtail); 3, Mr. Crofts (Black Molly). Further information is obtainable from Mr. R. Crofts 42, Burncross Road, Chapeltown, Nr. Sheffield.

AT the Annual Members' Trophy Show of the **Yeovil A.S.** the results were: Common Goldfish: 1 and 2, T. Perry (Assurance Cup); 3, N. Stainer. Bristol Shubunkins: 1 and 2, S. Langdon (Shubunkin Shield); 3, N. Stainer. London Shubunkin: 1, V. Collins (R. & R. Cup). A. O. V. Fancy Coldwater Fish: 1 and 2, V. Collins (Langdon Cup). A. O. V. Pond & River Fish: 1 and 2, V. Collins (F. J. Stokes Bowl); 3, G. Anson. Breeders: 1 and 2, S. Langdon (Perry Cup). Labyrinth: 1 and 2, A. Nichols (Labyrinth Shield); 3, Pilkington. Siamese Fighters: 1, G. Anson (Moore Hill Cup); 2, C. Bushell. Barbs: 1 and 3, G. Anson (Pinder Cup); 2, L. Pilkington. Characins: 1, T. Perry (Hook Cup); 2, G. Anson; 3, M. [illegible]. Cichlids: 1, T. Perry (Bushell Cup); 2, W. Dodd; 3, D. Silver. A.O.V. Egglayers: D. Moore; 2, T. Perry; 3, N. Stainer. Catfish: 1, G. Anson (Edith Anson Cup); 2, A. Gillett; 3, M. Holbert. Mollies: 1, C. Bushell; 2, T. Perry; 3, C. Bushell. Male Guppies: 1, T. Perry; 2 and 3, A. Nichols. Female Guppies: 1, A. Nichols; 2, M. Holbert; 3, N. Stainer. Swordtail Platy: 1, T. Perry; 2, A. Nichols; 3, W. Dodd. Breeders' Egglayer: 1, G. Gillett (Margaret Duff Cup). Breeders' Livebearer: 1, T. Sharp (Margaret Duff Cup); 2, T. Perry; 3, N. Stainer. Best tropical fish in the show was a [illegible] which earned Mr. G. Anson the Stainer Shield. Best coldwater fish was a Bristol Shubunkin owned by Mr. S. Langdon winning the Rogers Shield. The best livebearer in the show went to Mr. T. Perry with the Bryant Cup who also won the Thomas Steel Cup for the highest aggregate.

THE results of the annual show held by the **Oseam A.S.** (Show) were as follow: Furnished Aquaria: 1, J. E. Shore (Oseam); 2, G. Collins (Oseam); 3, H. Penhall (Oseam). Anabantids: 1, C. Walker (Oseam); 2, P. Duffy (Nottingham); 3, F. Campbell (Bury). Small Barbs: 1, R. Collins (Oseam); 2, K. Wilbraham (Oseam); 3, J. E. Shore (Oseam). Large Barbs: 1, G. A. Crichton (Belle Vue); 2, H. Stockton (Oldham); 3, W. H. Smith (Stretford). Labeos & Sharks: 1, C. Walker (Oseam); 2, S. Nichols (Oseam); 3, F. Dalzell (Oseam). Siamese Fighters: 1 and 3, L. Lewis (Burnley); 2, F. Eastham (Belle Vue). Small Characins: 1, L. Lewis (Burnley); 2, R. Crook (Blackpool); 3, S. Nichols (Oseam). Medium Characins: 1, 2 and 3, J. Ashworth (Oseam). Large Characins: 1, R. Collins (Oseam); 2, W. H. Hughes (Belle Vue). Rasboras: 1 and 3, J. E. Shore (Oseam); 2, J. Whetstone (Oseam). Danios: 1 and 3, A. Stokeson (Oseam); 2, F. Partington (Middleton). Dwarf Cichlids: 1, R. Collins (Oseam); 2, W. H. Hughes (Belle Vue); 3, R. Crook (Blackpool). Angels: 1, R. Crook (Blackpool); 2, L. Lewis (Burnley). A.O.V. Cichlids: 1, W. H. Smith (Stretford); 2, C. Holroyd (Oseam); 3, C. Walker (Oseam). Tooth Carps: 1, R. Collins (Oseam); 2, L. Lewis (Burnley); 3, F. Partington (Middleton). Loaches: 1, T. Greenwood (Oseam); 2, C. Walker (Oseam); 3, G. A. Crichton (Belle Vue). Catfish: 1, R. Collins (Oseam); 2, F. Dalzell (Oseam); 3, W. H. Hughes (Belle Vue). Swordtails: 1 and 2, P. Duffy (Nottingham); 3, J. Scolnick (Oseam). Mollies: 1 and 3, T. Greenwood (Oseam); 2, L. Lewis (Burnley). Platys: 1 and 3, J. E. Shore (Oseam); 2, J. Ashworth (Oseam). Guppies: 1, C. Walker (Oseam); 2, W. H. Hughes (Belle Vue); 3, J. Scolnick (Oseam). Breeders Egglayers: 1, Mrs. M. M. Williams (Blackpool); 2, F. Williams (Blackpool); 3, K. Wilbraham (Oseam). Breeders Livebearers: 1 and 2, J. E. Shore (Oseam); 3, J. Ashworth (Oseam). Breeders Guppies: 1, W. H. Hughes (Belle Vue); 2, P. Duffy (Nottingham); 3, Beresford & Jeffry (F.G.A.). A.O.V.: 1, L. Lewis (Burnley); 2, J. E. Shore (Oseam); 3, C. Walker (Oseam). Breeders Egglayers Pairs: 1, R. Collins (Oseam); 2, K. Wilbraham (Oseam); 3, H. Stockton (Oldham). Pairs Livebearers: 1, H. Stockton (Oldham); 2, C. Whitsey (Blackburn). Oseam Juniors, Any Variety: 1, J. Hay; 2, P. Abbotsdale; 3, G. Walker. Goldfish: 1 and 2, L. & B. Baxter (N.G.P.S.); 3, H. Charlton (N.G.P.S.). Shubunkins: 1 and 2, H. Penhall (Oseam); 3, W. H. Ramsden (N.G.P.S.). Fantails & Veiltails: 1 and 2, H. Penhall (Oseam); 3, W. H. Ramsden. Orandas & Lionheads: 1, W. H. Ramsden (N.G.P.S.); 2 and 3, A. Philipson (Burnley). A.O.V. Coldwater: 1 and 2, H. Charlton (N.G.P.S.); 3, H. Penhall (Oseam). The best fish on show award again went to Mr. C. Walker for a Silver Shark, and the best in show Coldwater was awarded to Mr. H. Penhall for a Shubunkin. The Fancy Guppy Association put on a colourful exhibition on their own Show Stand which was judged by Mr. J. L. Kelly and Messrs. Beresford and Jeffry had a field day taking four Gold Awards, four firsts, two seconds, and one third, the other successful competitors being Mr. V. Partington and Mr. J. Allen. Messrs. Beresford and Jeffry also won the Silver Trophy for the Best Guppy in the Show.

