

The Aquarist

and Pondkeeper

JULY, 1960



MONTHLY
Vol. XXV No. 4

TWO SHILLINGS

WALTER R. SMITH

*For Complete Tropical
and Coldwater Aquaria*

80 VARIETIES OF TROPICAL AND
COLDWATER FISH USUALLY IN STOCK

70 Chromium Plated Tanks of Fish on view

DISTRIBUTOR OF—

- MCLYNN'S FISH FOOD
- ES-ES PRODUCTS
ELECTRICAL AND GENERAL
- WATER LIFE, AQUARIST AND DITCHFIELD'S
BOOKLETS
- REJECTORS, SEDIJETS AND MAINTENANCE
EQUIPMENT
- PROCKTER 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 THERMO-
METERS
- STUART TURNER WATER PUMPS
- ZOOSKO PUMPS
- VI-FIT FISH FOOD
- BLACK MAGIC GLAZING COMPOUND
- GLASTICON '303' AQUARIUM SEALER

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

20 PAGE PRICE LIST FREE ON APPLICATION

WALTER R. SMITH

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

Manchester 4

Telephone: Deansgate 3761 and 3830

HYKRO HYKRO

HYKRO FISH FOODS

The best in the World. Have stood
the test of time

Keep your tanks crystal clear with

HYKRO FILTERS

These are of sound construction and
highly efficient. Thousands are in use
and again have stood the test of time.

Hykro three-in-one BREEDING TRAPS,
FEEDING RINGS etc. are on sale at all
the Leading Retailers.

JOE GRASSBY, F.R.H.S.

'The Glen' Fisheries, Mobblerley,
Nr. Knutsford, Cheshire



We guarantee to keep fish WARM

The quality and work-
manship in Evans
Heaters and Elephant
thermostats guarantee
customer confidence.
Our thermostats give
full protection from
moisture and condensa-
tion, and are renowned
for quality and long
life.

Write to Dept. 1 for illu-
strated literature.

EVANS ELECTRONIC

Developments Ltd.
EVONIC WORKS,
SHADY LANE,
BIRMINGHAM, 22A.

Telephone:
GREAT Barr 1754/5.

PARAMOUNT AQUARIUM

London's leading Tropical Fish Importers
and stockist of all the very latest equipment

FIRST CLASS FISH AT THE LOWEST POSSIBLE PRICES
ALL OF GOOD SIZE AND GUARANTEED DISEASE FREE

V.A.E. FOR OUR
LATEST FISH AND
EQUIPMENT LIST

Aquarium Equipment

HEATERS 25-150w

Parasoon	7/6
Little Wizard	8/6
ES-ES Flexible	19/6
ES-ES Flexible	7/6

Postage 1/-

THERMOSTATS

"LINO"	18/-
Popular	12/8
Popular with Neon	12/8
Submersible	12/8
"ES-ES" Make	18/-
"PROCKTEK"	18/-
Outside Heat	18/-
"CONSTAT"	18/-
Junior	21/-
Heavy Duty	25/-

Postage 1/-

VIBRATOR AERATORS

Masterair Minor	21/-
Masterair M.A.	24/-
Reocean Hurricane	34/-
Prockter Heavy Duty	48/-
Abruzzan	25/-
Fairy	27/6

Postage 1/-

AMERICAN TERRAPINS
Baby Red-Eared Green Terrapins,
size to keep 7/8 each or 12/4 pair
(Carriage 1/8)

SPECIAL TERRAPIN BOWL
Complete with food, sand, palm
and instructions ... 6/11
Postage 1/- extra

REPTILES

Amphispeltis Snakes	36/-
Leopard Snakes	36/-
Cat Snakes	36/-
Glass Snakes	12/4
Green Snakes	4/6
Green Lizards	6/8
Wall Lizards	7/6

Carriage and Box 2/6

TROPICAL FISHES

BELOW IS A SELECTION OF FISHES FROM OUR
LIST OF OVER 70 SPECIES

Angels	1/9	Schubert Barbs	2/8
Widows	1/9	Red Serpents	3/6
Swindells	1/9	Glowlights	2/-
Rose Barbs	1/9	Bloodlines	2/-
Harlequins	1/9	Penguins	3/4
Tiger Barbs	2/-	Australian Rainbows	2/-
Beacons	2/-	X-ray Tetras	2/-
Flames	2/-	Red Eye Tetras	2/-
Platy	2/-	Cherry Barbs	2/-
White Clouds	1/-	Bumble Bee Guppies	2/-
Neons	1/10	Red Platys	2/4
Zebra Danios	1/6	Nannostomus	1/6
Peel Danios	1/6	Animulus	3/-
Kribia-Eels	2/6	Soiserrilla	2/-
Nigger Barbs	2/6	Armas Cats	6/-
Guppies	1/-	Deaf Gourami	5/-

MANY, MANY OTHERS

RARER FISHES

Large Scars	18/-
Medium Scars	12/6
Malaya Angels	10/6
Crown Loach	15/-
African Electric Catfish	23-0-0
Black Sharks	14/-
Puffer Fishes	7/6
Marbled Gobies	8/6
Rare Congo Glass Cat	18/-
Clarias Lizard Cat	20/-
African Leopard Cat	20/-
Blind Cave Chameleon	6/6
Yellow Scorpion	12/6
A. Hammer	6/6
Synbranchiodon Discus	45/-

SPECIAL JULY OFFER
South American Neon Tetras
24 each

THE AMAZING NEW JUNIOR HY-FLO



PRICE **£4-12-6** Postage 2/-
THE ONLY COMPLETELY
SILENT AIR PUMP
FULLY GUARANTEED

THE STOKES Ornamental Fountain

£7 - 19 - 6

*Keeps fish active and water clear.
A most attractive addition to any pond.*

THE SEDIJET

ALWAYS HAVE A CLEAN
AQUARIUM
16/-

COMPLETE WITH BELLOWS
OR TO WORK FROM
AIR PUMP **8/- ONLY**



WHY NOT PAY US A VISIT—OPEN ALL DAY SATURDAY

95 HAVERSTOCK HILL, HAMPSTEAD, LONDON, N.W.3

Telephone: PRImrose 1842

FOUR MINUTES FROM BELSIZE PARK UNDERGROUND STATION

YOU
want the best fish
WE
have them

WE BREED the world's finest Veiltails, Fantails, Black Moors, and Bristol Shubunkins. Now ready for sale—this year's spawnings.

Remember we won the G.S.G.B. Cup and 2nd prize. Then we won 1st, 3rd and 4th prize at Hackney, for Veiltails. 2nd and 3rd prize for Black Moors at Willesden last year, our first year of showing.

TRADE SUPPLIED.

Tropicals—We still have the largest selection in England of guaranteed trouble free fish at competitive prices.

Equipment—We have the full range of aquarists' requirements.

We are specialists in aquarium, pond, and exhibition installations—**LIVE FOOD ALWAYS IN STOCK.**

CHISWICK AQUARIA

136 HIGH ROAD, CHISWICK, W.4 — CHISWICK 6549

27, 91, 655, 657, 667 Buses and Trolleybuses pass the door.

Open daily until 6.30



the
scientific method
of feeding
your baby fishes

Start your Baby Fish on
LIQUIFRY
and watch them GROW!

LIQUIFRY is a liquid suspension containing: (1) Particles of immediate nutritional value to the fry. (2) Particles to produce infusoria in the minimum possible time. Nothing compares with LIQUIFRY — No smelly tanks, no trouble, no waiting, no waste. LIQUIFRY No. 1 (red tube) for fry of egg-layers. LIQUIFRY No. 2 (green tube) contains added green vegetable matter especially for livebearers.

A few drops a day is the LIQUIFRY way

(Regd.
Trade Mark)

1s. 6d. per tube

Approved by



FEDERATION OF
BRITISH AQUATIC SOCIETIES
after inspection and test

For **CLEAREST TANKS** and
HEALTHIEST FISH use

"PLEASURE"

Food granules for adult aquarium fishes

**THE REVOLUTIONARY
TOP QUALITY DRIED FOOD**

"PLEASURE" is scientifically formulated and manufactured by a special low temperature process to retain maximum food value. Contains no filler.

Packed in handy plastic drums, price 1s. 9d. each

**"GIVE YOUR FISH PLEASURE AND
MAKE THEM HAPPY"**

"LIQUITOX"

*The proven specific treatment for
FUNGUS and FINROT*

**COLOURLESS
EFFECTIVE
DOES NOT HARM THE PLANTS**

Accurate dosage obtained by special chart

Standard size

1s. 9d. per carton of 2 capsules

Brooders' pack

6s. 9d. for 12 capsules

Each capsule will treat 4 gallons of aquarium water

LIQUIFRY QUALITY PRODUCTS are available through your dealer or post free from

**THE LIQUIFRY COMPANY LTD., CHURCH STREET,
DORKING, SURREY**

The Best Fish Foods...



SHRIMP FISH FOOD drums 6d.
TROPICAL FISH FOOD drums 6d.
DRIED DAPHNIA drums 6d. & 1/-
GRANULAR FISH FOOD drums 6d. & 1/-
ANT EGGS drums 6d.
POND FISH FOOD drums 1/-

Available from all aquaria and pet shops

TROWER'S AQUARIUM GRAVEL

*Is carefully selected
and cleaned to the correct
grade to ensure full
plant growth*

IN PACKETS 8d. AND
IN BAGS 1/3 & 2/3

...are packed by

TROWER & CO. LTD.

TREMADOC ROAD • LONDON • S.W.4

NOW! IS THE TIME TO GET YOUR TROPICAL FISH PLANTS, ETC. THEY ARE LARGER AND MORE PLENTIFUL, AND WILL TRAVEL SAFER. LIVE DAPHNIA, TUBIFEX AND WHITE WORM ALWAYS AVAILABLE

A NEW CONSIGNMENT OF WEST AFRICAN RARE FISHES NOW IN

Momotrus (red)	40/-
spotted	20/-
yellow	17/6
Aphrasma (yellow)	20/-
black	20/-
marbled	15/-
Burtonia	17/6

We carry a large selection of Goldfish, from 1.0 to 12.0
Large Black Moons 4.21 each
Varieties 2.00 - F. 18.00. Also
Common, Fancy, Pond Plants,
Water Lilies, etc.

THERMOSTATS

Proline	36/-
General Electronic	35/-
Copied New Electronic Type OK	21/-
UNO	
Out/In	18/-
In/In	15/-
In/Out "Pop-Up"	10/-
"Pop-Up" with alarm indicator	12/6
"In-In" Sentinel	20/6

AERATORS

Zodiak Tank	75/-
Taurus	45/-
Monsoon Model	24/-
Monsoon Model	21/-
"In-In" Flare	27/6
Aerators	25/-
Proline	25/-
"In-In" Model D	67/-
Dynas Mk. I A.C. D.C.	29 0 0
Dynas Mk. D A.C. only	29 0 0

PISTON PUMPS

Hy-do Junior	82/6
Hy-do "A"	120/-
Hy-do "B"	117/6
Hy-do "C"	250/-
Leak, Model 1	117/6

Thermometers

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

Sandries

T. Pieces	8/-
Clamps	1/-
Aeration	
Tubing 3/4 yd.	
Tubing 1 1/2 yd.	12/6, 15/-
Glass Wool 1"	8/-
Filter Carbon 2"	15/-

TROPICALS

Large Neons, 6 for £1; 3/6 each

Reocra	5/6	Key Hole Cichlid	4/6
Angels	2/6 & 3/6	Black Angels	
White Cloud		12/6 to 20/-	
Minnows	2/6	Black Lure	
Planes	2/6	Angels	7/6 to 12/6
Bracon	2/6	Tiger barb	2/6 & 3/6
Dark Widow	2/6	Greenlight	2/6
Platy, various		Fengary	
from 2/6		(pr.) 7/6, (each) 4/-	
Swordtails, vari-		Rainbow Dora	
ous, from 2/6		(pr.) 7/6, (each) 4/-	
Schubert's barb	2/6	Mollie, Black	
Schubert's	2/6	from	4/-
Guppies (pair) 1/6, 3/-		Lemon tetra	4/-
Haddock	3/-	Glassfish Adult	4/6
Clay's barb	3/-	Acropus Cichl.	6/6
Clay's barb	3/-	Indian Puffers	2/6
Chrysem barb	3/-	Ocellina Cichl.	
Adult Herring	3/-	8/6, 10/-	
Heart Tetra	13/6	Leopard Cichl.	11/-
Red Nosed Tetra	12/6	Adult Fighters	
Pterois		10/-, 12/6	
10/6, 12/6, 15/-		Serpent	4/-
Green Killifish	1/6	Frenum	6/-
Mollie	4/6		

Guppies, three spots 2/6, thick lip 3/-, dwarf or best 3/6, King 4/-, Opaline 3/6.

We also set-up and service aquaria, and there are specialist lines to satisfy all customers' requirements.

BOOK CASE BOW-FRONTED AQUARIUM

48" x 12" x 15"	£28 9 6
36" x 12" x 15"	£18 19 6
Standard Bow	£21 £19 10 £11 3 6

PLANTS

Sagittaria	6d. each	2/- doz.
Valis. Terna	6d.	5/-
Valis. Spiralis	6d.	5/-
Ambulia	6d.	5/-
Ludwigia	6d.	5/-
Hygrophila	6d.	5/-
Cryptanthus	2/- and 3/-	
Wexia	1/6	2/-
Guar Hygrophila	1/6	2/-

By post, add 1/6d.
HEATERS 25w to 100w

Control	7/6
Wheat	8/6
"In-In" Flexible	10/6

RARE FISHES

Butterfly Fish	40/- A 30/-
Electric Cichl.	26/- A 90/-
Exotic Fish	25/- A 30/-
Woolly Cichl.	7/6
Clown Loach Large	20/-
Small	15/-
Scaleless	10/- to 20/-
Malayan Angelfish	10/- to 12/-
Fluorescent	7/6
Bismarck	7/6
String Fish	20/-
Diana	each £3
Weather Loach	5/-
Blackheads	12/-
White African Cichl.	7/6
Blue Axolotl	2/-
Blind Cave Fish	6/6

Our minimum order for fishes is £2, a charge of 22s. 6d. is made for container. Carriage charges, by fast passenger train and telegram, making time of arrival.

REPTILES

Wall Lizard	4/6
Green Tree Lizard	6/6
Green Snake	5/-, 6/6
Tortoise	4/6
American Yucca	7/6
White African Tortoise	6/6

STANDARD AQUARIUMS (Light Gauge) (Angle Iron)

12" x 6" x 6"	10/-	24" x 12" x 12"	40/6
15" x 6" x 6"	9/6	24" x 12" x 15"	55/-
18" x 6" x 6"	14/6	30" x 12" x 15"	75/-
18" x 6" x 8"	15/6	36" x 12" x 15"	85/6
18" x 10" x 10"	21/-	48" x 12" x 15"	135/-

COVERS STANDS

18" x 10"	14/6	18" x 10" x 36"	32/-
24" x 12"	21/-	24" x 12" x 36"	42/-
30" x 12"	26/-	30" x 12" x 36"	47/6
36" x 12"	35/-	36" x 12" x 36"	50/-

CONTINENTAL FRONTS Red and Cream Stripes

15" w.	7/-
24" w.	10/-
36" w.	15/-

FOODS

Basic Flakes	1/6
Hydra Flakes	1/-
Brookies	1/6 & 2/6
Basic	6d. & 1/6
Stumpy	6d. & 1/6
Dry Daphnia	6d. to 2/6
Liquid	2/6
Infusyl	2/6
Elze	2/- & 4/6
Holly	2/- & 6/6
McLynn's	1/6, 2/6, 6/6, 17/6
Green Shrimp	2/-, 2/6, 15/-
Meat & Veg	1/- ea.
Barnum's	1/6 & 2/6

Add 1/- up to 10/-; 1/6 up to 20/-; 2/- up to £1; 2/- up to £2; 3/- up to £3 over Free. CARRIAGE AT COST ON AQUARIUM STANDS AND TANKS

THE CENTRAL AQUARIUM

Situated on the A41 Route 4 miles North of London
391 HENDON WAY, HENDON CENTRAL, N.W.4 Phone: HEN 9700
OPEN 8.00 a.m.—7.00 p.m. Emergency Phone: HEN 6285



We are specialists in aquaria installations. All sizes and styles to customer's own specification carried out. We have many displays set up in our showrooms. Write for catalogue and prices.

BOW-FRONTED AQUARIUMS

48in. x 10in. x 12in. bow-fronted aquarium with wrought iron bookcase stand £28/9 complete.
36in. x 12in. x 12in. bow-fronted aquarium with wrought iron bookcase stand £18/18 complete.
Available in penny bronze, black & gold, and cream

WITH PLAIN STAND

Jacobs 48 x 10 x 12 £21.0.0
" 36 x 12 x 12 £15.10.0
" 24 x 12 x 12 £11.10.0

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

All Standard Sizes of Aquaria in Stock. Any shape or size made to Customers' Specifications. Installations a Speciality.

REMEDIES, etc.

Bronze White Spot Cures 2/-
Vivo Salts 2/-
Sea Salt 1/6
Clarin (Not by post) 2/6
Liquor 1/6
Dissolve 2/6
Branston Fertilising Tablets 1/6

Please add 1/- extra postage on appliance orders up to 10/-

STANDS

18 x 10 x 36 35/-
24 x 12 x 36 45/-
30 x 12 x 36 55/-
36 x 12 x 36 55/-

LIVE FOODS

White Shrimp Eggs 2/6 and 4/6
Cultures of White Worm 2/6
Micro Worm 2/6
Tubificor worms 1/6 and 2/9

THERMOSTATS

Constant External 33/-
Constant New External Type OK 21/-

UNO

Out/Ad. 18/-
In/Ad. 15/-
In/Ad. "Popular" 10/-
"Popular" with neon indicator 11/4
"Ea-Ea" Sentinel 15/6

THERMOMETERS

Mercury 4/6
Glass 4/6
Plastic Backed 4/6
Soak Brim Glass 5/-
"Ea-Ea" Dummy 6/6

FILTERS

"Windmill" Plastic 19/6
Outside Filter 19/6
"Windmill" Biological Aquarium Filter 12/4, 15/-
"Windmill" Regent Inside Filter 16/-
Corner Filter 6/-
Air Lift 2/6

AERATORS & PISTON PUMPS

Masterma 21/-
"Ea-Ea" Fairy 24/-
Star 17/6
Hydro Junior 9/6
Hydro "A" 12/0
Hydro "B" 15/6
Hydro "C" 20/0

HEATERS

"QUEENSBOROUGH" 25w., 40w., 60w., 75w., 100w., 120w., 150w. 10/-
"Ea-Ea" Flexible Heaters (100w. and 150w.) 19/-
"Ea-Ea" Thermostatic Heaters, 100w. and 150w. 36/-
Heater Holders 2/-

FOODS

Queensborough Tropical Fish Food 1/6 and 2/6
Enzo Flakes 1/6
Hydro Flakes 1/-
Branston 1/6 and 2/6
Branston Pygmae 1/6
Branston Biovic 6d. and 1/6
Liquority Nos. 1 and 2 2/6
Infant 2/6
Ella 2/- and 4/6
Dried Daphnia Our 6d.
Ground Shrimp 1/-
Fish Food pack 1/6 in 3 sizes
Anti Eggs 6d.
1/6 up to 20/-, 2/- up to 30/-

SPECIAL OFFERS

30 Assorted Tropical Plants 10/-
36 Assorted Tropical Plants including Cryptocorynes 20/-
Algae Eating Snails 6d. each

BOOKS

Guide to Tropical Fishkeeping (L. H. P. Bryner) 36/6
Diagnosis of Fishes (C. Van Dolen) 15/6
Exotic Aquarium Fishes (W. T. Innes) 84/-
Handbook of Tropical Aquarium Fishes (G. H. Axelrod) 77/-
All about Tropical Fish (McLennan) 77/-
Encyclopedia of Tropical Fishes (H. R. Axelrod and W. Vanderwalker) 62/4
Electricity in your Aquarium (L. Warburton) 8/6 (Books post free)

SEDIMENT REMOVERS

"Windmill" Air 10/-
"Windmill" Hand 15/-
"Windmill" Rejuvenator 15/-
Fibrel 2/-
Fibrel Tubing 7d. 0
Hand Type Plastic 4/6

BACKING PAPERS

NATURAL STRATA ROCKWORK
24in. long x 20in. high, 1/4 per sheet, or 1/3 per foot.

FULLY-GLAZED AQUARIUMS

Pressed Steel Angle Iron
Aluminium Tank H's Reg.
Inches Tank H's Reg. 12 x 6 x 8 10/6 - 4/6
14 x 8 x 8 13/6 - 7/-
18 x 8 x 8 15/- - 7/6
18 x 10 x 10 22/6 15/- 8/-
Inches 24 x 12 x 12 30/- 11/- 8/4
24 x 12 x 15 55/- 21/- 8/6
30 x 12 x 15 70/- 27/6 -
36 x 12 x 15 85/- 32/6 -
Carriage extra
Glass, China and Shells sold at purchaser's own risk.

PLANTS

Valisneria Spiralis 6d.
Elodea Densa 6d.
Hygrophila 6d.
Ruppia 6d.
Sagittaria natans 6d.
Sagittaria nana 6d.
Valisneria spiralis 9d.
Ludwigia 9d.
Myriophyllum 9d.
Ranunculus 2/6
Water Clover 1/6
Spottedwort 3/6 and 5/-
Ceratophyllum Demersum 2/-
"Wallnut" 2/6 and 5/-
"Cordula" 2/6 and 5/-
"Marcellina" 2/- and 4/-

Water Hyacinth 2/6
Glass Sagittaria 2/6
Glass Najas 2/6
Najas Microdon 2/6
Amazon Sword 4/6
Amazon Chamaedorea 1/6
Duckweed per portion 6d.
Bladderwort per portion 1/-
Rivers per portion 1/-

SUNDRIES

Reading Trap 15/-
Aqua Science 5/-
Aqua Tong 2/6
Suckers Keel or Shark 4d.
"Double" 6d.
Planting Sticks 1/3
Razor Scraper 2/-
Dry Floating Wings 1/-
"Squares" 1/6
Hydro 4 in. Feeder 2/3
Worm Floating Feeders 1/6
Worm Cradle with Suckers 1/6
"Windmill" Diffuser 1/- to 1/4
"T" Piece 1/- to 1/4
Aerator Tubing 1/4
Rubber 1/4
Plastic 1/4
4 Way Piece 1/-
Clamps 1/-
Carbon 1/-
Glass Wool 1/2
Nylon Wool 1/4
Coloured Chips 1/6
Artificial Glazing Compound - 25 lb. 4/0
Post 1/9 extra

QUEENSBOROUGH FISHERIES

111 GOLDHAWK ROAD, SHEPHERD'S BUSH, W.12 (1 minute from Shepherd's Bush Market)
Telephone: SHE 3730
Hours of Business: MON. to SAT. 9 a.m.-4.30 p.m. THURS. 9 a.m.-1 p.m.

QUEENSBOROUGH HOUSE, Ferry Lane, Hythe End, Wraysbury, Nr. Staines
Telephone: WRAYSBURY 124
Sundays only from 10 a.m. to 4 p.m.

15 PICTON PLACE, LONDON, W.1 (1 minute from Selfridges)
Telephone: WELBECK 0408
Hours of Business: MON. to FRI. 9.30 a.m.-4 p.m. SAT. 9.30 a.m.-5 p.m.

The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



THE BUTTS, HALF ACRE, BRENTFORD,
MIDDLESEX

Telephone: ISLeworth 6221

PUBLISHED MONTHLY
SUBSCRIPTION RATES

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

QUERIES

Postal replies are made to all specialised queries accompanied by a stamped, addressed envelope. This 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.

VOL. XXV No. 4

1960

Editorial

FISHKEEPER or aquarist? If urged to decide upon a title for himself it is likely that the man with an interest in aquaria would not distinguish between these two names. In fact, most people would probably be content to describe an aquarium as a container for live fishes, although neither the word aquarium nor the word aquarist should be closely identified with fishes at all. It has been suggested that the rather narrow interpretation of the terms and association of them with fishes only instead of with all forms of aquatic life is unfortunate, because it might cause the other interests within the hobby to be overlooked.

Certainly it is the exception rather than the rule these days to find an "aquarists' society devoting time at meetings to any aspect of aquarium-keeping other than fishkeeping. This emphasis is a relatively recent phase in the development in the hobby, and the introduction of tropical fishes can be given as the main cause of the change. A glance at some of the early books for aquarists will confirm that, in the first two decades of this century and before, their readers were being told how to keep and observe invertebrate freshwater animals as diverse as crayfish, water scorpions and mussels, and in prominent sections on marine life, enthusiastic accounts were given of species from the sea shore for the home aquarium.

Although the number of mature fishkeepers likely to want to extend their activities in these ways is probably small we do believe that societies in particular should be conscious of the true breadth of the hobby, because they may be in a position to influence the young aquarist. In schools we would like to see augmentation of the usual one or two aquaria housing fishes with containers displaying specimens of local pond life, captured by the children themselves where possible. The child who develops an interest in matters aquatic should be given a chance to experiment widely, for he will surely be a better fishkeeper for the experience.

Contents

	Page
Editorial	71
Breeding the Spraying Characin	72
Readers' Queries Answered	73
The Garden Pond in July	75
Strange Habits and Floral Mechanisms of Familiar Aquarium Plants	76
Interior Decoration and the Aquarium	81
<i>Limnophila sensillifera</i>	84
Characins	85
Fishmonger's Canvas	86
Aquarist's Notebook	87
A Concrete Bridge	88
Natural Foods for Small Reptiles and Amphibians	89
The Guppy—King of Tropical Fishes	90
Our Readers Write	91
News from Aquarists' Societies	93

Breeding the Spraying Characin

by R. E. MACDONALD

I ALWAYS feel that breeding is the most absorbing aspect of tropical fishkeeping. Without a doubt, maintaining an aquarium is interesting enough, but the eccentric manner in which some species reproduce invariably encourages the ordinary aquarist to further his hobby by setting up a breeding tank. Once an aquarist's interest begins to develop along these lines, his desire for the unusual will increase proportionately.

One such unusual breeding habit that I happened to witness took place in a friend's breeding tank that contained a pair of spraying characins (*Copeina arnoldi*), of the family Characidae.

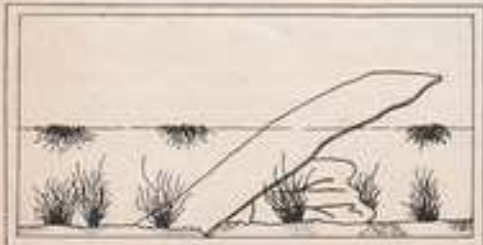
We had decided previously that we would make an attempt at breeding this particular characin and had set the stage by half-filling a 24 in. by 12 in. by 12 in. breeding tank with seasoned water. The water in the tank was kept at a steady 75 F throughout the entire breeding period and a pH value of 6.8, slightly acid, was maintained, by frequent testing with a pH test set.

Knowing what to expect we had placed in the tank a piece of slate that had one end embedded in the sand and was supported below the surface of the water by a rock that held the slate, half out of the water, at an angle of 30-45 degrees, as shown in the diagram. Also in the tank we placed a few floating plants, namely *Riccia* and floating fern, and planted bunches of *Fernisalis* in the sand.

After the tank had been allowed to stand for a further week, we selected the healthiest-looking pair of fish and introduced them to the tank. It is no trouble to separate the two sexes of *Copeina arnoldi* as they differ from each other in many ways. The male is very much larger than the female and has a more pointed dorsal fin. The female carries a red spot on her dorsal fin and is always recognizable by the characteristic fullness when ripe that indicates the female sex. In addition, if the female is observed with a strong light behind her, the dark yellow eggs in the ovary can be seen through the abdominal wall.

The pair of spraying characins were then well conditioned on a diet of *Daphnia*, white worms, chopped earthworm, raw beef and fish and before long the female began to bulge with spawns. It soon became apparent that the larger the female became with eggs, the more attention the male paid to her, and it was not long before the male was darting through the water in search of a suitable spot on which the pair could spawn.

Inevitably, the male fish soon began to examine the slate



Floating plants and a piece of slate inclined above the water surface were special features of the breeding aquarium used



Spraying characin (*Copeina arnoldi*)

and, after a most thorough inspection, he drove the female to within an inch or so of it. Then quite suddenly they leapt from the water, locked their fins and appeared to cling together on the slate. At first we wondered how they managed to keep attached to the slate but after much observation it became apparent that by pressing their fins to the surface of the slate they were able to produce a form of suction, rather like that when rubber suckers are attached to glass or tiles.

While they were clinging in this manner on their selected spawning site, about 10 eggs were deposited by the female and fertilised by the male. The eggs appeared to adhere effectively and could not be easily dislodged from the slate. Whether the eggs were forced from the female by the sudden jar as she leapt on to the slate, or whether they were forced from her by pressure on her body from the male, it is hard to say. It was obvious, however, that the fin-locking procedure of the spawning fish facilitated a complete fertilisation of the extruded ova. This was proved from the resultant number of fry.

In all, it took 52 minutes for the fish to produce somewhere in the region of 90 eggs by this method of spawning.

The male and the female worked on incessantly, never stopping for a moment, until the final eggs were laid. Then, completely exhausted, the pair wriggled from the slate for the last time and sank to the bottom of the tank, where they rested from their labours. The rest was not complete for the male, because every 15 minutes or so afterwards, he made a fast dash for the spawning site and by vigorously thrashing his tail fin about, succeeded in splashing water over the neat circle of eggs on the slate. In this manner he continuously kept the eggs moist for the next 3 days.

At the end of this period I received a 'phone call to say that the eggs were hatching, and on arrival I saw that this was indeed the case. As they hatched out, the fry were wriggling into the water from the slate and were making their way to the bottom of the tank, where they were hiding in the vegetation.

When the last egg had hatched and the male no longer occupied himself by splashing water over the spawning site, the parents began to show their hereditary cannibalistic tendencies by hunting out and devouring the young fry for which they had previously worked so hard to produce. It is still a mystery why fishes should react in such a way—building and then destroying. Perhaps this action is entirely because fishes lack a power of reason. Without a reasoning power the desire and need for live food, particularly after the energy used when producing young, obviously

becomes stronger than the maternal instinct and mental will-power that fishes are capable of exerting. In some cases they can be distracted from their efforts by constant feeding with live foods, particularly after the eggs have hatched, but their desire to consume their own offspring is obviously great. Needless to say that once this pair of spraying characins were seen to display these tendencies they were removed from the tank without delay.

Little was seen of the fry for the next 7 days, during

which time they were fed with plenty of Infusoria, but on the seventh morning we were greeted with the sight of about 60 fry swimming in a school, obviously looking for food. The fry were then fed on sifted live *Daphnia*, freshly hatched brine shrimp and dried foods and lived without mishap to be distributed amongst our closest friends.

The spraying characin is a peaceful species, growing eventually to about 3 inches, and is therefore most desirable as an addition to the community tank.

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

The thermostat controlling the temperature of my aquarium is set at 75° F, yet sometimes in the mornings the thermometer gives a reading of about 70° F. For the rest of the day the temperature ranges between 74° and 76° F. Do you think the thermostat is faulty?

If your aquarium gets early morning sunlight that will account for the rise in the temperature. You will probably find that the current is "off" when the thermometer shows a reading in the high seventies. What happens is that the thermostat switches off at about 76° F, but the sun streaming through the window warms the back of the aquarium and is responsible for the temporary rise in the temperature. It is surprising what a difference even an hour of winter sunlight will make to the temperature of an aquarium, let alone the stronger sunlight of spring or summer.

I am a beginner in tropical fishkeeping, and my aquarium is stocked with tetras, guppies and platys. The platys remain on good terms with each other during the daytime, but when the top light is switched on at night the male chases the female in and out of the plant life and does not give her any rest. Will this treatment do her any harm?

The strong light at night stimulates the mating instinct in the male and causes him to court and pursue the female. So long as the tank is well planted to provide temporary hiding or resting places for the female, she will not suffer any harm.

I should like to use a piece of cork to enhance the appearance of my aquarium. Is it safe to place cork in the aquarium?

If you leave your piece of cork to soak in water for several days it should prove quite satisfactory.

Some of my tropical fishes do not seem to be enjoying the best of health. I feed them on dried and live food and keep the aquarium scrupulously clean. The temperature is maintained at about 72° F, and the tin hood covering the top is kept bright with regular polishing to boost the light supplied by a 15-watts bulb. Can you give me any ideas why my fishes appear to be off colour?

Drops of water falling off the hood into the aquarium may be the cause of the trouble. Bare metal in contact with water (condensation) is not ideal for fish. We advise you to give the hood at least two coats of white enamel paint, and then soak it in a bath of water for a few days before returning it to the aquarium.

I have a small zinc-bottomed and -framed aquarium in which I have kept some guppies for several weeks. Lately the guppies have been swimming about with closed fins and hollow bellies. What is wrong with them?

Fishes do not do well in a zinc-bottomed aquarium. But you can make such an aquarium suitable for fishkeeping by covering the floor with a sheet of glass bedded round the edges and middle on aquarium cement. Then paint the undersides and top of the frame with two coats of bitumen paint. Give the aquarium a good soaking in several changes of water before putting it into use.

I tried to mate a young but sexually mature male Siamese fighting fish with a larger female, but though the male built a bubble nest the female turned so vicious that I had to remove

him from the aquarium. Is it possible that the female so dislikes this male that spawning them is out of the question?

It is always advisable to pair up two fish of about the same size. For the time being, keep the fish separated and try them again when the male has increased in size. A generous diet of live food will help to bring him into good condition.

I should like to breed mollies, and would appreciate your advice on the size of the tank, depth of water, food, temperature and so forth to achieve the best results.

Mollies like plenty of swimming space in water about 7 to 9 inches deep. A 24 in. by 12 in. by 12 in. aquarium would make a good breeding tank for a couple. Mollies prefer slightly saline conditions. A level teaspoonful of evaporated sea salt to every gallon of water should not inhibit the growth of the plant life. The temperature should be maintained at about 72° to 75° F. Mollies are fond of eating greenstuff, and mossy algae should be permitted to grow on the back and ends of their tank. Chopped lettuce, boiled spinach and duckweed are good substitutes for algae. Any dried or live food will be taken with relish. Their aquarium should be lighted with strong electric light, or placed in a sunny window.

I am considering buying some pompadour fish, but as these fish are rather expensive I should like some information about their habits and care. Would they settle down in a 26 in. by 12 in. by 12 in. tank housing some clown loach and angelfish?

The pompadour fish (*Symphycarodon discus*) likes acid water and is not pugnacious. It will eat dried food and live food and should settle down nicely with clown loach and angelfish. The pompadour fish has a temperature range of about 70° to 85° F, and is not difficult to keep in good health.

Every few weeks I have been adding a little salt to my aquarium, and though the guppies, neon tetras and wasp gobies look the picture of health, I have lost two catfish within the last fortnight. Do you think the salt has killed them?

A small amount of salt added to an aquarium will not harm catfish, but adding salt at frequent intervals has proved too much for them. Catfish do not like saline conditions. Guppies, neon tetras and wasp gobies can withstand an appreciable amount of salt in the water without suffering any harm. However, once some salt has been added to an aquarium, it is not a good policy to introduce any more.

What is the best depth of compost for growing plants in the aquarium?

It all depends on the sort of plants you intend to cultivate in your tank. Plants such as *Vallisneria*, Indian fern and

Hygrophila will flourish quite well in about 2 inches of compost, but giant *Sagittaria*, the larger *Cryptocoryne* and *Cabomba* appear to grow more luxuriantly when they are given a good root run in a deeper planting medium.

The bottom of my aquarium has become covered with a greyish-white cobwebby growth. What is the cause of this growth, and will it harm the fishes?

Too much unwater dried food left to decompose on the bottom may be the cause of the trouble. It often appears in a tank containing fry that have been overfed with pea flour or fine oatmeal. Rake over the compost with a dinner

fork tied to a piece of stick, and dip-tube or siphon the bottom to get rid of the loosened mould. If it is not removed at once it will soon pollute the water.

I introduced a pair of *Amblycheilichthys lineatus* into my community tank a fortnight ago, but now I have been told that this fish will soon kill the other occupants of my tank. Is this true?

The surface-haunting *A. lineatus* has a large mouth studded with sharp teeth, and will snap at any small fish large enough to be swallowed. But it seldom molests fishes of medium size that swim in the lower levels of the water.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

In a garden-pond article "Astilbes" recommended *Laguncularia* and *Egeria densa* as two very good plants for the pond. I have just received a catalogue from a firm who claim to have the finest collection of water plants anywhere in the world and yet neither of these plants is mentioned. Where can I obtain them?