A TABLE show was held by members of the **Leyse Aquarists** and the results were as follow: Livebearers (Pairs): 1, Mr. C. Stockdale (Green Wagtail Swordtails); 2, Mr. J. Mills (Black Mollies); 3, Mr. F. Avenard (Sunset Platys). Livebearers (singles): 1, Mr. J. Goodger (Red Platy). Egglayers (pairs): 1, Mr. T. Whalley (Flag Tetras); 2, Mr. Robson (Checkered Barbs); 3, Mr. C. Stockdale (Nigger Barbs). Egglayers (singles): 1, Mrs. Smith (Cherry Barb); 2, Mr. D. Semden (Red Finned Shark); 3, Mr. W. Barker (Kribensis). Best fish in show award went to Mr. T. Whalley with a pair of Flag Tetras.

THERE was a record entry at the M.A.P.S. Show and the results were as follow: Coldwater, Common Goldfish and Comets: 1, A. R. Barnes; 2, J. D. Bradford; 3, E. Woodward. Breeders' Class (4 fish): Twintails: 1, C. T. Sutton; 2 and 3, E. A. Mason. Breeders Class (6 fish), Singletails: 1, W. Hicks; 2, S. Lloyd; 3, G. Harper. Bristol Shubunkins ('S' body limit): 1, 2 and 3, W. Hicks. Calico Veiltails: 1 and 3, M. G. Neal; 2, E. A. Mason. Bristol Shubunkins Bred 1963 (minimum 4 entries): 1 and 3, S. Lloyd; 2, G. Harper. Scaled Veiltails: 1, H. T. Jago; 2, C. T. Sutton; 3, E. A. Mason. Moors (Bred 1963): 1 and 2, T. L. Dodge. Shubunkins (Bred 1963—min. 2 entries): 1, Mrs. F. R. Close; 2, F. R. Close; 3, S. W. Richardson. Calico Veiltails (bred 1963): 1, 2 and 3, C. T. Sutton. Bristol Shubunkins (matched pairs): 1 and 2, W. Hicks; 3, W. G. Bryant. Orandas, Telescopes, Lionheads, Celestials, Bubble-eyes, etc.: 1, W. G. Bryant; 2, G. Harper. Moors: 1 and 2, T. L. Dodge; 3, S. W. Richardson. Bristol Shubunkins (3 in. body limit): 1 and 2, W. Hicks; 3, W. G. Bryant. Calico Fantails and Nymphs: 1 and 2, M. G. Neal; 3, C. T. Sutton. Scaled Fantails: 1, H. T. Jago; 2, J. D. Bradford; 3, T. Roberts. A.V. Pond or River Fish: 1, J. D. Bradford; 2, A. R. Haddon; 3, R. Humphries. Novice Shubunkins: 1 and 3, A. R. Barnes; 2, J. M. A. Biddle. Individual Coldwater Aquariums: 1, R. F. Graves; 2, Mrs. A. Turner. Inter-Society Aquariums: 1, Walsall A. and P.S.; 2, Burton and District A.S.; 3, N. Warwickshire A.S.; 4, Coventry P. and A.S. Tropical Classes—Barbs: Tetras, Glassfish, Cummings (true pairs): 1, J. T. Cook; 2, W. H. Williams; 3, F. C. Randall. Barbs: Tetrazona, Nicro-