The plants in question are probably included in the catalogue under their old names, which are: *Elodea densa* for *Egeria densa* and *Elodea crispus* for *Laguncularia major*. These plants were renamed many years ago but some firms still list them under their old names.

I have a supply of white worms sent me every 2 weeks and they come in a sort of peaty mixture. Is there any means of separating the worms from this, as I seem to get a lot of the material in the tank?

One way is to use the small worm-feeding traps which can be bought at aquarist shops. These are small floating cups with holes in the bottom through which the worms gradually work their way into the tank, leaving behind the peat etc. Another way is to have a small box of peat and place your consignment in this when it is received. Place a piece of cheese (rind will do) in a small depression in the peat and leave it for a day or so. Keep the box cool and shaded and when examined later there will be crowds of worms congregating round the cheese and they can be picked up with tweezers quite cleanly and easily.

I have a garden pool containing 12 shubunkins and this spring I found that three toads have also taken up residence in the pool. I would like to keep the toads but I am a bit worried as they have now spawned. Will the fish eat the tadpoles, as I do not want to be over-run with toads and if not, what is the best solution? Will the toads spawn all the summer?

The toads will leave your pond soon after they have spawned. They spawn only once a year and rarely stay in or near the pond after this. They are not like frogs, many of which remain for some time in or near the pond. Your shubunkins will not eat the tadpoles; they will spit them out as soon as they take them in their mouths and soon learn to leave them alone. If you have too many you can net some out. Place a feeding ring with some dust-free cereal food in and when a bunch of tadpoles are underneath net them out. They can then be transferred to a local pond. The tadpoles make excellent scavengers and will clear up any decaying matter in the pond. If you wish to keep a toad in the garden it is a good plan to set up one or two bricks as small shelters in shady parts of the garden. Toads like to shelter by day and hunt by night and a small artificial cave is appreciated by these creatures, which can become tame enough to take worms from the fingers in a short space of time.

I wish to paint some wooden plant holders I have made for my lily pond. I want to preserve the wood and prevent the nails from rusting. What paint will be harmless to fish and plants?

The best paint for you to use is a bitumastic one. This is a good waterproof paint and if applied on the wood when

it is very dry should answer your purpose well. A second coat can be added once the first has dried.

My young son cracked the front glass of my tank and I have had to replace it. Since then I have been unable to keep the surface of the water clear of a coloured film. What can I do to remove this?

The film is the result of oil seeping from your glazing compound. Most of these contain either linseed oil or similar. You have probably left too much compound exposed inside the tank. Provided that the glass was cut to the correct size there need not be much of the compound in contact with the water. You can get rid of the film by drawing a sheet of paper quickly along the surface of the water from end to end. It should soon disappear.

I have recently bought a moor which although it eats greedily seems to swim in jerks. It is a fin-nipper and has had its own fins bitten by, I believe, a catfish. Will the fins heal again?

Many moors swim in jerks, especially the veiltail types. Their tails are so long and their bodies so short that normal swimming movements are impossible. You cannot stop the catfish from nipping its fins except by removing it to another tank. Once you have removed the cause of the trouble the damaged fins will soon heal and grow again, especially in the warm weather. The fins may show a thickened line where the damage ended but otherwise the fin will grow all right once more.

I have a pond that has unfortunately developed a crack. I am under the impression that I read lately of a method of mending a crack without emptying the pond. How is this done?

The position of the crack will decide whether it is possible to repair your pond without emptying it. If it is not right at the bottom it is possible to make a good repair without actually emptying the water out. If the crack is exposed when the water is lowered it should be cleaned out well and all loose material removed. Then force in a mixture of one part of Prompt Cement and one part of fine, clean, sharp sand made "puddery" with a little water. See that the mixture is pushed well in and do not allow a lot of it to overlap the edges of the crack on the old concrete. This cement sets rock hard in half an hour, and then the pond can be refilled. The small amount of free lime which may come from such a repair will not do any harm to the fishes. Naturally it would be difficult to make such a repair under water, but I have done such a repair to a large galvanised tank. Some rather dry mixture was enclosed in a polythene sheet and thrust down into the tank over the hole. It was held there for a few minutes with the polythene on the water side to prevent as far as possible the water from washing away the cement. The trick has worked, as the tank still holds water. Whether you would be able to do such a repair job to your pond depends on the extent and depth of the crack.

Last summer I made a garden pond and filled it with water. I changed it before the winter and it went rather green. How

ever, during the winter it has cleared nicely. I am now wondering if I should empty it again or can I start to put in my plants and fishes in this water?

It should be quite safe to plant your pond now without emptying the water out. If you do it is almost certain that the water will green up again. Do not put your fishes in until the plants have grown up and have helped to get the water in a good condition.

I have recently fitted a waterfall to my pond and now some of my fishes are dying. Why is this?

If the trouble has only started since you started the waterfall it is possible that there may be something poisonous about the fittings. Any copper or brass can be very dangerous and if such metal was used it will be well to remove it as soon as possible. It must be realised, however, that if the water is foul even the use of a waterfall will not help matters much, you are only running the foul water round and round.

Is there any way of removing the sediment from the bottom of a tank without emptying it?

This can be removed with a siphon tube. This can be a glass tube about half an inch in diameter as long as or a bit longer than the depth of the tank. This is attached to

rubber tubing long enough to enter a bucket standing on the floor beside the tank. Insert the glass tube well down in the water and give a quick suck to the tube end. Drop this end quickly into the bucket and the water will start to flow from the tank. Hold a finger and thumb across the rubber tube to apply pressure if any fish gets near the end of the glass tube. Now work the tube over the base of the tank in a small circular movement about half an inch above the bottom. This will cause the sediment to rise up and be sucked away. Throw away old water removed and refill the aquarium with fresh.

I have an outdoor pond, 11 feet by 7 feet and 15 inches deep. I wish to purchase some goldfish (3 to 4 inches) and would like to know how many I can have with safety.

If you have a dozen such fish you will find the number adequate. Remember that the fish are more likely to remain healthy if they have plenty of space and there is also the probability that they will breed. Most pondkeepers who are new to the hobby think that they are not being successful unless they have plenty of fish of all kinds in the pond. This is a great mistake for it is far easier to keep a few fish healthy than to try and crowd too many fish together, when trouble is sure to ensue.

The Garden Pond in July—by ASTILBES

AT this time of the year the pondkeeper has an opportunity of enjoying the interest of his pond and may be able to sit in a deck chair and contemplate the many living forms in the water. There are few gardens which could not be improved by the addition of a pond but it is said by some people who know no better that a pond will attract mosquitoes, which will breed there and be a nuisance.

Although it must be admitted that many kinds of insects will visit a pond for the purpose of laying their eggs it is a fact that as long as there is only one goldfish in the pond the resultant larvae will never reach maturity, as they will be eaten long before that time. Provided then that a few fish are kept in the pond, there need be no fear that any annoying mosquitoes or midges will be bred there.

Taming Pond Fish

In addition to the attraction of the pond in the garden with its water lilies and other flowering plants, there will be the added attraction of watching the fish swimming around and perhaps breeding. Many people tame their fish so that visitors can be entertained by them. This may be a good idea but it must be realised that the more tame the fish are made the more chance is there of cats being able to catch them. Normal fish will soon become tame as long as a few points are borne in mind. In the first place the fish will come near the owner when they are hungry. If they have plenty of food they are not likely to be bold enough to come close to the side but hunger drives them to take risks which they would not normally take.

When the fish are really hungry a little food can be thrown into the pond whilst the owner stands very still at the side. Gradually the small particles of food can be thrown nearer to the side and as long as no quick movement is made the fish will swim closer and closer. All movements near the pond must be made very quietly and sharp movements must never be made. A few days of training will soon encourage the fish to come in quite close to be fed. Continual training is necessary for several days running and no food should be given other than that which is placed near to the owner and always in the same place. Small

pieces of dry brown bread will float on the surface for a long time and will prove a very good food for encouraging the fish to become tame.

Spawning Time

In many ponds goldfish will breed with no assistance from the pondkeeper and yet in others the fish will never make the slightest attempt to breed. The conditions which encourage the fish to spawn are fairly well known yet what actually starts the fish off in the breeding chase is not properly understood. Sometimes the fish will commence to spawn at the beginning of a warm spell whereas at other times a slight shower of rain may be the signal. The goldfish may look full of eggs and appear to be in prime condition but yet there may be no sign of any attempt to spawn. Some pondkeepers may never know that their fish have spawned, but if they have watched during early mornings it would be almost impossible not to notice that something extraordinary is happening once spawning starts. The fish rush around like mad things and the male fish continually nudge and push around the females, urging them into the thickest water weeds so that the eggs may be laid.

Often several males will drive one female and these attentions may give one the idea that the female fish will be killed by the constant nudging. However, little harm will come to them and in due course the eggs will be laid. They are fertilised in the water by the milt from the male as they are laid and they adhere to the water plants, as they have a peculiar sticky substance which enables them to stick to the plants although under water. The eggs may be seen as small single beads of jelly each about the size of an average pinhead. If the plants are lifted out of the water for a moment the eggs will show up more clearly and take on a slightly amber hue.

When several goldfish are spawning in the shallows of a pond the noise can be as much as if a dog had got into the water. The time of spawning is usually in the morning and it does seem that when the sun can reach the pond about this time the fish are encouraged to make a start. Sometimes it is as late as July before the fish will breed in

(Please turn to page 88)

Strange Habits and Floral Mechanisms of Familiar Aquarium Plants

by C. D. SCULTHORPE (*Photographs by the author*)

SPECIES of *Vallisneria*, *Hydrocharis*, *Elodea* and *Stratiotes* are well-known aquarium plants; that they all belong to one family is surprising for they are markedly dissimilar in appearance and they show many detailed differences in vegetative structure. When their floral arrangement and strange pollination mechanisms are studied their botanical similarities become apparent, and their interest for the aquarist, in whose tanks and pools all of them will thrive and flower, is obvious. This family, the Hydrocharitaceae, is notable in that all its 13 genera, comprising some 55 species in tropical and temperate regions of the world, are aquatic, the majority inhabiting fresh water. Of the five genera occurring in the British Isles, three are submerged, one is partially submerged and one is floating.

The only species of *Hydrocharis*, from which genus the family name is derived, is *H. morsus-ranae* L., the frog-bit, a locally common, floating plant well known to aquarists. The yellowish green leaves are sometimes bronzed, and

from the node where each rosette is produced hangs a bunch of long, simple, white roots with conspicuously long, dense root-hairs. The roots become entangled not only with each other, but with the long stolons, and in midsummer a pool may be covered with a matted network of plants. A new rosette of leaves arises from a bud at each node of an advancing stolon; in autumn, or earlier if adverse conditions prevail, these stolons form terminal turions, each of which is dark green and clasped by two, tight, scale leaves. A split develops and the turion falls to the substratum, where, its centre of gravity being in the basal, stalked end, it always remains upright. A minimum degree of illumination, particularly at the yellow and red end of the spectrum, is necessary to induce germination. The bud scales open, the rapidly growing leaves develop air-filled spaces, and the young plant floats to the surface.

Limnobium spongia Steud., sometimes known as *Trinova bogotensis* Karst., is an American frog-bit from the Mississippi valley, differing from *Hydrocharis* only in its cordate,



Rosettes of leaves of frog-bit on a pool in early summer; roots and stolons can be seen below the surface.



Frog-bit in an aquarium, photographed in early autumn. Two terminal turions (right) grow downwards in contrast with the horizontal or erect summer buds.



An old submerged water-soldier plant in early autumn



A thriving water-soldier plant in mid-summer

thick, fleshy leaves and its preference for warmer water.

One of the most fascinating physiological features of plants with floating leaves is the adjustment of their petiole length to water depth. *Hydrocharis morsus-ranae* plants grown in water 1 1/2 inch deep and then held beneath 12 1/2 inches of water produce floating leaves with petioles at first 1 inch long, and after the change about 12 inches long. Similarly water lilies progressively lowered in the water of a pool produce successively longer petioles. Now there are really two ways of examining this feature. Firstly, one may search for some positive agent which, so to speak, pushes the petiole up to its predestined place at the surface; if one believes, as I do, that all plants will continue to grow unless they are arrested, one will look for the factors which effect a gradual cessation of growth as the petiole nears the surface. It is certain that in *Hydrocharis morsus-ranae* the regulation of growth does not result from changes in light intensity, since accommodation of the petioles occurs in complete darkness.

The regulation is not due to the surface film constituting a physical barrier; if it were, we should expect all floating leaves to lie just below the surface film, not upon it. Nor is it due to the lowering of the pressure of the water above the leaf. Some years ago a research worker discovered that if tubes of oxygen-free air were inverted over individual leaves of *H. morsus-ranae*, *Ranunculus sceleratus* and a species of *Marulca* just before they reached the surface, the leaves continued to grow, into the air. He therefore concluded that the presence of oxygen in the atmosphere checks the growth of petioles at the surface, though the actual path of inhibition was not discovered.

It was thought for a long time that the aerial male and female flowers of the frog-bit appeared on different plants. Later observation revealed that they are borne on the same plant, but at different nodes, separated by stolons which had presumably been broken by those making the early records. Two or three male flowers occur within a spathe, each having 12 stamens, of which only the inner ones are fertile; each solitary female flower has a six-celled ovary. The flowers are about 1 inch in diameter and have three, obovate white petals with a yellow mark at the base. Only intense illumination induces flowers to appear. Many



Mature stem of *Elodea californica*, the dense, twisted leaves giving a feathery appearance



Elodea minor



Left of pot, young specimen of *Elodea callitrichoides*;
right, *Elodea minor*

years ago, a set of plants was exposed to 9 hours of sunlight daily from spring onwards and an equal number was exposed for 3 hours daily from the same date. From 1st July to 31st August the first set bore over a thousand flowers whereas the second set bore none. Plants from the second set put under bright sun at the end of June bore flowers within 4 weeks. The water temperatures of both experimental sets were equalised throughout. It is doubtful if fruits ever mature in this country, though elsewhere they are fleshy, gelatinous and dispersed by water fowl.

Sagittaria aloides L., the water soldier, closely resembles *Hydrocharis* in the arrangement and structure of the flowers, though male and female plants are quite distinct, and only the female occurs in Britain. The petals are larger and more rounded; the fruit is never produced in this country. Since male plants are absent the continued survival of the species depends on vegetative reproduction by offsets formed in autumn. These offsets are bright green and grow into new plants in the following spring. *Sagittaria* inhabits more calcareous water than *Hydrocharis* and may thrive in a pool, but will not multiply throughout the summer with the same vigour as *Hydrocharis*, unless conditions are ideal. The rigid, brittle leaves may grow to 20 inches in length, and are armed with surface spines and saw-toothed edges. Bright bronze-green when young, they become dark brown with age. The very long, unbranched roots grow fast, at the rate of about 3 inches in 24 hours, but are short-lived. The unbalanced posture of the plant after any of these roots have been destroyed hints at their function in maintaining equilibrium.

The renowned rising and sinking of *S. aloides* have intrigued botanists for over a century. The first record claimed that the plant rose and sank twice each year; this has not been verified, and all subsequent observers agree that it rises in the spring, flowers and in late summer sinks to the bottom and produces offsets. Water where it grows

contains much dissolved calcium bicarbonate. Absorbed by the plant it dissociates into carbon dioxide and calcium carbonate; the carbon dioxide is retained in the leaves while the calcium carbonate is secreted in weak solution on to the leaf surface, where evaporation leaves it as a crystalline deposit. Accumulation of this throughout the summer, and waterlogging of the decaying leaves, increase the specific gravity of the plant and it slowly sinks. In spring, rapid growth of young, succulent leaves decreases the proportion of calcium carbonate-encrusted leaves and hence the specific gravity of the plant which therefore rises once more to the surface.

Sagittaria aloides and *Hydrocharis morsus-ranae* are pool plants of unusual appearance and habits; for the fulfilment of their life-cycle they need sunlight, and do not thrive for long in indoor, coldwater aquaria.

The submerged genera of the Hydrocharitaceae have foliage of two main types: long, ascending stems with whorled, alternate or opposite leaves, e.g. *Elodea* and *Hydrilla*, or crown-like stems from which arise radical, ribbon-shaped leaves, e.g. *Vallisneria* and *Osselia*.

Of the genus *Elodea*, native to the Americas, *E. canadensis* Michx., the Canadian pondweed, has been naturalised throughout the British Isles. All species of *Elodea* have inconspicuous, unisexual flowers, male and female on different plants, borne solitarily in tubular spathes in the leaf axils. The female floral tube elongates, pushing the flower to the surface, where it opens and exposes its three receptive stigmas. The male flowers of *E. canadensis* break away and float to the surface; those of *E. isensis* Michx. and *E. callitrichoides* L. are carried up on thread-like stalks. At the surface they all burst open, the pollen sacs of the stamens explode, and the buoyant pollen grains float until, by chance, they reach a stigma. The male flowers of *E. canadensis* are extremely rare in Britain. *E. stricta* Casp. has also been introduced to British waters, though



Egeria densa



Lagarosiphon major. Compare the appearance of the apices of stems of this species with those of *Egeria densa*

only the male flowers have been observed here. Its white flowers secrete nectar and are pollinated by insects, this being one of the reasons why the plant is now placed in a different genus, *Egeria*.

E. callitricoides is distinguished from *E. canadensis* by its paler green, twisted and recurved leaves whose bases are brick-red. *E. minor* L., whose leaves are not in whorls of three, is mid-green and is the smallest species. The leaves of *Egeria densa* are smooth and in whorls of four; those of *Lagarosiphon major* Harv., previously known as *Elodea crispus* Hort., have short, stiff hairs and are inserted closely on the stem, though not usually in whorls.

E. callitricoides and *E. minor* are excellent tropical-aquarium plants, thriving under a wide range of light intensities. *E. canadensis* makes a fine, if somewhat vigorous, pool plant, but often becomes etiolated under artificial light. *Lagarosiphon major*, from Africa, is a superb plant for the outdoor pool, forming luxuriant plumes of dense foliage. Under artificial light it does not flourish and is not easily acclimated to warm water. This is perplexing for in Morocco it flourishes in brightly lit water at temperatures between 75° and 85° F. *Egeria densa* similarly needs good illumination and should be allowed to hug the surface if it is to maintain its profuse foliage. Grown as cuttings all these species form strong, unbranched roots which, on entering the compost, develop tenacious root-hairs.