Jamaica Tetra and Conchonius (true pairs): 1, J. R. Smith; 2, D. Frost; 3, J. T. Cook. A.O. Barbs: 1 and 2, T. F. Jerrams; 3, M. G. Davis. Danio, Brachydanio and White Cloud Mountain Minnow (true pairs): 1, J. T. Cook; 2, D. Frost; 3, A. R. Haddon. Any Rasbora: 1, D. Frost; 2, M. G. Davis; 3, F. A. Pilsger. Characins, Hyphessobrycon, Hemigrammus and Cardinals: 1 and 2, W. Davison; 3, J. T. Cook. Characins A.O.V.: 1, F. A. Pilsger; 2, J. T. Cook; 3, P. R. Stokes. Male Fighters: 1 and 2, T. F. Jerrams; 3, B. Hall. A.O.V. Male Anabantid: 1 and 2, D. Lucas; 3, W. Davison. Cichlids: 1, C. Hill; 2, P. J. Hill; 3, A. S. Wood. Cichlids (over 3 in.): 1, D. Lucas; 2, J. A. Roberts; 3, J. T. Cook. Cichlids Angel Fish: 1 and 3, K. G. Pearce; 2, D. A. Thomson. A.V. Male Guppy: 1, F. E. Woodall; 2, C. J. Cottrell; 3, K. G. Pearce. A.V. Mollies (true pairs): 1, M. G. Davis; 2, F. E. Woodall; 3, F. A. Pilsger. A.V. Platys (true pairs): 1, W. H. Williams; 2, S. Prior; 3, P. J. Hill. A.V. Swordtails (true pairs): 1, T. F. Jerrams; 2, J. Bowles; 3, M. G. Davis. A.O.V. Tropical Fish: 1, D. Lucas; 2, F. A. Pilsger; 3, J. Foden. Breeders Class Egglayers (6 fish): 1, M. G. Davis; 2, S. Swadling; 3, P. R. Stokes. Breeders Class Livebearers (6 fish): 1, F. E. Woodall; 2 and 3, D. A. Thomson. Any Catfish: 1, R. F. C. Hadley; 2, D. Lucas; 3, J. M. A. Biddle. Novice any Characin: 1, Mrs. W. A. Jerrams; 2, G. Gadd; 3, F. S. Baldwin. Novice, any Danio, Brachydanio or White Cloud Mountain Minnow: 1, D. Frost; 2, S. D. J. Lucas; 3, M. Pilsger. Novice, any Barbs: 1, G. Gadd; 2, A. W. Spencer; 3, P. J. Hill. Novice, any livebearers (true pairs): 1 and 2, G. Gadd; 3, S. D. J. Lucas. Novice A.V. Male Anabantid: 1, G. Gadd; 2, J. A. Roberts; 3, A. Smith. Traders Class: 1 and 2, Tropicana. Plant Class: 1, D. Frost; 2, P. W. Jude; 3, S. R. Wood. Individual Furnished: 1, P. R. Stokes; 2, D. W. G. Fretwell; 3, D. A. Thomson. Inter-Society Furnished: 1, Wolverhampton and District A.S.; 2, N. Warwickshire A.S.; 3, Burton and District A.S.; 4, Atherstone and District A.S. Inter-Society Competitive Display: 1, N. Warwickshire A.S.; 2, Smethwick and District A.S.; 3, Hadley A.S.

* * *

THE results of the annual show of the **Newport A.S.** were as follow: Siamese Fighters: 1, Owen Davies; 2, G. James; 3, Colin Lewis. Labyrinths (excluding Fighters): 1, Mrs. Morgan; 2, O. Davies; 3, T. G. Wall. Barbs: 1, D. Amos; 2, G. James; 3, Eric Harris. Hemigrammus and Hyphessobrycon: 1, T. Cowling; 2, T. Wall; 3, D. Amos. A.O.V. Characin: 1, Glyn James; 2 and 3, R. Harris. Angels: 1 and 2, C. Salmon; 3, N. Wilkes. Dwarf Cichlids: 1 and 2, R. Harris. A.O.V. Cichlids: 1, C. Salmon; 2, G. James; 3, J. Wall. Corydoras: 1, J. Oliver; 2, J. Burgess; 3, T. Cowling. A.O.V. Catfish: 1, B. Kelly; 2, C. Salmon; 3, C. Lewis. A.O.V. Egglayers: 1, J. Burgess; 2, O. Davies; 3, T. G. Wall. Swordtails: 1, J. Watkins; 2, T. G. Wall; 3, R. Harris. Any variety Guppy (male): 1, N. Connell; 2, R. Harris; 3, D. Amos. Any variety Guppy (female): 1, D. Amos; 2, R. Harris. Platys: 1 and 3, R. Harris; 2, J. Burgess. Breeders Egglayer: 1 and 2, R. Harris. Breeders Livebearer: 1, C. Salmon; 2, R. Harris. Breeders Guppies: 1, D. Amos; 2, J. Burgess; 3, R. Harris. Tropical Plants: 1, T. G. Wall; 2, R. Harris; 3, Glyn James. Any Variety Coldwater: 1, O. Davies; 2, T. G. Wall; 3, M. Perry. Mollies: 1, M. Wilkes; 2, R. Harris; 3, O. Davies. Special Awards—Best Egglayer and Best in Show: Colin Salmon (Brown Acara); Best Livebearer in Show: J. Watkins (Male Red Sword). Breeders: Egglayer—R. Harris. Livebearer—C. Salmon.

* * *

AN interesting evening was spent at the headquarters of the **Stourbridge and District A.S.**, the Crispin Inn, Church Street, Stourbridge. Mr. T. L. Hodge of M.A.P.S. gave a lecture on Aquatic Photography and with the use of illustrations also talked about Indoor and Outdoor Photography.

* * *

THE **East London Aquarists and Pondkeepers Association** held their Annual Show recently and there were over 200 entries to be seen. Results were as follow: Best Tropical Fish in show: Mr. W. Bussey (Tiger Barb); Best Coldwater Fish in show: Mr. W. Corby (Lionhead); Junior Best Fish in show: Master P. Corby (Veiltail Guppy). Best Plant in show: Mr. R. Bell (Fish, Rasbora).

Club Furnished Aquaria: 1, Ilford Aquarist and Pondkeepers; 2, Dunstable and District A.S. Individual Furnished Aquaria: 1, A. Field; 2, P. Vickers; 3, R. Dodkins. Large House Propagated Plants: 1, R. Bell; 2, A. Field; 3, W. Bussey. Any Other Variety: 1, J. Haines; 2, Mrs. I. Bussey; 3, R. Dodkins. A.V. Livebearer (Breeders): 1, A. Stebbings; 2 and 3, D. Mayhew. A.V. Egglayer (Breeders): 1 and 2, P. Vickers; 3, A. Field. A.V. Guppy (Male): 1 and 3, A. Stebbings; 2, Master P. Corby. A.V. Guppy (Female): 1, R. Bell; 2, A. Stebbings. A.V. Platy (pair): 1, R. Bell; 2, W. Corby. A.V. Mollie (pair): 1, W. Corby; 2, Master P. Corby. A.V. Swordtail (pair): 1, J. Smith; 2, D. Mayhew. A.V. Characin: 1 and 3, H. Corby; 2, A. Field. A.V. Barb: 1, W. Bussey; 2, W. Bussey; 3, D. Mayhew. A.V. Rasbora: 1, P. Vickers; 2 and 3, J. Brydon. A.V. Cichlid: 1, R. Bell; 2, P. Vickers; 3, A. Field. A.O.V. Egglayer: 1, 2 and 3, J. Brydon. Any Anabantid: 1, W. Corby; 2 and 3, A. Field. A.O.V. Labyrinth: 1, W. Corby; 2, J. Smith; 3, J. Brydon. A.O.V. Coldwater Fish: 1 and 3, W. Corby; 2, P. Adams.