The third native genus, *Hydrilla*, is represented by species known only from the North Lancashire lake of Estwaite Water. This species is probably *H. lithuanica* (Besser) Dandy but it has never yet flowered. It resembles *Elodea canadensis* in habit, floral structure, pollination mechanism and perennation by winter-buds, and may be distinguished only by its paler green colour, and the arrangement of the narrower, toothed leaves in whorls of four.

The leaves of *Vallisneria spiralis* Gaertn., from New Guinea and the Philippines, grow to over a yard in length



Vallisneria var. *torta*



Male spathe of *Vallisneria spiralis*, appearing close to the crown of the plant

and appreciate a temperature of 65° to 80° F, whereas *V. spiralis* L., *V. spiralis* var. *torva* and *V. spiralis* var. *rubrofasciata*, a 6- to 9-inch tall, red variety, come from temperate regions and are suited to both coldwater and tropical aquaria, where they quickly form screens of foliage. They all grow in sand, gravel or a sand/soil mixture, and they need a bright overhead light.

In its method of pollination *Vallisneria spiralis* shows a development of the *Elodea* method. Male and female plants are separate; the solitary female flowers reach the surface on the elongated stalks of their spathes. Each submerged male spathe near the crown of the plant holds hundreds of flowers, each containing two stamens and an air bubble. The spathe having broken, the flowers float to the surface where they burst open. The heavy female flowers depress the surface film and the males are blown to them, sliding down the slope and rubbing the sticky pollen of the debussing stamens on to the stigma. The maturing fruit reaches the substratum partly by its own weight, and partly by the spiral contraction of the stalk.

Pollination in the marine genus *Enhalus* is similar, and true hydrophilous flowers occur in *Halophila*, in the sea near Mauritius. Male and female flowers remain submerged and the pollen grains, united into strings, become entangled with the thread-like, receptive stigmas.

An elaboration of the ribbon-shaped leaf of *Vallisneria* is found in the genus *Ottelia*, of which one species is rarely available to aquarists. *Ottelia alcazobala* Buchenau, from tropical Africa and Madagascar, has broad, translucent, green leaves of a similar size and furled habit to those of *Aponogon nitens* Bak., and with parallel, carmine-

tinted veins. This fragile plant grows well in aquaria at a temperature of 65° to 90° F, rooted in sand, and producing its hermaphrodite, creamy-yellow flowers, which later set seed.

It is thus the floral characters and pollination mechanism which provide the main interest of the family. Only in *Ottelia* do hermaphrodite flowers occur, and of those with unisexual flowers, only *Hydrocharis* and *Linnæobium*, the two floating genera, have male and female on the same plant. These two genera, together with *Seratocyon*, bear aerial, conspicuous flowers pollinated by insects. The remaining genera have the sexes on different plants and show various mechanisms which, at their simplest, effect pollination at the water surface, and at the most specialised, in the marine genera such as *Halophila*, effect it completely under water.

Finally, the pattern of distribution of these species occurring in the British Isles is worthy of note. *Hydrocharis morosa-rumex* is locally common in England and Wales, favouring the more calcareous waters, but is absent from Scotland. Similarly, *Seratocyon albidus* is a local plant believed to be diminishing, occurring mainly in waters rich in base salts, in eastern counties, but occasionally present as something of a rarity in western districts, such as the Wirral. This species occurs all over Europe and north-west Asia; in the north, including this country, all the plants are female, in the south they are almost entirely male. There are a few median records of hermaphrodite plants but these may be errors, and merely indications of the known fact that male and female flowers of all *Hydrocharitaceae* usually contain rudimentary female and male organs respectively. The spread of *Elodea canadensis* I discussed in a previous article; the only records of male plants are from Scotland in 1879. *Hydrilla lithuanica*, of course, has never flowered here yet, and only male flowers of *Egeria densa* have been found where this species has been introduced, as for example in several canals in south Lancashire. *Vallisneria spiralis* is naturalised in south-east Lancashire, south-west Yorkshire, Worcestershire and Gloucestershire where the water is naturally warm or where it is heated by effluents from textile mills. It appears that the continued existence of these interesting genera in our flora is only assured by vegetative reproduction and successful perennation.



In some mill "bedges," such as this one in Lancashire, *Vallisneria spiralis* has become naturalised in the artificially warmed waters

Interior Decoration and the Aquarium



Tiger barb (Barbus tetrazona)

I HAVE now kept tropical fish for 4 years, and, during this time, I have found my interests progressing through what seems to be the normal pattern of tropical-fish-keeping hobbyists. Initially one begins with a single tank and tries to cram in as many different types of fishes as possible, then comes the desire for more tanks and finally the keeping, and possibly breeding, of one or two species follows.

My first tank, a 24 in. by 12 in. by 15 in., was stocked with the usual types of fishes to which the beginner is attracted, and when at last I became convinced that eight or ten pairs, according to their size, was the most which my tank would hold, I acquired a second tank of the same size and assembled a two-tier arrangement on a single thermostat. However, my plans to stock even more types of fishes were at this point thwarted by the birth of a number of moon platys, which were excitedly rescued from the community tank, installed in their new home and gazed at

by B. POPLAND

Colour photographs by B. PENGILLEY

for most of the next few days with feelings of amazement and pride.

After rearing and disposing of these dozen or so platys I isolated and bred other species and finally bought a 36 in. by 12 in. by 15 in. tank, transferred my mixed collection to this and reserved my two-tier stand for breeding. After the first enthusiasm had worn off, however, I began to be interested in the presentation of the tanks almost in preference to the actual fishes and I now find that it is the picture presented by the whole assemblance, fishes, rocks, plants etc., which intrigues me.

By profession I am an architectural assistant and am therefore concerned in decoration, colour and interior



Mosaic or pearl gourami (*Trichogaster leeri*)

design. Even without such artificialities as synthetic plants, rocks, divers etc., a variety of colour is available to the aquarist, to blend as he will, and in most cases I feel that this aspect of fishkeeping is overlooked. At a recent exhibition, for instance, I saw a tank in which a bluish slate had been used for the rocks, the floor of the aquarium was in clippings of the same material and the fish were zebra danios. The steel blue of their stripes matched their surroundings admirably and I felt that this tank, installed

in a room with a colour scheme dominantly blue, would have been so much more in harmony, than, say, the usual set-up which I suppose is dominantly green. I realise that a large section of the aquarist world support the view that a natural appearance should be aimed for, and therefore include in their set-ups a profusion of plant life. Provided, however, that sufficient plants are included and that the rocks are not of a harmful nature, I feel that the dominant colour of an aquarium could quite successfully be designed



Red Siamese fighting fish (*Betta splendens*)

to harmonise with the room in which it is situated rather than present a neutral or even discordant colour.

In my own home I have at present one tank set up in black. Coal has been used for the rock and a backing of copper foil, screwed up and then roughly flattened to simulate a rough rock face, was fastened on the outside after being painted black. As the larger pieces of coal rise towards the back of the tank, they seem to merge into the backing and an impression of depth is created, the whole tank appearing startlingly clear and the general appearance most convincing. Chippings of coal, laboriously broken but well worth it, have been used for the

can be very cheap to maintain as no new fishes need be bought to replenish stocks and only a single pair are necessary to begin with. The coal chippings need only be a half inch or so deep with normal gravel below.

Another tank in my home is basically red. This, of course, is a classic in fish-tank set-up: red sandstone, normal brownish gravel and tiger barbs. However, try this with a backing of copper or tin foil, fashioned as I have previously described, and with red, white and black paint; stipple one colour on another until a shade very like the colour of the rocks is obtained. Don't overpaint the tank so as to hide the backing sheet and rocks and use reddish



Rosy tetra (*Hyphessobrycon roseaceus*)

floor, and only plants of pale apple green included. This pale-green plant life glistens almost jewel-like against its jet-black setting. Imagine the exotic effect if we now introduce three or four male green swordtails and perhaps a green Siamese fighting fish, or the contemporary effect of albino fish, swordtails or paradise fish with their pure white body colour and pink eyes. My own choice, however, was one pair of platys; their fiery red glowed against the blackness of their background and they soon obliged me by presenting offspring.

With a single species in a tank, any fry of live-bearing fish have a fair chance of survival, and a set-up such as this

coloured plants (*Cryptocoryne*, with their dull pinkiness, and possibly red *Myriophyllum*).

Green tanks are, of course, easy. Green background, Westmorland green rocks and a profusion of green plants can make a luxuriant setting for silver, white and neutral-coloured fishes. Angels, pearl danios, beacons and black mollies would blend beautifully and this tank could look really well in the lime-green colour schemes so often used in contemporary decoration.

A tank can be designed to complement almost any colour scheme employed in a room, and by using gentle contrasts between fishes and plants a monotonous appearance is

avoided. In a basically blue room, where it may be desirable to avoid any green colour whatsoever, a tank could be furnished to house a large cichlid which does not need and, indeed, might not even tolerate, plants. Such fishes as Jack Dempseys or firemouth cichlids could be housed in a tank with high banks of black coal or blue slate and with a gravel floor of the same material broken in chippings.

However, tanks which do not contain plants are not always successful in appearance and a very interesting and imaginative rock lay-out would have to be conceived.

So many colour combinations are possible that the imagination is soon swamped by the number of striking colour combinations that can be achieved. Some examples are given in the panel on this page.

Siamese fighting fish are available in many colours to be used as contrasts or matches, and all neutral-coloured fishes, angels, beacons etc., could be included in any of the tanks noted in the panel. When one next considers the addition of plants in their various shades the combinations increase again. On black tanks I should favour the pale apple greens, in red tanks *Cryptocoryne* or the lush deep green of *Gabonoba* etc., and a green tank could support all shades. Blue tanks would be a problem unless no plants are included but this will restrict the breeds of fishes which would welcome the omission and necessitate more frequent siphoning.

I have purposely left out white and yellow tanks as fishes,

Suggestions for colour combinations of fishes and background

Black tanks: Red platys; green swordtails; albino fish; yellow wagtails.

Red tanks: Tiger barbs; harlequins; glowlight tetra; mosaic gourami; rosy tetra; red platys.

Blue tanks: Black mollies; zebra danios; pearl danios; three-spot gourami.

Green tanks: Pearl danios; green swordtails; angel fish; black mollies.

generally speaking, do not favour light backgrounds and also the growth of algae would be extremely noticeable. A deep yellow is perhaps a possibility, but I do not think that this colour would look quite so good as those previously discussed, or is this perhaps my personal prejudice?

I feel that this side of fishkeeping is very interesting. By careful colour blending, choice of slow-growing plants and inclusion of long-lived fishes or species which readily reproduce, a tank can be an easily maintained, inexpensive accessory designed to blend with contemporary decoration of the highest standard.

Limnophila sessiliflora—

by JACK HEMS

IT seems that this plant has lost the popularity it enjoyed immediately before the war and during the war years.

In those days it was much in demand as a decorative plant, as a protective plant for nervous or very young fishes and also for growing in semi-shade. In other words, it prospered behind a light-diffusing screen of *Vallisneria*, or under electric light, and looked extremely attractive when massed to one side of rockwork, or used as a centrepiece or feature plant in the tastefully laid-out tropical aquarium. At that time it was known as *Anubias*.

Even at the present time it is usually spoken of as *Anubias*; but how often does one see it in an aquascaped aquarium, or in a dealer's collection of "plants for sale"?

It is not easy to find a reason why the plant has gone out of fashion, because it has all the virtues needed for success; and, indeed, it has virtues far in excess of plants which have held their own against all newcomers over the last three or four decades. We still, for instance, find *Egeria* (*Elodea*) *densa* being sought after by the plant enthusiast, and the ubiquitous *Vallisneria* and the feathery-foliated *Myriophyllum* and *Gabonoba*. Yet all these plants need a bright light and, apart from the *Vallisneria* species, soon grow stringy or leggy in the aquarium. But not *Limnophila*.

Strong Light not Essential

As mentioned above, *Limnophila* will grow well in semi-shade, and it does not grow so rampantly as to prove an embarrassment in the aquarium. Moreover, its stems and foliage remain fresh-looking and green for months on end. And it is not a favoured green food of greenstuff-eating fishes. They much prefer to nibble and devour the leaves of *Gabonoba* or *Egeria*; and if these are not available, they will bite off the leaves of *Vallisneria*. *Aisembhausia oligolepis* will soon make short work of *Vallisneria* if there is not enough mossy algae or duckweed in their tank to satisfy their vegetarian leanings.

The slow-growing stems of *L. sessiliflora* bear close-set whorls of six to eight dissected leaves. Side branches are produced at frequent intervals all along the main stem, and when the main stem reaches the surface of the water the centre should be pinched out to encourage the side stems to grow more luxuriantly and more sturdily. If the aquarist wishes to increase his stock of the plant, the main stem should be permitted to grow horizontally just underneath the surface of the water; then nip this off and push the stem into the compost, where it will soon take root. Apart from propagating the plant by cuttings, the plant will increase of its own accord by throwing out runners just underneath the sand.

Potting for Best Results

To obtain the best results with *L. sessiliflora*, a stem with roots, or bushy plant, should be set in a small pot of yellow clay or peat, lightened or made more friable by the addition of some charcoal and coarse grit. The pot should be topped with about an inch depth of sand to prevent the fishes stirring up the planting medium.

There are about 30 species of *Limnophila* known to botanists, but two only appear to be known to aquarists, namely *L. sessiliflora* and *L. heterophylla*. The latter species is similar in appearance to *L. sessiliflora*, but produces, in addition to the attractive submerged foliage, *Ranunculus*-like floating leaves.

The genus is widely distributed over Asia and the East Indies. The two species mentioned in this article need a temperature above 70°F if they are to stay delightfully green and survive. Both species, when bunched, form a first-class spawning plant for barbs, goldfish and other fishes which scatter adhesive eggs in thickets of aquatic vegetation.

emerged some hours or days previously he refused it but when another emerged and climbed up the wall he at once caught and ate it.

The many peculiar features of chameleons, together with further information on keeping them, are the subject of next month's article.

Dwarf chameleons

I had read much about the hardy and attractive S. African dwarf chameleon (*Micromis pumila*) and was delighted when a number came my way. These 5- to 6-inch specimens are beautifully coloured in bright green with brick-red markings and blue patches. Being of small size they are much easier to feed than, for instance, adult common chameleons. They are also very hardy; coming from extreme South Africa, they are accustomed to cold nights. This species is viviparous and readers can imagine my delight when one evening I observed several baby chameleons. During the next hour or so I watched the birth of the rest of the brood, 11 in all. Readers who are interested will find further details in the *British Journal of Herpetology* (vol. 2, no. 1, December, 1955, pp. 6-8).

Later still I was to obtain a number of *Chamaeleo bitaeniatus alleni* from Kenya and to find them a very suitable species for life in the vivarium. With this species, to be described next month, chameleon keeping is brought well within the range of the keeper collector who is willing to spend some time with his animals. Many people following my example and instructions have also bred this species in close confinement.



Kenya dwarf chameleon (*Chamaeleo bitaeniatus alleni*). In this pair the female (upper specimen) shows the characteristic black and white coloration.

FISHMONGER'S CANVAS—by HENRY TEGNER

IT was cool beneath the canvas canopy. Coming into the fish shop from the brilliant, hot, concrete pavement was like walking into a dimly lit cave. Somehow the place reminded me of an aquarium only instead of live fishes there were plenty of dead ones lying about.

This was certainly no ordinary fish shop, although it was in the Brompton Road. I did not want any fish, but when I saw all the fascinating species laid out on the great, sloping marble slab I just walked in. The fishmonger's marble slab was like a huge canvas. The colours the artist had used, however, were all of piscine materials.

A fine big halibut was the centrepiece of the picture, its dead-white belly provided a background on which the fish salesman had exercised his skill. Tiny, silver white-bait formed a circle around a shelled scallop that had been placed in the halibut's middle. An outer fringe, consisting of the scarlet tails of a number of lobsters, added brilliant colour to the tableau. The display reminded me of a Salvador Dali painting.

The halibut itself was surrounded by various kinds of fishes which intrigued the angler in me. Soles, plaice, herrings, cod and mackerel were all there in their serried ranks like rows of orderly soldiers—not one of them out of place. The red splash of raw salmon from Scotland, a split side of pink Beluga sturgeon, large, dark-brown eels from the polders of Holland helped to fill out the fishmonger's marble canvas.

The whole picture was framed along its edges in cracked ice interspersed with little wreaths of seaweed amongst which nestled pale-pink prawns. There was a touch of Louis Quinze about the frame, in contrast with its Surrealist contents.

I think it was the sight of the thick piebald cod which first lifted me from out of that London fishmonger's shop to the north-east coast, where, off the Northumbrian shore, I had fished in my youth for codlings in the bleak, bitter,

raw down with long hand-lines arrayed with numerous triangular hooks which you worked on the sink-and-draw principle over the side of a high-bowed cobbie. It was cold work, but rewarding once you struck the codling shoals.

The scarlet tails of the lobsters reminded me of warm September days amongst the rocky foreshores of Cornwall, where at low tide you could sometimes find lobsters hiding amongst the seaweed beneath the ledges of stone. We used a long-handled, crooked, iron bar with which to rake out any unfortunate crustacean we discovered.

The white-bellied halibut recalled a happy Sunday spent in the Channel out of Littlehampton, when we hoped for coogee and perhaps a big halibut but all we got were a number of small sea perch; however, the sun had been warm and the weather beautiful so that we had all enjoyed ourselves.

The mackerel, too, brought back pleasant memories of trolling for these attractive fish off the uninhabited Isles of Ferns. I had gone out with a number of fishermen from Seahouses in one of their paraffin-engined mules, a boat which will stand any amount of rough weather—a necessity off this coast where storms rise quickly. The fishermen wanted bait for their lobster-pots and as whiting are easy to take at the tide-change we were using snatch lines, which are also tempting to mackerel.

The bait consisted, I remember, of hen's feathers dyed a brilliant crimson, orange and purple. They were certainly effective lures, for we chugged into the harbour 2 hours later with a boat-load of small whiting for the pots and two dozen nice mackerel.

While I was contemplating the pleasant past I heard a voice from behind me say: "What may I get you, Sir?"

I hesitated for a brief second before I replied: "Two mackerel, please."

I said this, I am sure, for of all the fishes displayed there on the fishmonger's slab mackerel held for me, I think, some of my happiest memories.

emerged some hours or days previously he refused it but when another emerged and climbed up the wall he at once caught and ate it.

The many peculiar features of chameleons, together with further information on keeping them, are the subject of next month's article.