* * *

THE winners at the **Portsmouth A.S.** Open Show were as follow: Club Furnished Aquaria (Tropical): 1, T.G.B.S. (Portsmouth Branch); 2, Portsmouth A.S. Club Furnished Aquaria (Coldwater): 1, Cannon Club; 2, Portsmouth A.S. Individual Furnished Aquaria (Tropical): 1, J. Stillwell; 2, M. Mason; 3, L. W. Jordan. Individual Furnished Aquaria (Coldwater): 1, G. L. Saurin; 2, A. Atkinson; 3, J. Stillwell. Individual Furnished Aquaria (Marine): 1, Messrs. Stillwell and Howard; 2, W. Ryder. Individual Furnished Aquaria (Juvenile Tropical): 1, T. Stewart. Individual Furnished Aquaria (Juvenile Coldwater): 1, A. Stillwell; 2, S. Saurin; 3, R. Saurin. Common Goldfish: 1, H. Hancock; 2 and 3, R. M. Bockett, Bristol Shubunkins: 1, W. J. Evans; 2, R. M. Bockett; 3, L. Saurin. London Shubunkins: 1 and 2, R. M. Bockett; 3, L. Saurin. Fantails: 1, 2 and 3, W. A. Wicks. Veiltails: 1, 2 and 3, W. J. Evans. Moors: 1, G. Eastwood. Telescopic Eyed Goldfish: 1, W. J. Evans. A.O.V. Fancy Goldfish: 1, F. W. Ryder; 2, L. Saurin. Golden Rudd, G. Tench, G. Orfe and Hope Carp: 1, L. Saurin. A.V. River or Pond Fish: 1 and 2, L. Saurin; 3, Master S. Saurin. Novices Coldwater: 1, T. Stewart; 2 and 3, Mrs. G. L. Saurin. Guppies A.V. Male: 1, C. Drury; 2, A. V. Taylor; 3, R. A. Dove. Guppies A.V. Female: 1 and 2, A. V. Taylor; 3, C. Drury. A.V. Scott-Morgan. A.V. Swordtail: 1, V. J. West; 2, R. Russell; 3, P. Scott-Morgan. A.V. Platies: 1 and 2, R. A. Dove; 3, Miss Scott-Morgan. A.V. Mollies: 1, Messrs. Gregory and Greenslade; 2, Miss E. Hancock; 3, P. Scott-Morgan. A.O.V. Livebearers: 1 and 2, R. Keeping; 3, J. Stillwell. Dwarf Cichlids: 1, L. W. Jordan; 2, P. Scott-Morgan; 3, M. Mason. Cichlids: 1 and 3, R. A. Dove; 2, L. R. Goddard. Barbs: 1, H. Armitage; 2, R. Keeping; 3, D. Hancock. Rasboras: 1, P. Scott-Morgan; 2, L. W. Jordan; 3, J. Stillwell. Characins: 1 and 2, D. Hancock; 3, L. A. Timms. Catfish: 1, Miss Scott-Morgan; 2, A. Forrest-Jones; 3, T. G. S. Stewart. Egglaying Tooth Carps: 1, E. Browning; 2, L. A. Timms; 3, D. E. King. Danios, Carps and Minnows: 1, V. P. Vorsey; 2, L. R. Goddard; 3, R. Keeping. Siamese Fighters: 1, Mr. Duffy. A.O.V. Labyrinths: 1, H. Armitage; 2, V. P. Vorsey; 3, C. Drury. A.O.V. Egglayers: 1, P. Scott-Morgan; 2, L. A. Timms; 3, D. E. King. Novices Tropical: 1, Mrs. G. L. Saurin; 2, H. Armitage; 3, T. G. S. Stewart. Breeders Coldwater: 1 and 2, W. A. Wicks; 3, G. Eastwood. Breeders Livebearers: 1, Miss Scott-Morgan; 2, P. Scott-Morgan; 3, Miss E. Hancock. Breeders Egglayers: 1 and 2, D. Hancock; 2, D. King. Breeders Guppies: 1, 2 and 3, Messrs. Gregory and Greenslade. Rooted Plants in Pots: 1, M. Mason; 2, R. A. Dove; 3, Messrs. Duffy and R. A. Dove. Plants Propagated by Cuttings: 1, R. A. Dove; 2, D. E. King; 3, D. Hancock. Floating Plants: 1 and 2, J. Stillwell; 3, D. Hancock.