Dwarf chameleons

I had read much about the hardy and attractive S. African dwarf chameleon (*Micromis pumila*) and was delighted when a number came my way. These 5- to 6-inch specimens are beautifully coloured in bright green with brick-red markings and blue patches. Being of small size they are much easier to feed than, for instance, adult common chameleons. They are also very hardy; coming from extreme South Africa, they are accustomed to cold nights. This species is viviparous and readers can imagine my delight when one evening I observed several baby chameleons. During the next hour or so I watched the birth of the rest of the brood, 11 in all. Readers who are interested will find further details in the *British Journal of Herpetology* (vol. 2, no. 1, December, 1955, pp. 6-8).

Later still I was to obtain a number of *Chamaeleo bitaeniatus alleni* from Kenya and to find them a very suitable species for life in the vivarium. With this species, to be described next month, chameleon keeping is brought well within the range of the keeper collector who is willing to spend some time with his animals. Many people following my example and instructions have also bred this species in close confinement.



Kenya dwarf chameleon (*Chamaeleo bitaeniatus alleni*). In this pair the female (upper specimen) shows the characteristic black and white coloration.

FISHMONGER'S CANVAS—by HENRY TEGNER

IT was cool beneath the canvas canopy. Coming into the fish shop from the brilliant, hot, concrete pavement was like walking into a dimly lit cave. Somehow the place reminded me of an aquarium only instead of live fishes there were plenty of dead ones lying about.

This was certainly no ordinary fish shop, although it was in the Brompton Road. I did not want any fish, but when I saw all the fascinating species laid out on the great, sloping marble slab I just walked in. The fishmonger's marble slab was like a huge canvas. The colours the artist had used, however, were all of piscine materials.

A fine big halibut was the centrepiece of the picture, its dead-white belly provided a background on which the fish salesman had exercised his skill. Tiny, silver white-bait formed a circle around a shelled scallop that had been placed in the halibut's middle. An outer fringe, consisting of the scarlet tails of a number of lobsters, added brilliant colour to the tableau. The display reminded me of a Salvador Dali painting.

The halibut itself was surrounded by various kinds of fishes which intrigued the angler in me. Soles, plaice, herrings, cod and mackerel were all there in their serried ranks like rows of orderly soldiers—not one of them out of place. The red splash of raw salmon from Scotland, a split side of pink Beluga sturgeon, large, dark-brown eels from the polders of Holland helped to fill out the fishmonger's marble canvas.

The whole picture was framed along its edges in cracked ice interspersed with little wreaths of seaweed amongst which nestled pale-pink prawns. There was a touch of Louis Quinze about the frame, in contrast with its Surrealist contents.

I think it was the sight of the thick plebeian cod which first lifted me from out of that London fishmonger's shop to the north-east coast, where, off the Northumbrian shore, I had fished in my youth for codlings in the bleak, bitter,

raw down with long hand-lines arrayed with numerous triangular hooks which you worked on the sink-and-draw principle over the side of a high-bowed cobbie. It was cold work, but rewarding once you struck the codling shoals.

The scarlet tails of the lobsters reminded me of warm September days amongst the rocky foreshores of Cornwall, where at low tide you could sometimes find lobsters hiding amongst the seaweed beneath the ledges of stone. We used a long-handled, crooked, iron bar with which to rake out any unfortunate crustacean we discovered.

The white-bellied halibut recalled a happy Sunday spent in the Channel out of Littlehampton, when we hoped for coogee and perhaps a big halibut but all we got were a number of small sea perch; however, the sun had been warm and the weather beautiful so that we had all enjoyed ourselves.

The mackerel, too, brought back pleasant memories of trolling for these attractive fish off the uninhabited Isles of Ferns. I had gone out with a number of fishermen from Seahouses in one of their paraffin-engined mules, a boat which will stand any amount of rough weather—a necessity off this coast where storms rise quickly. The fishermen wanted bait for their lobster-pots and as whiting are easy to take at the tide-change we were using snatch lines, which are also tempting to mackerel.

The bait consisted, I remember, of hen's feathers dyed a brilliant crimson, orange and purple. They were certainly effective lures, for we chugged into the harbour 2 hours later with a boat-load of small whiting for the pots and two dozen nice mackerel.

While I was contemplating the pleasant past I heard a voice from behind me say: "What may I get you, Sir?"

I hesitated for a brief second before I replied: "Two mackerel, please."

I said this, I am sure, for of all the fishes displayed there on the fishmonger's slab mackerel held for me, I think, some of my happiest memories.

AQUARIST'S Notebook

by
RAYMOND YATES



THE Barrow-in-Furness Aquarists' Society are rather remotely situated on the edge of the Lake District and are quite a considerable distance by road and rail from the more densely populated parts of Lancashire. However, the hobby is quite flourishing there and has many real enthusiasts. As with most clubs, present membership is rather lower than at one time but things could be much worse. Never having had more than 40 members, Barrow cannot understand how a certain club could disband when its membership fell to 80! Two meetings are held monthly, one of these being a beetle drive and get-together which permits friendly discussion and increases finances.

The club magazine has been issued since 1954 and is now being sent out to seven other clubs which include those at Portsmouth, Lowestoft, Oxford, Lancaster, Basingstoke and Middleton. The club is now nearly 10 years old and in the early days had a precarious existence, commencing with nine members, who quickly dwindled to three. Present subscription is 6 shillings, which must be one of the lowest in these prosperous times. At every meeting members' queries are discussed and sometimes actually solved. A "Member of the Year" contest takes place, points being awarded for attendance at meetings within first half-hour (4), after first half-hour (3), notice of absence sent in due to illness or work (3), talk by member as main item of agenda (4), a short talk—not a main item (2), exhibiting at club shows (2), contributions to club magazine—one contribution per issue (4), contributions other than correspondence in national press (6), attendance at beetle drives (1), each new member introduced (2). These are interesting, although frankly I would give ten points for every new member (subscription paid!).

The club has been running a most unusual inter-club quiz competition with the clubs previously mentioned, also with those at Plymouth and Londonderry. Readers may be interested in a summary of the rules.

The competition consists of six quiz competitions held at 2-monthly intervals at the clubs' convenience. A quiz, with questions and answers, is prepared by a selected member of a society (a different society each time), the roster being arranged in alphabetical order. A team consists of six members selected from those present at the meeting. Officials needed are a quiz master and a scorer. The quiz itself consists of five rounds, each of six questions (30 in all) on subjects dealing with the hobby, covering as many aspects as possible.

There is a time limit of 30 seconds in which to begin to answer the question, but no limit within reason to actual length of answer. If a member realises he is unable to answer the question he can say "I give in to the team", provided that he does so within the time limit. Any member of the team can then be allowed to answer the question. A member is allowed to ask a question to permit him to understand fully his own quiz question, but a leading question will not be allowed. Scoring is as follows: 2 points for a correct answer, 1 to 1½ point for part-correct answer, 1 point for correct answer "given to team", ½ point for part-correct answer "given to team". The answers provided on the quiz papers are for guidance and the decision of the quiz master is final. Prompting by either another team member or audience causes forfeiture of points for that question. The papers are prepared by the Society whose turn it is to select the questions. They will elect one member of their club to compile the 30 questions and answers. He will make sufficient copies to enable one copy to be sent in a sealed envelope marked "Quiz for month of " to each

society participating, and to reach them by the 20th of the preceding month. Club scores are sent in to the central club (in this case Barrow) as soon as possible to enable the overall score card to be made up. Copies are sent to all clubs.

Barrow have been running this Inter-Society Postal Quiz since 1958 and have found it very successful, as, in the words of one club secretary, "It provides a change from fish madding". The secretary is Mr. K. Ralph, of 8, Malton Crescent, Barrow-in-Furness if any other club feels the need for more information.

I called recently on Mr. Vernon, the well-known hobbyist of Romiley, near Stockport, and saw something really unusual. I thought I had seen everything in freaks and such like but this was quite new. He showed me an angel that appeared to have three dorsals. The main dorsal was quite normal but, branching out at right angles, about half way up the main dorsal, were two other fins. The effect was similar to the tail plane of an aircraft. All the fins were distinct and not due to damaged parts of the original dorsal. The effect was not pleasing, of course; such freaks are purely of side-show interest. Mr. Vernon told me that he has found veterinary terramycin a certain cure with cases of mouth fungus.

Since my recent notes on pet crocodiles appeared a reader in U.S.A. has sent me some notes about the pet alligator kept by Mr. and Mrs. William Kinster of Baltimore. Way back in 1917 Mr. Kinster brought home a souvenir of a business trip to Florida, a 14-inch, 3-years-old alligator. Thriving on special care this unusual pet took very well to captivity and soon reached the stage of being able to frighten off casual visitors, notwithstanding her lary, most domesticated and casually indifferent manner.

Now 46 years old, the alligator is about 10 feet long and weighs in the region of 300 lb. Her two saurian companions are a 16-years-old 6 footer and a baby little over a foot long. Things have not always gone smoothly as one would expect with such pets, plus eight monkeys, a skunk and 200 foreign birds. On one occasion the big alligator slipped away from her rock-garden pool into the nearby streets, and getting her back, inch by inch, by prodding and coaxing was no easy task. The garden pool is 15 ft. long and 4 ft. wide and serves until autumn, when semi-hibernation takes place in a cellar pool. During this time food is taken only once a month, as against three times weekly in summer. Noise is practically nil but lack of sun appears to irritate and the alligator then makes a sort of hooting sound. About the only attention given is the scrubbing of the teeth with a salt solution to free them of fungus growth, common where regular access to salt water is denied. The reptile's 2-foot jaws have never snapped at her owner since those early days and Mr. Kinster considers that alligators, just like any domestic animal, appreciate affection and care.

It used to be a well-known maxim "To try anything once" and I think this can be recommended for hobbyists

too. The newcomer to the hobby is only too ready to try each and every fresh fish variety that comes his way, but, as experience increases, this urge diminishes. One gets likes and dislikes, and some varieties are shelved mentally as "not wanted" without ever having been tried. One hears tales from other aquarists which make the blood curdle and ever after the very name of some poec fish produces a shudder. I know because it has all happened to me long ago. There were some kinds of fishes I swore I would never keep because of their habits, colour, ugly looks, bad reputation etc. but, at long last, I kept them and often regretted not having introduced myself to this particular variety sooner.

The thing to remember is that in time we tire of almost any fish that has been with us for a protracted period. Just because it is rare or large is no reason for keeping it if you have lost interest; sell it or better still give it away. Change in the tank set-up is essential and unwanted fishes prevent you having a "new look". Many club members take them down to club meetings where they are auctioned off to other members but any school with a tropical tank (and many have them nowadays) will welcome gifts of this nature as school funds do not run to many expensive fishes.

Recently I got rid of my enormous silver shark, which had reached the staggering size of 8 inches. I wasn't a bit sorry to see it go because I immediately filled the tank which it had so long dominated with numerous small, attractive fishes and dozens of new plants. I always hate to see a single large show fish in a tank; so many hobbyists

have these odd tanks hidden away. Fish which cannot be made part and parcel of a community set-up make dull viewing—like a tiger in a bare cage. It is as well to remember that activity makes an aquarium and a well-planted tank, well lit and populated with numerous small fishes which constantly dash backwards and forwards makes a pleasing picture to everyone, not least to the visitor. How drab the other sort of tank where the fish, motionless, loers at you with oriental inscrutability, or the owner, with stick, jabs about and says "It's hiding about somewhere, I'll drive it out soon".

"Try anything once," but this is what many aquarists do, only once. I have long ago discovered that the mere keeping of a pair of fish for a period does not thereafter entitle you to say that you know all about that variety. Far from it; after an interval, come back to them. My suggestion is "Try everything twice—at least". Some fishes are quite an acquired taste.

We are used to hearing of water pollution, the throwing into natural waters of old bedsteads, unwanted cats and dogs, and I mentioned recently the deliberate draining of a large lake by sluices being opened. In May a dimmed boating lake at Kirk Hallam, Ilkerton, Derbyshire caught fire and it took 12 firemen more than an hour to put out the flames. It appeared that engine oil, which had been poured on the water, had caught fire. It was not explained how the oil came to be poured on the water but it is hard to understand how anyone could have done such a thing. What are we coming to?

A CONCRETE BRIDGE

A LITTLE carefully arranged stonework, natural stone or artificial, can sometimes be an eye-catching feature in a water garden.

Quite recently I decided that a cement archway, or miniature bridge, could be sited to make one of my small pools look more interesting, so after carefully making a suitable mould, I filled it with dry earth for measuring purposes, and found that one large bucket of sand would suffice for the job.

I have always found that very strong concrete can be made by getting a 1 cwt. bag of fresh cement direct from a wholesale builder's merchant, but as I did not require such a large quantity this time, I carried a large bucket up to a local store to get the required material. I was offered some ready-mixed cement and sand, but I prefer to dry mix it myself. The cement that I purchased, I was told, was "water repellent" and "would not go hard"; this appeared to mean that it would not "go hard" in stock in the shop, so I carried my loaded bucket back to the garden, and proceeded to dry mix it to cement-manufacturer's specification.

I have always found it best to measure the proportions carefully as specified. Attempts to make the mixture "stronger" by one's own variations sometimes lead to disappointment.

Turning the mixture "three times dry and three times wet" is an old rule which should be regarded as the minimum; streaks of sand or streaks of cement visible in the mixture show that more turning and mixing is required before putting the material into the mould.

Having dry mixed the concrete upon a nice area of clean, level concrete, I brought the water can into use, and found the description "water repellent" was appropriate indeed. The water from the spout and sprinkler seemed to want

to run anywhere in the garden, but not into my cement, so I fell back upon an old friend in need, the clean lid of a domestic dustbin, and wetted the material in that, a little bit at a time. I then made one large heap of it again and finished off the thorough mixing. Then I was able to pack the mixture well down into the mould, and leave it there in the shade to harden slowly, away from the sunshine until it could be put into position.

Now my thoughts are of the time when the mellow brown colour of my romantic little archway will be reflected in the water, and mingle with the colour of the goldfish as they manoeuvre near it for shade or shelter.

THOMAS S. COX

THE GARDEN POND IN JULY

(Continued from page 75)

some ponds whereas in others they may do so in April.

It must be realised that all varieties of fancy goldfish have been bred from the same stock and so they will all interbreed. When good kinds of fancy goldfish are introduced into a pond indiscriminately the resultant youngsters may be nothing but useless types of fish with scarcely a properly shaped fish among the whole brood.

All healthy fish have the urge to reproduce their kind but may do so only when the conditions in the pond are to their liking. The water must have a good oxygen content and any foulness of the water may mean no spawnings. See then that the water is clean and clear, feed the fish with some broken garden worms and there should be spawnings before the end of the summer.

Natural Foods for Small Reptiles and Amphibians

by DAVID MORRIS

I HAVE been a field naturalist all my life, and as a result I did not find feeding any problem when I decided to keep reptiles and amphibians some 12 years ago. I have spent many hours turning stones and logs over and studying the habits of insects, to say nothing of collecting moths and butterflies. When it came to finding food for my new animals I had only to go out and pick up what I required in the way of live food.

My feeding methods have always paid dividends, and I have been able to breed all the British lizards in controlled captivity; by this I mean in small vivariums and not large outdoor reptiliaries. I am sure my success is due to feeding with natural foods plus the necessary direct sunlight at the right time of day.

It may require a little more time and effort, but I am sure that if my readers will follow this article they will find it well worth while, to say nothing of adding to their knowledge of field and hedgerow. To simplify things I would like to go through the seasons with particulars of what may be found and where to look for it.

In February and March hibernating insects and other creatures are beginning to move around into their familiar haunts. This movement, of course, coincides with the awakening of the reptiles and amphibians who will require food after their long sleep.

Worms and slugs are usually the first things to be seen, in fact they can be found all the year round, and a piece of old sacking or similar material placed in an unused spot in the garden will soon provide a hiding place for such creatures. Spiders and centipedes will also be found there. A word of warning: always put the sacking back again into its original position after lifting. This also applies to bricks, logs and rocks moved during a country walk. By doing this you will not disturb the ground and any insects that have escaped will return again for another day. They will not do so if the material has been moved to a fresh spot.

During February and March the ground spiders are on the move and may be found under any old rubbish in the garden or field. They are usually easy to catch as they are sluggish after their hibernation.

Another useful food supply is the larva of the crane fly, commonly known as the leatherjacket. It is a fat greyish grub found just under the ground, usually in the roots of grasses. My eyed lizard is passionately fond of them; his strong jaws make short work of the grub's tough skin and he will eat as many as I can find.

At the end of March already we have found a varied diet for our pets, and such a change from mealworms and gentles—I do not think gentles are good for small lizards or even frogs and toads. I find they pass through the animal's system undigested and cannot be beneficial in any way.

I had an unusual experience some time ago. A green lizard had been feeding on gentles and one had managed to get into its ear. I could see it crawling around inside the protective ear skin, which was smeared with blood. The reptile was obviously uncomfortable, to say the least, as it was shaking its head from side to side and trying to scratch the maggot from its ear. It died shortly afterwards and I have never used gentles for food since that time. The late Jack Lester could not account for this unusual happening and agreed with my decision not to use them.

The above-mentioned foods will now take us into early summertime and now the real variety begins. The young green leaves on the trees and bushes bring a host of caterpillars to feed on them. They are found on the underside of the leaves or curled up inside. Favourite trees are lime, oak, hazel and elm. They may be gathered by hand,

when care should be taken or the grub will fall to the ground before the leaf can be opened. A good method is to place a sheet on the ground under the trees and shake the branches. An open umbrella will also serve the same purpose. This will always produce a good haul of caterpillars and other insects too.

When the bramble leaves are fully grown several species of spiders will be found curled up in a similar manner to the caterpillars. They may be collected by opening the leaf over a jar and letting the spider fall into it. Care should again be taken as these creatures also drop out of their hiding place as soon as it is disturbed.

Nettle beds also provide a good hunting ground. The larva of the lesser magpie moth feeds on the leaves, and curls them up in the same way as spiders and other grubs. It is a green juicy grub much relished by lizards. It is advisable to use gloves when collecting from nettles for obvious reasons.

We now come to the easiest of all collecting methods—the sweep net. I use a butterfly net, as it has a long bag so useful for retaining lively insects. It is only necessary to sweep the top of grass banks and hedges (taking care not to catch the netting on bramble thorns) and the net will be found to be alive with flies, spiders, grasshoppers and many other insects. This is the most interesting method of all as it provides the vivarium inmates with plenty to eat and to do, and the owner with a fine study of feeding habits. I have learned a great deal from watching my animals feeding on the contents of a sweep net, and I am sure readers will do the same. Almost any waste land with some grass or weeds on it will be worth sweeping, and a patch of really long grass will be found to be most productive.

Grasshoppers are a most useful item of food, but most difficult to catch. The sweep net will always produce a few and these may be supplemented by catching them by hand. I can catch them at any time, but I advise my readers to look for them in the early morning or late evening. They are less active at these times and may be picked up and popped into a jar without difficulty.

Late summer and autumn bring out the large garden spiders. I am sorry to say that spiders are my pet aversion, and I am only able to catch large ones with the aid of a net or jar. I merely hold a jam jar opposite the spider as it sits in its web and put the lid on it. I have caught hundreds in this way without handling one. I have not discovered an easy way to catch wolf spiders so far. They move very quickly and are very easy to kill. The slightest injury seems to knock them out, but I find the animals will eat them if life is stimulated by moving with a small stick.

Another spider may be found in a small round web in the corners of windows, especially the garden shed or greenhouse. These again are difficult as they hide in the cylindrical web and drop to the ground at the slightest provocation. I have solved this problem by using empty matchboxes. It is only necessary to hold the open matchbox, flush with the windowpane as near to the web as possible, touch the web with a small stick and the spider will drop obligingly into the box without any damage. You then slide the lid on and continue with another box. Although you may clear your windows, you will be surprised to find the webs occupied again within a very short time. This state of things will continue right through the seasons. The spiders are small but will be much enjoyed by small creatures such as fire-bellied toads and small lizards. My wife never throws matchboxes away; they are always kept for collecting purposes!

It is unfortunate that our countryside and near suburbs

are being disfigured by rubbish and slag heaps. We have many in our part of Surrey and I find these good hunting grounds for crickets. A great deal of heat is generated in the ground, and the crickets enjoy these conditions. They hide under lumps of slag and other rubbish. Often large numbers of all sizes will be found sheltering under the same stone. I usually gather them by hand—it is the easiest way.

Night hunting is very exciting. You will need a good torch, collecting tins or jars and wellington boots, as the grass is usually damp in the evenings. The sweep net will be most useful, and you will find many nocturnal insects in your catch. Field crickets will also be caught in the net, and if you are needing slugs they can be found on dandelion leaves and grass stalks and may be collected by hand with ease.

Among the beetles I find the violet ground beetle to be the most useful. My eyed lizard is very fond of them, and I think that the soft wingcase proves more palatable than the usual hard one found on most beetles. This is a large oval beetle with a violet or mauve line round the outer edge of the wingcase. They may be found in all the usual insect hiding places.

With the approach of winter most insects either die or hibernate. Some of these may be traced to their winter

quarters in cellars, sheds and outhouses. They may be collected by shaking out old sacking and moving boxes and other rubbish usually found in such places.

The damp sacking outdoors will continue to provide worms and other insects throughout the winter if you keep the frost away from it. You may, if you wish, continue your outdoor hunting. I have turned stones over with 3 or 4 inches of snow on the ground and collected a good supply of worms etc., and on one such occasion a hibernating lizard!

Worms may be stored in damp moss and compost during the winter. They will keep lively and ready for use when the ground is too hard to tackle.

The production of flies for your tree frogs presents no difficulty at this time. It is only necessary to purchase some gentles from the fishing-tackle dealer, put them in jars with a lid on and place them in the airing cupboard at varying intervals, when they will hatch out and provide a goodly supply of bluebottles.

I hope I have given my readers something to think about and work on during the seasons. To those who think this will take up too much time, may I suggest that they give it a trial. I am sure it will be found to be worth while. The countryside will take on a new look and, what is most important, your pets will benefit from a constant supply of natural live food.

THE GUPPY—King of Tropical Fishes by P. DENDY

I ENDED the first article of this series by telling you to find out, when you buy basic stock, whether your guppies were from the same strain, were breeding true to type and for how many generations they had been inbred. In addition to this basic information you must use your eyes and look for lively inquisitive fish with well-formed bodies and regular finnage, preferably of a good size, because in inexperienced hands the size of the fish gradually decreases and the end result is a collection of brightly coloured runts. The standard male body size is 1½ inch from nose to caudal peduncle and the ventral should have a tail length equal to that of the body. The female should be 2 inches from nose to caudal peduncle. Don't expect to get fish up to this standard size, there aren't many about, but try and get near it.

There are certain visible signs of present or incipient trouble which may be spotted amongst all or some of the fish on view, and if seen those particular fish should be avoided and others sought out. The main faults to look for are hollow belly in males and, more particularly in females, humped backs, crooked or twisted spines, listlessness, drooping or clamping caudal fins, general lack of colour and smallness of size. Many of these faults are due to debility consequent on too much inbreeding and some are due to plain bad feeding. I believe that it took me nearly a year to learn how to feed guppies properly and many a fine fish was lost in the process.

Now that you have some ideas on the basic pair from which to breed I will deal with the mechanics of the business, where you will meet with triumph or disaster, which it is to be is up to you. I shall be expressing definite opinions and many aquarists may well not agree with me, but the suggestions I make have been tried and found to work; after all there are more ways of killing a cat than drowning it! To illustrate this, at a recent guppy meeting a census of food used was taken and it was found that 27 different foods were currently being fed to their guppies by the 20 members present.

The hardness and pH value of the water is immaterial,

though moving a breeding pair from one type of water to a vastly different type without proper acclimatisation is asking for trouble obviously. The temperature should be round about 75°F and the basic space allowance is half a gallon per male and three-quarters of a gallon per female. This is a minimum and more space can be allowed with advantage. One of the best tank sizes is 24 in. by 12 in., although it does not really matter as long as the size is not below 18 in. by 10 in. for adult fish.

Plenty of plants for the fish to swim about in and nibble at are required, and the softer-foliated varieties, such as Indian fern, seem to be best. I am a strong believer in sub-gravel filtration, which produces a crystal-clear water, and also aeration to produce a current for the guppies to swim against to promote growth. Crystal-clear water is a must with guppies as they are very sensitive to increase in bacteria from decomposing food or too much muck.

The rise in the numbers of bacteria irritates their gills and makes them most unhappy, so that they either hang about dejectedly in odd corners or start "gill bashing" against the gravel or rocks. If you have any rockwork in your tanks, scrap it at once; it can play the devil with the tails of the long-tailed varieties.

Aquarium maintenance is rather more important with guppies than with most tropical fishes and I advise you to siphon off from the tank bottom one-quarter of the tank water weekly. This water can be replaced straight from the tap with no ageing as long as it is at the right temperature. If your water is heavily chlorinated, then you may have a little bother perhaps, but that could always be ascertained by experiment.

Many guppy breeders believe in the addition of salts to the water, either sea salt or Epsom salts, at dosages ranging from one teaspoonful to 5 gallons to one teaspoonful to 1 gallon. I have tried both and found no particular advantage, though the Epsom salts may help to remedy constipation if you are feeding incorrectly. It is much easier to use untreated water and a great deal less trouble on the weekly maintenance.

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.

Under-Gravel Filtration

THE letter by P. Dendy of Ilvesham (*The Aquarist*, May) cannot be left unanswered. His suggestion that the trouble he is experiencing with his guppies dying off is due to the use of a biological filter is too absurd for words; he does not specify how this could occur, nor for that matter do his "experienced aquarist" friends who also are "dubious." He does suggest that the change from anaerobic conditions to aerobic may be the cause, but in saying this he obviously does not appreciate what happens physically, for I would say that over the whole history of aquarium keeping more than 100 times as many fishes have died from the effects of anaerobic conditions than from all other causes put together. I would go still farther and say that most of the diseases to which aquarium fishes are heir emanate from conditions that start in the first place from this cause.

The build-up of organic matter in an aquarium has to be broken down into inert substances and this is done, broadly speaking, aerobically or anaerobically. Aerobic conditions presuppose living in the presence of free oxygen, either gaseous or dissolved, which is surely what our fishes require and all our efforts should be directed towards providing optimum conditions. A base filter does just this, all other things being equal. The water is drawn down through the shingle and discharged at the water surface. In the course of this cycle the fine particles of suspended matter are oxidized chemically and biologically so that they are converted into other forms (nitrates etc.) in which they no longer have a demand for oxygen. Another side-effect is to increase the particle size to make it heavy enough to sink to the bottom and stay there. This latter reason explains why aquaria fitted with base filters are usually clear and free from cloudiness.

The advantage of a base filter over all others is that it does not rely on a straining action to clarify the water. Fundamentally it provides a medium upon which a healthy zoogeal film can develop and the water being drawn over and through this film, is purified in so doing by the various organisms which inhabit the film.

If Mr. Dendy is losing his guppies he should look elsewhere. He says guppies are "extremely delicate" fishes when bred intensively for the show bench. I cannot agree, as I have found them as tough as any other sort of aquarium fish. If selection of parents is limited to maximum show characteristics, then each succeeding generation will get steadily weaker. If, however, constitutional vigour and size is the first consideration and show characteristics second, there is no reason why a strain should not go on indefinitely, provided that records are kept to avoid as far as possible repetitive brother to sister matings. Diet, too,

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

has to be studied, for certain elements in the water are missing in the average guppy set-up. In my view all guppies should have 2 months at least, every summer, in the pond.

Finally, Mr. Dendy mentions the use of "salt and Epsom salts" on his guppies. I have often read of this treatment—what exactly does this do and at what concentrations?

L. C. BETTS,
Banstead, Surrey.

READING Mr. Dendy's letter in *The Aquarist* (May, 1960) on the unaccountable losses and sickness of male fancy guppies, brings to mind a similar disaster I experienced when I first fitted under-gravel filters to my tanks.

I also breed guppies for competition and found that after the filters had been in constant operation for over 2 months my fish, for no apparent reason, became listless, disinterested and very sensitive. After a series of experiments I traced this to continual use of the filters. Now instead of running the filters 24 hours a day I use them only 10 hours daily, still keeping the water in my tanks crystal clear.

My findings were that the constant agitation of the water, produced by the filter's action, had a weakening effect on the fish and cutting down the operating time, and giving the fish a period of rest, brought about a satisfactory result.

I would suggest that Mr. Dendy follows my example by cutting down the operating time of his filters. He should not do what many aquarists would have him do, and take the filters out, because this system of filtration is really a boon to fish hobbyists.

G. J. WILSON,
Hull, Yorkshire.

Reproduction in Water Fleas

IN his article "What do you know about *Daphnia*?" (*The Aquarist*, April) C. E. C. Cole quotes observations showing that ephippia in the genus *Daphnia* are produced by only one particular size group of female. Though interesting, I do not see how this proves or disproves anything about the causes of ephippial production.

The weight of evidence, I think, favours the view that ephippial production depends on (1) how much food a *Daphnia* has been getting in the past and (2) a fall in the amount of food it is getting in the present. Slobodkin (1954), studying laboratory populations of *Daphnia pulex*, concluded that the probability of resting eggs being laid was greatest when a high reproductive rate was reduced to the rate of two eggs per brood. Berg (1934), in a study of natural populations of *Daphnia magna* and *Daphnia pulex*, has shown that ephippia are produced only when the mean

number of eggs per female approaches two per brood. At one time it was thought that ephippial production was due to extreme starvation (Berg, 1934; Mortimer, 1936; Banta *et al.*, 1939), but Slobodkin (1954) finds that starving *Daphnia* are hardly capable of any reproduction at all.

Berg (1931) noted that one and the same female may sometimes produce several ephippia in succession, resulting and increasing in size each time. Thus ephippial production is not necessarily limited to some particular size of female. Rodina (1946) has shown that size of *Daphnia* may vary greatly according to the amount of food eaten. In the light of these observations, a correlation between size and egg numbers and ephippial production would be expected in nature, not because they are causally related but because all are related to food supply.

With regard to C. E. C. Cole's observation that males are shaken off if a female is not "ephippia-minded," I wonder if the serious interpretation behind this fanciful expression is correct. Berg (1934) showed that resting eggs are produced in the absence of males, although viable young are produced as a general rule only if they are fertilized. I would suspect that a female ready to lay resting eggs is perhaps less vigorous than a parthenogenetic female and therefore less able to shake off males trying to attach themselves.

Finally, it may have been only a slip of the pen but an ephippium is not a resting egg but the protective sheath which encloses one or more resting eggs.

W. J. P. SMYLY,
Ambleside, Westmorland.

REFERENCES

- Banta, A. M., Brown, L. A. and Ingle, L. (1939). *Carnegie Inst. Wash., Dept. Geology, Paper no. 39-283 pp.*
Berg, K. (1931). *Visnuk. Medd. naturh. Foren. Kbh. 92*, 1-222.
Berg, K. (1934). *Cambridge Phil. Soc. Biol. Rev.* 8, 139-174.
Mortimer, C. H. (1936). *Zool. Jahrb. Abt. f. Zool. u. Physiol. Tiere*, 56, 325-388.
Rodina, A. G. (1946). *Zool. Zhur.* 22, 227-244.
Slobodkin, L. B. (1954). *Ecol. Monogr.* 24, 89-88.

Feeding and Losses of Fishes

I THINK Mrs. D. A. Hanning's sustained losses (*The Aquarist*, April 1960) are very likely due to insufficient feeding.

JOHN ROBERTS,
San Salvador, El Salvador, C.A.

Parental Care by Dwarf Cichlids

IN the December 1959 issue of *The Aquarist* you kindly published my letter about my success with the dwarf cichlid *Prismochromis kribiaensis*. I have since had over 40 enquiries, which have all been answered, and I thought that you or your readers may be interested in the latest behaviour of the parents.

They were in a 4 ft. community tank containing about 40 youngsters of the original spawning, varying from 1½ to 2½ in. (mainly males) and some angels and various other fishes. I knew they had spawned on a rock in the corner of the tank and thought I would leave them as I had too many of the same species. Naturally, I thought that the eggs would all be eaten. I have now seen what I thought to be impossible; the parents are swimming around the one end of the tank and have a batch of 20 or 30 youngsters with them. In turn they are protecting them from the other fishes: first the male leaves the family group and scatters the others away, and then he comes back and the female has a go. These are the same pair that have previously eaten four spawnings, yet they raise this lot in a community tank of all places!

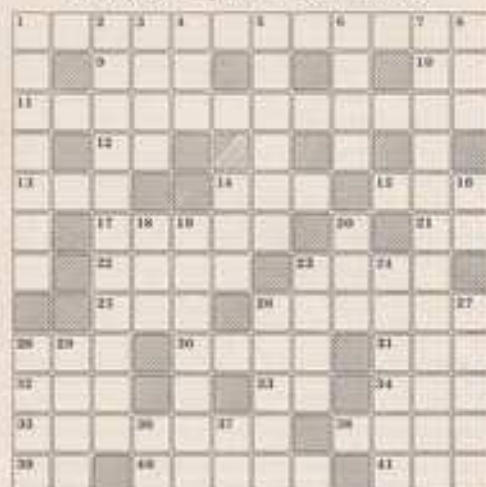
I do not know if any of your readers have seen anything like this before, but I can say that the sight of these parents

protecting their family is the most amazing one I have ever seen. Friends of mine have visited me and spent hours watching them.

H. ROBERTS,
(Isle of Wight Aquarist Society),
East Cowes, Isle of Wight.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- Aid for new ray producers tropical favourite (3, 7)
- Honey manufacturer (3)
- Head of company is head of octopus (1, 1)
- Fourteen best beautiful tropical fish (3, 4)
- Moan (1, 1)
- Find her with an antibiotic (3)
- Moribund between toes of amphibia (3)
- Sit (3)
- When I join the star you may be scared (5)
- It is the correct answer (2)
- The creature on which a parasite lives (4)
- Enemy of mural-framed tanks (4)
- Orfe (3)
- Outside bath everyday the sentiment (6)
- Waiting place (3)
- You can see through this fish! (1-3)
- A foot more than nothing comes not seldom in soft me (1)
- A little one (3)
- Is the answer in the centre of fish? (2)
- This way you might get a vial for an extra pound (3)
- Not get in a way, this Zoolera (7)
- Scabbards and Siamese fighters hatch eggs in this (6)
- The old age of the male, eventually (2)
- Brandy (5)
- The better half of the shell (3)

CLUES DOWN

- Head pain with live food for fishes (7)
- Having no gills (11)
- Twenty quays (4)
- Green food (3)
- Succulent blades (6)
- Pipe (4)
- Tiny live-bearing fish (3-4)
- Colloquially a dreaded fish disease (parasitic) (3)
- Understanding (3)
- Dulcinea tremens (1, 1)
- Coal-scuttle (3)
- Sealow (7)
- Shoe (3)
- Large marine flat fishes (4)
- Pusher (6)
- Maggot, worm, cheese and bread for examples! (5)
- Condition (3)
- Check a link (4)
- French but not the fish (4)
- The Old Country (1, 1)
- Compass point of 36 across (1, 1)

(Solution on page 94)

News

from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

AT the last meeting of the **British Aquarists Study Society**, held in the London Zoological Society's lecture hall, membership and guests turned to numbers given by a team of aquarists to questions sent in to the Society. Question master was Mr. E. Kiddle and in the team were Dr. Guyenne Votey (Curator of the London Zoo Aquarium), Mr. W. L. Mandeville (Birmingham), Mr. R. Meakins (F.R.S.), Mr. Arlott (Weybridge) and Mr. Anthony Evans (Editor of *The Aquarist*). Topics discussed ranged over a wide range of subjects from, for example, the nature of colour vision in fishes to ways of testing water pH and hardness.

AS part of an Arts, Crafts and Hobbies Exhibition staged by Moleton Borough Council recently **The Independent Aquarists Society** arranged an attractive exhibit with the theme "Fish in the Home". Within the confines of three miles of a "river" were displayed aquaria set in the wall as living pictures, aquaria used as part of a room-divider and in conjunction with a bookcase. The tanks were designed to present various interests within the hobby. One tank was set up within a television-set cabinet so as to appear in the place of the screen, and connected with the speaker of the cabinet was a tape-recorder that was used to relay a commentary on fishes in aquaria. Considerable attention from the public was gained by the whole exhibit.

A TABLE show for livebearers was the main event at the May meeting of the **Regent A.S.** of Derby. After a talk on the methods of judging and awarding of points, Mr. Frank Hildway (judged a very satisfactory entry. His results were: First, Mr. D. Oliver (Golden mollie); second, Mr. R. P. Finch (Silver mollie); third, Mr. P. Hanks (Red-eyed red sword). The president of the society (Mr. I. Everett) presided.

THERE was a meeting and show of the Yorkshire Section of the Federation of Quarry Breeder Societies, recently.