* * *

THE results of the third Open Show of Tropical Fish and Aquaria held by the **Bristol Tropical Fish Club** were as follow: Fighters: 1, B. Clarke; 2, L. Littleton; 3, R. Clarke. A.O.V. Labyrinths: 1, L. Littleton; 2, J. R. Wheeler; 3, G. R. Forbes. Barbs: 1, D. Wheeler; 2, D. Jones; 3, F. Keeney. Hemigrammus and Hyphessobrycon: 1, R. D. Johns and Son; 2, T. T. L. Mapson; 3, F. Brown. Angels: 1 and 3, Mrs. M. Pain; 2, F. Brown. A.O.V. Characins: 1, F. Baines; 2, G. R. Forbes; 3, G. R. Forbes. Dwarf Cichlids: 1, F. Brown; 2, Lovegrove; 3, C. Cradock. A.O.V. Cichlids: 1, T. P. Callow; 2, F. Baines; 3, E. Dunstan. Corydoras: 1, D. Jones; 2, B. Clarke; 3, F. Brown. A.O.V. Catfish: 1, E. Dunstan; 2 and 3, G. S. Stone. A.O.V. Egglayers: 1, D. Wilcox; 2, C. Cradock; 3, B. Clarke. Mollies: 1, J. R. Wheeler; 2, D. Wilcox; 3, Mrs. H. G. Cronin. Guppies (Long Tail): 1, N. Court; 2 and 3, J. R. Wheeler. Guppies (Swords): 1, J. R. Wheeler; 2, N. Court. Guppies (Short Tail): 1, D. Challenger; 2, and 3, N. Court. Guppies (Female): 1, 2 and 3, N. Court. Swordtails: 1 and 3, F. Brown; 2, L. Littleton. Platies: 1 and 3, F. Brown; 2, J. R. Evans. Breeders Egglayers: 1, J. B. Evans; 2, D. Wilcox; 3, T. T. L. Mapson. Breeders Livebearers: 1 and 3, L. Littleton; 2, C. Cradock. A.O.V. Livebearers: 1, E. Jones; 2, Mrs. H. G. Cronin. Furnished Aquaria (Inter Club): 1, Bristol Tropical Fish Club; 2, Bristol Tropical Fish Club (Keynsham Branch). Furnished Aquaria (Individual): 1, Mrs. Stone; 2, Mrs. Wilcox; 3, Mrs. Mapson. Best exhibit in Show: L. Littleton. Most Individual Points: F. Brown.

* * *

THE **Prestwich and Bury A.S.** held their annual general meeting recently.

Officers for the coming year were elected as follows: Chairman, Mr. F. Campbell; vice-chairman, Mr. A. Wardle. Secretary, Mr. F. Jennings, 11, Burrswood Avenue, Bury; treasurer, Mr. B. Kearney.

The table show, which was for Labyrinths and Characins resulted as follows: 1, F. Jennings; 2 and 3, F. Campbell.

* * *

RECENTLY, the **Willesden and District A.S.** held a table show for Native and Foreign Coldwater Fish, open to their members only. The number of entries was higher than usual due mainly to the new members recruited at the recent Willesden show at Roundwood Park who entered right into the spirit of things on their first visit to the club. The judge for the evening was Mr. G. King. Results were as follow: Common Goldfish Class: 1, R. Porter; 2, S. Wingrove; 3 and 4, Miss M. Sherman. Native and Foreign Coldwater Class: 1, 2 and 4, R. Porter; 3, Master R. Massey. Fancy Goldfish Class: 1, 2, 3 and 4, R. Evans. Shubunkin Class: 1, S. Wingrove. Best Fish of the Show: Mirror Carp exhibited by Mr. R. Porter.

Crossword Solution

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

IT'S NEW!
IT'S DIFFERENT!

The Battery Operated 'GRO-WEL'

Swirl-Away

THE AQUA VACUUM CLEANER

THE IDEAL CHRISTMAS PRESENT!
Every Aquarist will want one!
Adjustable for tanks up to 24" deep.
Powered by torch batteries (not included in price).
Standard Model—Price 46/8d. inc. Purchase Tax.
Super Model with more powerful batteries 56/8d. inc. Purchase Tax.
Boxes of 5 disposable bags Price 4/-

★ Swirl-Away the dirt in your aquarium with this efficient aquarium vacuum cleaner!

INTER-PET SUPPLIES COMPANY

CHURCH STREET - DORKING - SURREY (Please write for details)

Of course we sell the very popular

SPRINGFIELD SAFETY CONTACT THERMOSTAT Type ET5

Price 22/- (post free)

Look before you buy—ask to see one and note the following features:

- **The only thermostat we know with optional earth terminal**
- **Snap-on cap to cover adjusting knob and discourage unauthorised interferences**
- **Double sheathed P.V.C. flex**
- **Heavy silver contacts**
- **Guaranteed for one year**
- **Neon Indicator lamp**
- **Full magnetic bias**
- **Attractive plastic case with solid brass shoe finished satin chromium (camera finish)**

Illustration just over one third full size shows thermostat clipped to outside of aquarium with stainless steel spring. Heat is transmitted and reflected by the shoe which must be in close contact with the glass.

An interesting leaflet giving further particulars will gladly be forwarded on receipt of S.A.E.

We also stock and recommend the range of Springfield Immersion Thermostats

Springfield Thermostat Type	CS 31	18/-
" " "	CS 31N	12/8 with neon indicator

We still have a few Glowlight Thermostats 18/- reduced to 15/6 because of a defaulted export order

Phillip Castang Ltd., 91, HAVERSTOCK HILL, HAMPSTEAD, N.W.3. *Telephone:* Primrose 1842 and 9432

HACKNEY AQUARIA SHOW

Saturday 23rd November

KING'S HALL

Lower Clapton Road, E.5.