A lecture was given by Mr. Gerald Smith, Blackburn, a member of the Lancashire Section on "The simple genetics of the guppy" and Mr. Smith also judged the table show, winners being: Females: 1 and 2, Mr. Winterton, Bradford; A.O.V.: 1, Mrs. Milton, Wigglesworth; 2, Mr. Emmott, Barby; 3, Mrs. Cherry, Gossington. 1, 2 and 3 in the double mermaid class was won by Mrs. Milton, of Wigglesworth, who also won the prize, given by Mr. Hipson, for the best fish in the show. A prize given by Mrs. Milton was won by Mr. Smith, Blackburn.

AT the **Marleyville A.S.** annual general meeting, Mr. Eric Hardy, was again elected president, and the secretary, Mr. R. T. Kelly, chairman, Mr. D. G. Jones, and the treasurer, Mr. H. Bennett, also held their office from the previous year. The show secretary is now Mr. D. E. Hughes, who was previously the librarian. The librarian is Mr. W. H. Lewis, who is a new member of the committee. Two other new committee members were elected: Mr. J. Casley, vice-chairman and Mr. L. W. Threlkeld, who will be responsible for publicity. The two auditors elected were Mr. B. T. F. Row and Mr. P. A. J. Row. From the committee members' reports it was apparent that the society is in a very healthy

state, both from the strength of the membership, and the state of the funds. The secretary is Mr. W. T. Kelly, 31, Radley Street, Liverpool, 17.

THE sixth meeting of the season of the **Dunelm A.S.** was held recently and the following officers were elected for 1960-61: President, Mr. W. Cockburn, vice-president, Mr. A. Fiskern; show manager, Mr. A. Crow; secretary, Mr. G. B. Kirkland; 2, Kestringham Crescent, Barnhill. The table show was for the Scott trophy and the results were as follows: 1 and 2, P. Greening; 3, A. R. Bell; 4, G. E. Kirkland. The leading placings with one show to contest are: A. R. Bell, 13 pts.; P. N. Greening, 10 pts.; G. B. Kirkland, 9 pts.; A. Crow, 8 pts. During the meeting discussion on the possibility of holding an open show in Dunelm took place and enquiries are to be made regarding possible accommodations.

THE May meeting of the **Bristol A.S.** took the form of a tropical table show and a talk on "The Guppy" by Mr. John Wheeler, of the Bristol Tropical Fish Club. He told the meeting many interesting facts about this, the commonest of tropical fish. There were 60 entries in the table show and a large number of the exhibitors were awarded plate cards. This was a preview of fish which will be at show at the Open Show to be held at Bathampton Parish Hall, Bristol, on 4th and 5th November.

THE **Croydon A.S.** have this year been concentrating on their new members who are mainly newcomers to the hobby. A "What is D?" night was put on by one of the members, Mr. Ken Burness, who brought along about 30 fishy objects and asked members to identify them. Among some of the objects were fishes growing to nearly half an inch long, which completely baffled all members of the club. Other objects which had some of the most experienced members guessing were a talking catfish, some newly hatched trout shrapnel and some 5-day-old zebra fry.

Mr. Burness has also given a lecture on breeding white clouds and zebras. Most members of the Croydon club say they prefer lectures given by a member because they can "drop in" when they want to.

The **Gordon A.S.** would welcome any new members, who should contact the secretary, Mr. D. N. Coppin, 27a, Silchester Road, South Norwood, S.E.25. Telephone: 7151, 9029. Meetings being the first and third Thursdays every month at Eldon House, 2, Lansdown Road, Croydon, Surrey.

AT the last meeting of the **Wolverhampton A.S.** received Dr. P. N. Goodladly from Sheffield, who gave a very good and interesting talk and film show on Tropical Fish Breeding. This also included a film in colour of different types of fish and reptiles. Fifty-eight members were present and visitors from Burton, Walsall, Dudley and Smethick societies also attended. A visit to Blackpool Aquarists also took place on the 26th May. The club meets on the third Friday of the month at 7.30 p.m., at No. 11, Tempest Street, Wolverhampton, and visitors are always welcome.

MAY was an interesting month for the **Erith and District A.S.** The speaker for the first meeting was Mr. J. Vines, who gave an

illustrated talk on "Geology for the Aquarist."

As well as the slides shown, the speaker brought with him some 50 specimens of rock, which he had collected from various parts of the British Isles while on holiday. Several contained fossils which members keenly examined, and each specimen was dealt with, also its suitability or otherwise for use in home aquaria was stated.

At the mid-monthly meeting there was a general discussion dealing with the exchange of views and speakers to other South London clubs, the arrangements for the society's display at the arts and crafts exhibition, held early in June at the Claydon Town Hall, and the final arrangements for the annual meeting. Recently members and their families travelled by coach to Mr. Whitwell's establishment at Cadchester, which must be a valuable possibility for aquarists. Members saw over 700 tanks, some containing fish, which previously they had only seen in tradebooks. There was hardly a member who did not bring back with him at least one specimen to add to his collection.

There is a slight but welcome increase in membership, and the way new members have given whole-hearted support is most encouraging. The hon. secretary is D. R. Collins, 94, Park Crescent, Erith, Kent.

AMONG the recent activities of the **Sheffield and District A.S.** was the furnished aquaria competition, results being: 1st, Mr. J. Penning, 73 points; 2nd, Mr. J. Beaman, 68 points; 3rd, Mr. and Mrs. H. Grove, 66 points. The judges were Mr. E. Clappison, F.N.A.S., and Mr. E. Collins. The table show for medals, awards and any other livebearers, including plants and guppies, had 21 entries. The results being: 1st, G. Lloyd; 2nd, R. A. Aldby; 3rd, N. Wright.

A visit from Mr. E. Peppy, of Mansfield, ended in him answering a variety of questions on all aspects of the hobby put to him on the spot by members. At another meeting a table show of members' fish was presented by Mr. R. P. Middleton and Mr. A. A. Ably. Sheffield members were warmly received on their first visit to the Walswell Society. An enjoyable evening was spent in discussing inter-club relations.

The weather certainly excelled itself in helping to give members an enjoyable day on the annual trip to Blackpool. An organised party was conducted round the Tower Aquarist and "behind the scenes" by the assistant curator, Mr. Beaumont.

AN inter-club competitive table show was held recently by **Stretford and District A.S.** There were 109 entries of tropical and coldwater fish on view, and some club members also brought along a few small reptiles and amphibians to add interest. Visitors came from Ferrieston, Ouse, Salford, Middleton, Urmston and Macclesfield.

Dr. Ghaffari of Sheffield University gave a very interesting lecture on fish diseases, while the show judges pointed the fish. The judges were Mr. K. Owen of Belle Vue, Mr. S. Taylor of Northenden, and Mr. J. W. Coope of the Northern Goldfish and Pondkeeper's Society.

After the lecture, the Mayor of Stretford, Councillor H. H. Edwards, presented the prizes and show medals to the following winners: Best in the show: Mr. Lee (Macclesfield); Best: 1, Mr. McKinnon (Ouse); Champion: 1, Mr. Turk Stretford; Guppies: 1, Mr. Moore (Stretford); Livebearers: 1, Mr. Blacklock (Macclesfield); Livebearers: 1, Mr. Rowell (Middleton); Coldwater: 1, Mr. Bradock (Ince-in-the-Valley); A.O.V.: 1, Mr. Whittaker (Ouse).

THE **Hampton A.S.** recently held a reception to Mr. and Mrs. Spurling Jewell of Dublin, Eire. Mrs. Spurling Jewell is hon. secretary of the Dublin A.S. Local aquarists from neighbouring societies attended and an enjoyable evening was spent. The society continues to meet fortnightly with lectures, table shows and other interesting features.

THE speaker at the May meeting of the **Belmont Tropical Fish Club** was Mr. L. E. Challenor, of Bath, whose talk on aquarist plants was much appreciated by a well attended meeting.

An inter-club table show amongst local clubs has been arranged by this club, and the first has been held on 16th June at the Bristol Tropical Fish Club meeting and will be followed later by heats at meetings of Bristol, Bath and Keynsham Aquarist Societies. Judging at these shows will be carried out by the local Tropical Study Group, and the club gaining the highest aggregate of points in the four heats will hold the R.T.P.C. Cup for the ensuing 12 months. At the meeting to be held at the Old Duke Hotel, King Street, Bristol, on Thursday, 21st July, commencing at 7.45 p.m., Mr. H. C. B. Thomas, who is well known in aquarist circles, will be giving a talk on a subject connected with tropical fishkeeping.

New members are welcome, and anyone interested is asked to write the hon. secretary, Mr. L. Littleton, 9, Little Stoke Road, Stoke Bishop, Bristol, 9, who will be pleased to furnish all details.

THE members of the **Basingstoke and District A.S.** were "At Home" on Sunday, 26th May, and spent a very enjoyable afternoon in the company of their friends from Wiltshire, High Wycombe, Slough, Oxford and Reading. The inter-club show was won by Wiltshire; the individual class winners were: Barbic: 1, R. A. Keppel (Basingstoke); 2, C. Caple (Wiltshire); 3, C. Caple (Wiltshire); 4, J. Smith (High Wycombe); Characins: 1, D. V. Jones (Basingstoke); 2, P. Wain (High Wycombe); 3, J. and A. E. B. S. Landau (Wiltshire); A.V. Lichner: 1, S. Bullen (Slough); 2, B. Hawkins (Wiltshire); 3, D. Anarston (Reading); 4, E. H. Charlfield (High Wycombe); A.O.V.: 1 and 2, E. R. S. Lomelin (Wiltshire); 3, C. Connor (Wiltshire); 4, S. M. Clark (Oxford).

The main forthcoming event is an inter-club show between Basingstoke, Southampton and Portsmouth on 9th July. New members are always welcome, club nights are the second and fourth Friday of every month at the club room of the Cricketer's Inn, Basingstoke.

MAY activity of the **Oxford A.S.** have included a talk on water and pH values by Mr. V. Lewis, a local Water Board official, which proved most interesting especially to the members who attempt breeding the rarer fish. At the next meeting the society's president, Mr. A. Lukes, gave a talk on electricity for the aquarist. This was the second talk he has given and was most proved most interesting and helpful to all members.

During May the first two sets of the postal quiz were also completed, and all members found it most interesting and enjoyable. Also, judging has been taking place to find the best home furnished aquaria in Oxford to represent the society in the competition being run by the Three Counties Group. The aquarist selected to represent the society belongs to Mr. R. Veal.

"A NATURALIST on the seashore" was the title of a most absorbing illustrated talk given to **Cambridge and District A.S.** members at their May meeting by Dr. Clifford, of Suffolk Walden, who afterwards recommended to the members a few books for those who wished to delve further into the interesting subject of life on the shores and in the shallows of our coastline.

At the June meeting, members had a guest speaker, Mr. C. D. Southcote, to lecture on aquatic plants, their interest to botanists and aquarists. After answering questions put by members, the speaker was warmly thanked by the chairman for a most interesting and instructive talk.

At the recent members show, held by the Cambridge Club, competition was keen and the quality of exhibitors first-class, most of the trophies changing hands. The Best in Show and Best Lignifier Cups were won by Mr. S. A. Bayley's cardinal tetra; Best Livebearer and Brooder's Cup were won by a red winged, raised by Mr. D. Aldridge; Best Goldfish was a common goldfish, belonging to Mr. F. Driver; Pales Cup was taken by giant danio of Mr. E. Haman's; Catfish Cup was won by Mr. Bayley's Grey-tail; Guppy Cup by a bottom sword of Mr. J. Palmer's; and Rood

Cup by Mr. Aldridge's pearl guppies. Mr. N. Radford's neo-competitive exhibits of several species of tetras attracted much interest among members and visitors alike.

MONTHLY meetings of the **Yeovil and District A.S.** are held at the Haybarn and Castle, Yeovil on the first Thursday of the month. All fish-keepers in the district are welcome. Recent activities of the society included a tropical fish table show in April, the result being: 1, Mr. T. Perry (B. ruficaudus); 2, Mr. N. Sainsby (cherry barb); and 3, Mr. Cox (jumbo tetra). The judges were the Bristol Tropical Fish Group. There was also an inter-club show between Yeovil and Taunton for coldwater and tropical fish, which ended in a success for Yeovil, the winners being: 1, Mr. A. Downey (goldfish); and 2, Mr. N. Sainsby (bleeding heart tetra). Mr. Baylison of Weston-super-Mare was the judge.

At the June meeting, Mr. T. Perry gave the members an interesting talk on the breeding of opaline guppies, of his mistakes and eventual success, which with many laughable incidents completed an enjoyable evening.

THE Annual Show of the **Mossfield A.S.** will be held on Friday and Saturday, the 23rd and 24th September. This show will be held at usual in conjunction with the Carri Society of Mossfield.

A PARTY from **Leicester A.S.** visited Derby for the June meeting of the **Regent A.S.** and Mr. S. B. Scargill, of Leicester, spoke on memories of 25 years as an aquarist. He paid particular attention to live foods for all types of fishes and extolled the virtues of the humble garden worm. Mr. H. J. Green, president of the Regent Society, presided.

AT a recent meeting of the **Goole and District A.S.** a table show for danios was held. The results were as follows: 1, R. Hunt (pearl danio); 2, Sanders Bros. (giant danio); 3, Sanders Bros. (zebra danio). The next table show is to be for anabantids.

A FINE kissing guppy won first place for Mr. Pratt in the 14th table show of fish held at the last meeting of the **Hounslow and District A.S.** There was a tie for second place between Mr. Luff's blue figure and Mr. Pratt's thick-lip guppy. Third was Mr. Luff's thick-lip guppy. The judge of the show was Mr. Burt.

During question time which followed Mr. Poole spoke of his experience of plants dying after compost had been in use for a long period.

THE **Bristol Tropical Fish Club** won the guppy section in a contest with the South Wales Federation of Guppy Breeders and the South Wales Aquarist Club at Newport. Bristol were defeated by South Wales in the tropical section by 18 points to 22. There were 82 fish in the show.

TWO meetings of the **Roanford A.S.** were held recently. At the first, in the absence of Mr. B. Morgans, the chairman, Mr. P. Abrams took the chair and a talk was given by Mr. J. Morris, of the F.B.A.S., who spoke on aquarist management—a subject which he made very interesting and absorbing.

At the second meeting, with Mr. B. Morgans in the chair, arrangements for the visit to Kingfisheries were completed. During the evening the society had a visit from a member of the East London Club asking if a team could be sent along to them to participate in a "Brains Trust." This offer was accepted and a return visit would be arranged later on.

SECRETARY CHANGES

CHANGES of secretary and address have been reported from the following societies: **Doncaster Aquatic Society** (D. Wells, 10, King Edward Crescent, Thorne, Nr. Doncaster, Yorks.); **Woodwell and District Aquarist Society** (J. Finney, 113, Barnsley Road, Woodwell).

AQUARIST'S CALENDAR

9th-16th July: Dagenham Town Show (Aquaria Section). Schedules and particulars from Mr. W. Carter, 6, Chesson Close, Harnchurch, Essex.

14th-16th July: **Mereside A.S.** Open aquatic show at the **Liverpool show, Wavertree, Details and schedules from Mr. W. T. Kelly, 21, Siddle Street, Liverpool, 11, or Liverpool show secretary, 40/55, Victoria Street, Liverpool, 1.**

15th-16th July: **Bedford and District A.S.** open show to be held in conjunction with the **Bedfordshire Agricultural Show.** Show schedules can be obtained from the show secretary, Mr. R. Pope, 51, Aylesbury Road, Bedford.

21st July: **Goldfish Society of Great Britain** meeting, 2.30 p.m. at the **Kingway Hall, London, W.C.2.**

1st-6th August: **Portsmouth A.S.** eighth annual open show at the **Twyford Theatre, Portsmouth Community Centre, Twyford Avenue, Stambourne, Portsmouth.** Show schedules can be obtained from the show secretary, Mr. W. Ryder, 493, Commercial Road, Portsmouth, Hants.

24th-25th August: The Midland open show, **Bingley Hall, Birmingham.** Schedules available from Mr. J. Edwards, 6, Amy Terrace, Oler Street, Birmingham, 14. Entries close 9th August.

8th-10th September: **East London Aquarists' and Pondkeepers' Association** annual open show at the **Central Hall, Barking Road, East Ham, London, E.6.** Details can be obtained from the secretary, Mr. P. Saunders, 21, Clarendon Road, Forest Gate, London, E.7.

10th-11th September: **Wiltshire and District Aquarist Club.** Annual open show entry form and details from Mr. Worcester, 269, Kilburn Lane, Kilburn, London, N.W.10.

20th-24th September: **Leeds and District Annual Open Show** at **Trinity Hall, Blue Lane, Leeds.**

21st-28th September: **Manchesterfield Aquarist Society** annual show.

24th September: **Kingston open show.**

22nd October: **Hendon and District A.S.** annual convention, 6-9 p.m. at **Wharfedale Secondary Modern School, Clarendon Road, Hendon, London, N.W.2.** Applications for tickets should be made to the secretary, Mrs. B. Robertson, Dock Cottage, 45, Duck Lane, London, N.W.9.

22nd-23rd October: **British Aquarists' Festival, Belle Vue Zoological Gardens, Manchester.** Schedules from Mr. Geo. W. Cooks, Spring Grove, Fieldhill, Huddersley, Yorks.

4th-5th November: **Bristol Aquarist Society** annual open show at **Staplepiece Parish Hall, Bristol.**

Crossword Solution

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

Testimonials prove that
**IT PAYS TO BUY
WINDMILL
PRODUCTS**



"WINDMILL"
HAND-REJECTOR
AQUARIUM
CLEANER

Complete with
Hand Bellows

15/- each



"REGENT"
INSIDE
FILTER

Designed for
easy cleaning

10/- each

"WINDMILL"
AIR REJECTOR
CLEANER

will work
connected to
any make of
Aerator

10/- each



"WINDMILL"
BREEDING
TRAPS

Beautifully
Designed and
Constructed

15/- each

TRADE NOTICE ENQUIRIES
ALWAYS WELCOME

Have YOU heard?

If you are in the swim you must have heard a whisper or two of the success of THE PREMIER BIOLOGICAL FILTER. Aquarists the world over are proclaiming this the greatest gift to better fishkeeping. Thirteen years of experience in the manufacturing of filters to the aquarium trade have produced this, the acme of all methods of preventing cloudy tanks.