In association with the

Essex, North and East London

Aquarists Association

OPEN CLASSES | F.B.A.S. JUDGES

Entries close 26th October

SCHEDULES FROM:-

Aquaria Section, Baths and Civic Recreation Department, 39 Lower Clapton Road, Hackney, E.5.

OVER 100 VARIETIES OF TROPICAL FISH

IN CLEAN HEALTHY TANKS

PLUS a wide range of Equipment.

Stockist of:-

Arbe Aquariums. Topsy Bow Bookcase Aquariums. Full range of standard Tanks. Pumps. Hy-Flo, Ozonia, Zoobeko, Quiko. Montrose Topsy Fairy etc. Electrical Equipment. Es-Es. Uno Constat. Springfield Inter-Pet. Perma Gravel. 3D Background etc.

H.P. terms Available. Send 6d. for full Illustrated Catalogue.

KEITH BARRACLOUGH

AQUARIST

215, Gt. Horton Rd., Bradford 7. Tel. 73372

I've Got Millions!

WORMS! FOODS! COMPOSTS! RESULTS!

EUGLENA	2/6—With 8 page instructional booklet
MICROWORMS	2/6—Complete with feeding powder
MICRO FOOD	2/6—Specially developed for Micro
GRINDALWORMS	2/6—Miniature W. Worms Easy to breed
GRINDALWORMS	3/6—Mature cultures in wooden boxes
GRINDAL FOOD	2/6—High protein content. Rapid results
GRINDAL COMPOST	2/6—Finely ground with organic base
WHITE WORMS	2/6—With complete instructions
WHITE WORMS	5/6—Mature cultures in wooden boxes
WHITE WORM FOOD	2/6—Exclusive formula. No mildew
WHITE WORM COMPOST	2/6—Commended for quicker breeding

Breeders' packs: five times 2/6 quantity for 7/6

Ask your dealer, or free delivery from

E. ARNOLD, 80, MONEGA ROAD, LONDON, E.7.

REPTILES — AMPHIBIANS

Imports from all Continents

Write for current price list

Sole agency for England:

G. A. IZZARD

13, Romney Close, Chessington, Surrey

•

DRS. W. DE ROVER

Quartier des puits du Plan Ouest

Fayence, Var, France

Don't be ignorant—ask the Man Who Knows at

QUINN'S PET STORE

8 Harmony Row, Govan, Glasgow

Telephone: GOV 1881

40 Aquariums containing Scotland's finest collection of tropical fish including Marine Tropicals for sale. Come and see us, you will be pleasantly surprised. Equipment and fish dispatched anywhere including Europe and the U.S.A.

...but the better aquariums

are glazed with

ARBOLITE Q.S.

Aquarium Glazing Compound

This versatile, watertight compound is now available in a range of pleasant shades–grey, cream, red, green and blue. Packed in 1 lb; 2 lb; 4 lb; 7 lb. and 14 lb. tins and in ¼ cwt., ½ cwt. and 1 cwt. kegs.

ADSHEAD RATCLIFFE

ADSHEAD RATCLIFFE & CO. LTD.

BELPER · DERBY · Tel: Belper 2891 (3 lines)

INTRODUCING
The NEW Super Ozonia Pump

★ *No Vibration* ★ *Silent*
★ *6 Months Guarantee* ★ *Extra Output*
★ *Spares Readily Available*

Price - **62/6** *post free*

The New Michaels Filter Aerator
Michaels pre-packed Nylon Wool
Plastic Aerator Tubing
Hobby Fish Food

Trade Enquiries:
TAYLORS AQUARIUM & PET SHOP
76, MANCHESTER ROAD, BURNLEY
Telephone: 6542

FOR HEALTHY TROPICALS . . .

AND THE BIGGEST SELECTION OF PLANTS, FOODS, TANKS, STANDS, LIVE FOODS AND THE LATEST ACCESSORIES, VISIT

THE PET SHOP
NEW ZEALAND AVENUE,
WALTON-ON-THAMES, SURREY (Tel. 24076)
Open until 6.30 p.m. Fridays

W. HAROLD COTTON
F.R.M.S.
ICHTHYONOTOMIST
POST MORTEM EXAMINATION
of Tropical and Coldwater fishes
Specimens should be wrapped loosely and very wet in greaseproof paper, surrounded by a damp cloth and then re-wrapped in dry greaseproof paper and sent in a strong container.
A brief history and any relevant details should be given. No preservatives please.
Examination fee 3/-
39, BROOK LANE, KINGS HEATH,
BIRMINGHAM 14
Phone HIGHbury 1693

BRITISH AQUARISTS' FESTIVAL

16th - 17th NOVEMBER, 1963

Belle Vue Zoological Gardens, Manchester

26 Classes covering TROPICAL, COLDWATER and AQUASCAPES.

HOURS OF OPENING

Saturday 16th November - 10 a.m. to 8 p.m.
Sunday 17th November - 10 a.m. to 7 p.m.

Admission to the Festival, including also the Belle Vue Zoo and Amusement Park, will be 2/6, children half price.

AQUARIUM PUTTY
Made specially for AQUARIUMS

★ WATERPROOF
★ A SMOOTH PUTTY
★ EASY TO USE

Makers of the famous Fillers & Stoppings.
If unobtainable write direct to manufacturers.

BRUMMER LTD. Oyster Lane, Byfleet, Surrey

HERTFORDSHIRES
NEW AQUARIA CENTRE

Tropicals, 100 varieties in stock. Plant, Tank, and all accessories. Come and see a wonderful display run by an Aquarist for the Aquarist.

Personal Shoppers Only
F. HENISON
7 BANK COURT, HEMEL HEMPSTEAD, HERTS.
Telephone Boxmoor 3874

QUEENSBOROUGH FISHERIES

present

GRO-WEL

Swirl-Away

The Aquarium Vacuum Cleaner

Come and see the latest in complete aquarium cleaners ● Completely self-contained ● A battery operated aquarium vacuum cleaner ● Always ready for instant use at the touch of a switch ● Uses disposable filter bags

STANDARD MODEL **46/8**

Disposable filter bags 4/- per box

Prices include Purchase Tax

To heat your aquarium:

The Inter-Pet combined heater/Thermostat, the most advanced design of guaranteed quality

COMBINED MODEL
22/6

SUPER SUBMERSIBLE MODEL
29/6

Prices include Purchase Tax

For feeding your fish:

Trust Longlife

Come and see the most comprehensive range of quality foods and fish aids

Make your selection from the Longlife Display Dispenser at:

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, Rythe End, Wraysbury, Nr. Staines
Telephone: WRAYSBURY 2805
Sundays only from 10 a.m. to 4 p.m.

16 PICTON PLACE, LONDON, W.1
(1 minute from Selfridges)
Telephone: WELBECK 5418
Hours of Business: MON. to FRI.— 9.30 a.m.–6 p.m. SAT. 9.30 a.m.–3 p.m.

Shirley Aquatics Ltd.

WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: SHIRLEY 130

Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

TROPICALS

BLUE GULARIS (*Aphyosemeon Cœruleum*) The first of these beautiful fishes in Great Britain for years. Young unsexed fishes—aquarium bred 15/- each, limited stock

Aphyosemeon Filamentosum SEXED PAIRS 20/-	*Aphyosemeon Cognatum* SEXED PAIRS 20/-	*Aphyosemeon Arnoldi* SEXED PAIRS 15/-

Other species of *Aphyosemeon, Notobranchius, Cynolebias, Pterolebias, Aplocheilus,* etc. are awaited at the time of going to press

MYLOSOMA DURIVENTRIS 25/- EACH	large 25/- each — *PHENACOGRAMMUS INTERRUPTUS* (*MICRALESTES INTERRUPTUS*) FEATHER TAIL CONGO SALMON — medium 15/- each	
Distochodus Sexfasciatus 30/- EACH	SILVER SHARKS 15/- EACH	*PELMATOCHROMIS KRIBENSIS* ADULT PAIRS 15/-

TROPICAL AQUARIUM PLANTS

COLLECTION OF *CRYPTOCORYNES* *Affinis, Beckettii, Ciliata, Griffithi, Nevillii, Thwaitesii,* one of each for 20/-	*NYMPHAEA MACULATA* Tropical lily with bright green leaves spotted red 10/- and 15/- each	*ANUBIAS CONGENSIS* Broad leafed Water Aspidistra 30/- each
COLLECTION OF *APONOGETONS* *Fenestralis* (Lace), *Ulvaceus* (King), *Rigidifolius* (New Giant), *Undulatus* one of each for 20/-	FOUR-LEAFED WATER CLOVER 2/6 each	*ANUBIAS LANCEOLATA* Water Aspidistra 20/- each
12"—15" PLANTS OF *LAGENANDRA OVATA* 15/- each		Beautiful *LITORELLA* 5/- dozen

AVOID POND LOSSES THIS WINTER. Pond heaters with 12' of flex 15/- each (1/6 post) (2 for 30/- post free). One or two of these suspended just below water surface should keep an ice-free patch all winter. Fishes can then get air and waste gases escape. Don't wait until too late to order. **Also the Otter pump will keep your water moving and prevent freezing—for cold weather remove fountain jet and resultant cascade will keep open space and aerate water. Order now while stocks available.**

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 ¼ 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.

WINTER HOURS (OCTOBER-MARCH) WE CLOSE AT 5 p.m.

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 May-July Only)
CLOSED ALL DAY EVERY MONDAY
TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Tropical minimum order £5, insulated container and carriage 10/-. Cold water minimum order £3 plus 10/- can 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