It is unique. It is reliable. It is unseen
It is nature's own method of filtration
It is permanent. It needs no attention



They are saying

- 1. BETTER CIRCULATION.** The Premier Biological Filter collects water from the bottom and recirculates it, thus preventing cold spots—in tanks fitted with this filter fry will even feed at gravel level.
- 2. HEAT ECONOMY**—the action of the Premier Biological Filter gives a continuous circulation of heat and thus provides the desired temperature evenly throughout the aquarium, saving of current costs is noticeable.
- 3. PLANT GROWTH**—in tanks fitted with the Premier Biological Filter plant growth has been more healthy—plant roots do not rot away.
- 4. WATER CLARITY**—tanks are kept suspension free, always crystal clear water. The Premier Biological Filter continually filters and purifies the water.
- 5. NO MESS**—filter mediums are not required for use with The Premier Biological Filter, saving need for replacement, provides a cleaner job and saves money spent on filter mediums. Completely eliminates need for syphoning and prevents black gravel, disposes of sediment where it settles.
- 6. NEATNESS.** The Premier Biological Filter is fitted underneath the gravel, only the air lift is visible. Can be worked by even the smallest of vibration aerators. Once installed can be left for years—will not clog up. Suitable for both cold water and tropical aquariums.

Made for 18" tanks at 12/6 each. 24" tanks at 15/- each
Other size tanks see fitting chart of filter box

Pamphlet willingly sent on receipt of 3d. postage

WINDMILL PRODUCTS

244 VAUXHALL BRIDGE ROAD, LONDON, S.W.1
Telephone: Victoria 5179

★ THE FOOD IN THE PLASTIC BOX

★ A PERFECTLY BALANCED DIET FOR TROPICAL AND COLDWATER FISH

★ CONTAINS PROTEIN, CARBOHYDRATES, FATS, MINERAL SALTS, VEGETABLE MATTER AND VITAMINS

★ WILL NOT FOUL THE WATER

★ FISH PREFER IT, EVEN TO DAPHNIA, ONCE TRIED MANY REFUSE ALL ELSE

★ IN VARIOUS SIZES 1/6, 2/6, 5/4, 6/6 & 17/6

McLynn's
FISH FOOD
of Ewhurst

★ MADE BY D. McINERNEY OF McLYNN'S AQUARIUM EWHURST SURREY

★ SALES ROCKETING UP & UP

★ THE MOST POPULAR FISH FOOD

★ FOOD FISH CANNOT RESIST

★ WATCH YOUR FISH THRIVE & GROW

★ AUTHOR OF "ALL ABOUT TROPICAL FISH"

★ UNSOLICITED TESTIMONIAL FROM Mr. B. ABRAHAM, BEDFORD, A.S.
"FOR THE PAST 2½ YEARS I HAVE USED McLYNN'S FISH FOOD AND HAVE WON IN OPEN SHOWS THROUGHOUT THE COUNTRY OVER 200 AWARDS INCLUDING 8 CUPS, 50 PLAQUES AND TROPHIES"

★ OBTAINABLE FROM ALL GOOD PET SHOPS OR DIRECT FROM US

McLYNN'S AQUATIC FOODS
DORKING
SURREY

THE NEW MICHAEL'S FILTER AERATOR



SUITABLE FOR ALL SIZES OF AQUARIUM UP TO 36 INCHES x 15 INCHES

- ★ Cheap to install—8/6
- ★ Promotes healthy plant growth
- ★ Does not need glass wool
- ★ Gives positive circulation of water to insure even temperature throughout aquarium
- ★ Aerates water without additional diffusers
- ★ Plus a crystal clear aquarium

Trade and retail enquiries to any of the following:

MICHAEL'S AQUARIUM, 22 NORTH PARADE, HALIFAX, TELEPHONE 3454
TOM C. SAVILLE LTD., 9 STATION ROAD, BEESTON, NOTTS
T. C. BONEYBILL, 2 GOOSEHOUSE GREEN, ROMLEY, STOCKPORT
JAMES NORTH (LONDON) LTD., 314 LEE HIGH ROAD, LEWISHAM, LONDON, S.E.13

POST
8/6
FREE

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.

Spriedeweg, 2

Putten (Gld.), Holland

Author of *Exotic Fishkeeping*

MARSHALL'S AQUARIA

24 Westbury Lane, Buckhorn Hill, Essex

Telephone: BUC 4708

OPEN WEEKEND ALL DAY

All my Books from here 6/- each.

Our great parcels are the best value on offer: 26 in 6 varieties 10/-; Half parcel 5/6; Mixed variety 3/-; Dorr, Malaysian Seeds 2/-; Dorr, Indonesian Snails. The only certain way to produce Tetras is for 2/-; L.A.E. for Guppies. Wholesale prices. Over 300 tanks on view. Breeding pairs of fish available to callers only. Central Live Tube to Buckhorn Hill, or Wagon 20, 20s & 147.

The finest show in the country

We have been breeding fish since 1920

"MOLLIFUD"

The Aristocrat of Fish Food

Enriched with the entire Vitamin and Mineral Supplement. For Mollusks no better food exists, also a welcome change of diet for all fishes. Ask your dealer for MOLLIFUD if he does not yet stock it he will get it for you, or send to me price 2/- post 6d. Breeders' Pack 4 times the quantity 6/- post free. Fry food 2/6 post 6d.

W. HUTCHINSON,

BANKHEAD TROPICAL FISHERIES, SEAHAM,
Co. DURHAM.

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—Produce W. Worms Easy to breed
GRINDALWORMS	2/6—Fluore 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—Not less than 2 oz. of worms
WHITE WORMS	2/6—Fluore cultures in wooden boxes
WHITE WORM FOOD	2/6—Exclusive formula. No mildew
WHITE WORM COMPOST	2/6—Composed for quicker breeding

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

Ask your dealer, or free delivery from

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



BRITISH AQUARISTS' FESTIVAL 1960

22nd and 23rd October

**BELLE VUE ZOOLOGICAL GARDENS,
MANCHESTER**

**MANY ADDITIONAL CASH PRIZES AND
VALUABLE TROPHIES.**

Schedules which will cover all varieties of Tropical and
Coldwater Fish are now obtainable from:—

Non. Show Secretary:

GEO. W. COOKE,

"Spring Grove", Fieldhill, Batley, Yorks.

LETTY KREMNER

OFFERS—FISH FOR YOUR POND

British bred Golden Rudd (2") very hardy, 2/6 each
(9 for 20/-); Golden Orfe (3") 3/- each; Golden Oefe
(5") 7/6 each; Goldfish (3") 1/6 each; Shubunkins
(3") 2/6 each; Shubunkini (7"-8") 12/6 each; Carfish
1/6 each; Goldfish (7"-8") 10/- each.

Carriage 5/- extra

OXYGEN PLANTS

Elodea Densa 3/- dozen; Willow Moss 1/- bunch;
Lytimachia 1/6 bunch (Beautiful bright green leaves).

MARGIN

Mint 9/6; Iris 1/-; Lilies White 7/6; Red 10/-.

Post 1/6 extra on Plants

Terraria. Large Stocks—call and see our 2/- range. All highly
best stocks. Unusual varieties and speciality. Lists supplied.

**34 CHEETHAM HILL ROAD
MANCHESTER 4 BLA 2163**

OPEN ALL DAY SATURDAY

YOU ARE INVITED TO SEE AN
EXHIBITION OF TROPICAL FISH
IN OUR NEW M. & R. AQUARIUM

- ★ Our Fish House is so designed that the novice and the connoisseur see the fish at their best.
- ★ We have on show a very large variety of the most beautiful specimens of the silent world under the most up to date conditions.
- ★ We specialize in installing and maintaining display tanks.

M. & R. PET SHOP—466 PAISLEY ROAD, GLASGOW, S.W.1
Telephone: 1BRox 3615

T.F.H. PUBLICATIONS
BRINGS YOU A COMPLETELY
NEW CALENDAR IN FULL COLOUR

This Calendar consists of 14 full colour pictures of Tropical Fish each measuring 10½" × 10½". The Calendar runs from June 1960 to May 1961. Each picture is a perfect example of the Colour Photographer's Art. Use this calendar then frame the pictures! (each is easily detached without affecting the calendar).

PRICE (inc. P/Tax) - 17/6 (or 19/- including postage and packing)

Place your order now and avoid disappointment, numbers are limited

NEW! T.F.H. Pet Books Price 2/- each

AFRICAN BARBS (c) - AFRICAN CICHELIDS (c) - TROPICAL FISH GUIDE (c) - LIVE FOODS FOR YOUR FISH - THE AQUARIST'S REPAIR MANUAL

(c) Denotes colour plates inside

COMING SOON!

Watch for details of the Household words of tomorrow:

HIGLOW SUPREMIX VITAFARE

If you want a clue read the Tropical Fish Hobbyist—2/6 monthly

T. F. H. PUBLICATIONS (LONDON) LTD.
34 NUTLEY LANE, REIGATE, SURREY

EAST LONDON AQUARISTS' & PONDKEEPERS' ASSOCN.

OPEN SHOW

and
**INDIVIDUAL OPEN FURNISHED AQUARIUM
CHAMPIONSHIP**

will be held this year at the Central Hall, Barking
Road, East Ham, London, E.6. **Thurs, 8th Sept.—
Sat, 10th Sept.** (three days).

Entry forms etc. available from—
Mr. J. Bryden, 22, Kingston Road, Wood, Essex.
Latest date for entries, 8th August.

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 grease-
proof paper, surrounded by a dense flock 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 1493

MIDLAND OPEN SHOW

BINGLEY HALL
BIRMINGHAM

August 24th—27th, 1960

ATTRACTIVE EXHIBITS—TRADE STANDS
ENQUIRIES AND SCHEDULES:—
J. EDWARDS, 6, AMY TERRACE, OSLER STREET,
BIRMINGHAM 16
ENTRIES CLOSE LAST POST AUGUST 9th

Shubunkins & Shredders

After a good season of breeding some top Shubunkins from
my well known strain (Barred Type) I can offer, breeding pairs
or single adult fish, last year's fish or this year's youngsters. Write
for price and starting requirements, S.A.S. please.

The Shredders have again been invaluable in rearing the
young fish, for, as every aquarist should know, shredded earth-
worms is without question the finest balanced food for fish.

The Shredders, 10/-, Super Shredders, 18/- and the Course
Tenth Shredders, 12/-, all post paid.

**Aquatic Developments,
143—145 Bure Lane, Christchurch, Hants.**

BOOKS TO HELP YOU

Exotic Egg-laying Fishes

BY JACK HEMS

(2s. 10d. or 50 cents post free)

Summary of Contents

General Requirements: Keeping & Breed-
ing · The Characin Family · The Catfishes ·
The Cyprinid Fishes · The Cichlids · The
Cyprinodont Fishes · The Labyrinth Fishes
· Some Diseases of Exotic Fishes

The Guppy

BY A. FRASER-BRUNNER

(2s. 10d. or 50 cents post free)

Summary of Contents

Why the name "Guppy" · The Guppy as
Prey and Predator · Guppies in the Aquar-
ium · Varieties · The Fins of the Guppy ·
The Role of the Male in Breeding · The
Part Played by the Female in Breeding ·
Hereditry in the Guppy

Simple Pond for the Amateur

BY T. BROWN

(1s. 9d. or 25 cents post free)

This booklet does not set out to be a
general treatise on pond-making. It is a
straightforward account of the construction
of one particular sort of pond based upon
the practical experience of the author.

The pond recommended can be adapted
to various gardens, for three sizes are given.
Even if an informal pool of irregular shape
is desired this book will be found valuable.

Obtainable from:

"The Aquarist,"

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

PREPAID ADVERTISEMENTS

5d. per word (12 words minimum) Box number 6d. extra

FOR SALE

GLAZED aquaria in all sizes including 36 x 12 x 12, 62x 6d, 18 x 10 x 10, 18x 6d, 24 x 12 x 12, 37x 6d. Tanks distributed to any part of Britain, carriage extra. Plants, Accessories, Fish. Wright's, 10, Luttre Road, London, N.4. Phone Archway 3920.

AQUARIA FRAMES. For quality and accuracy buy direct from the manufacturer. 1 x 1 4 steel angle, 30 x 15 x 15, 26x, 30 x 12 x 12, 24x, 30 x 15 x 15, 23x 6d, 30 x 15 x 12, 23x, 30 x 12 x 12, 22x 6d, 24 x 12 x 12, 20x 6d, also 18 x 15, 18x 6d, 18 x 12, 15x, from 1 x 4 x 1/2 angle. All milled and welded ground finish. Any size to order. Immediate despatch carriage paid. C.W.O. Money refunded if not satisfactory. For complete list, stands, shades, etc., S.A.E. J. E. Henry, 52, Charter Street, Accrington.

EASY TERMS. Retard your hobby the easy way. Hy-Ex, Leon, Proctor, Fairy Air Pumps, Thermostats and heaters by well-known makers. Filters, Thermometers, Nets, Breeding Traps, Frames and stands and all accessories. Send a stamp now for our list "A." Easy terms, only 2s. 6d. in the £ and 8 monthly payments. Joseph Stanley Ltd., 63, Church Hill, Northfield, Birmingham, 11.

REGULAR supplies Tubules, guaranteed fresh and clean. For full details contact: Tachbrook Tropicals, 244, Vauxhall Bridge Road, London, S.W.1. Tel: Victoria 5179.

FERRY'S for Plants. 1st and 2nd Awards British Aquarist's Festival. Assorted selections Tropical or Cold 2s. 6d.; 7s. 6d., 28s. 6d. Val. Turcs, Myrsinephium, Scutellaria Nigra, 6s. per dozen. Cryptocoryne Cordata 1s. 6d. to 2s. 6d.; Willow 2s. 6d.; Rocket 1s.; Harrietiana 2s. 6d.; Seven assorted 10s.; Water Wisteria, Giant Hygrophila 2s. 6d. Per 6d. All Advertisements Accessories. C. R. Ferry, Professional Aquarist, 65, West Street, Crews.

PERFECT Swimmers. Line Bred Blue Scarfhat Guppies 15s. per pair; Blue Fighters 15s. pair; Parma Black Mollies 1s. 6d.; Nannostomus Anostomus 10s. pair, Carriage 5s. 6d. C. R. Ferry, Professional Aquarist, 65, West Street, Crews.

AQUARIUM PLANTS at 5s. per dozen. Echinodorus (rygmy chain variety), Hygrophila, Ludwigia, Myrsinephium (green or parviflorum), Scutellaria (sweet, lemon or natural), Vallisneria (straight or twisted). 50 species usually in stock from रुपये to ten fish each. Try a generous 15s. cold or tropical plant parcel. Add 1s. 6d. for postage, etc. for orders below 15s. please. Send S.A.E. for detailed list (retail or trade). Business by post only. Tel: Frank Stone, 51, Nassington Road, London, N.W.3.

DERBY cichlids! Good selection of tropicals, plants, tanks and accessories. Syd Sharrock, 7, Cockpit Hill (opposite Bus Station), Derby, Tel: Derby 42343.

RUSTPROOFED Aquarium Frames, including bow and corner type. Ornamental Stands, Glazing Glasses and Equipment. Manufacturers—Woolley, Barton, Ormskirk.

MCLYNN'S Scientific Steel Breeding Traps, 12" x 5" x 6" ideal for saving freshwater, and operating the egg-scatterer, large enough for several adults at once. Strong, last for years, initial cost saved on one brood. Sent flat ready to be assembled, only 21s.—each including postage. MCLYNN'S Aquarists, Downhams, Ewhurst, Cranleigh, Surrey.

GOLDFISH SOCIETY OF GREAT BRITAIN publications "Basic Varieties" Book of Standards price 2s. 6d. "Breeding and Raising Goldfishes" Price 1s. 6d. obtainable from G. N. L. O'Neill, 64, Lavender Vale, Wallington, Surrey.

TAYLOR'S AQUARIUM, 76, Manchester Road, Burnley. Tropical Fish in variety. Our top quality Plants gained for us 1st in Tropical Furnished Aquaria, British Aquarist's Festival, 1959.

WHITE WORMS, Culture and Instructions 2s. Baker, 41, Barfield Avenue, Brighton.

AQUARIA stands, Shades and Frames. Guaranteed square. Stands to take two tanks 18 1/2 in. x 12 in. x 36 in. high 29s. 24 1/2 in. x 36 in. high 23s. 50 1/2 in. x 12 in. x 36 in. high 37s. 6d. 28 1/2 in. x 36 in. high 42s. Shades 14 in. x 12 in. 16s. 6d. 24 in. x 12 in. 17s. 6d. Frames 24 in. x 12 in. x 12 in. 19s. 6d. 24 in. x 15 in. x 12 in. 20s. 30 in. x 15 in. x 12 in. 21s. 6d. 36 in. x 12 in. x 23s. 36 in. x 15 in. x 12 in. 24s. Glazing Compound 1 lb. 1s. 6d. Postage despatch. Any size frame, stand, or shade made to order. Carr. paid. Money back if not satisfied. Hookney Engineers, 30, Somerset Street, Leeds, 1. Tel. 25061.

WATER LILIES—32 named varieties, short polythene for pond making and all pond requirements. Bennett, Water Plant Specialist, Coombe Avenue, Weymouth.

BRINE Shrimp Eggs. Breeder's Half Pint Bulk Packs. One for 10s. Two for 70s. registered post paid. C.W.O. Hatching guaranteed. Box 2356, The Aquarist, The Barn, Buryford, MIDDLESBROUGH.

COLDWATER plants, Katsuboni snails, snails and Daphnia. Trade invited. 25, Brookside, South Mimms, Herts.

ENTIRE contents of fish house, including 8—24 x 12 x 12, 4—24 x 8 x 8, 6—12 x 8 x 8, 3—18 x 12 x 9; also heaters, thermostats and racks, if required. £15 the lot, or individual items at reasonable prices. Derek, 8, Delemere Road, Heading. Phone 62468.

GOLDEN ORPHE Breeder arrives offers per 100, to be retted by purchaser. Sizes between 8 and 10 inches. Clark, Odcombe, Bathurst Green, Surrey.

BRISTOL BLUE shubunkins—first-class youngsters in type and colour. 11 in. selected 2s. 6d., 2s. and 10s.; others 20s. doz. Car and carriage 7s. 6d. on orders under £1. Kenneth Thomson, 81, Doughton Park Drive, Romsey.

GUARANTEED thermostat, heater and thermometer 20s. post paid. Sizes wanted required. Sterling Fisheries, 62, Manor Road, N.22.

LEON air pump, double piston, as new, £4. Brod. 55, Cotton Road, Notting.

ENGLISH Elodea (crisp), unlimited supplies. 60 shoots for 10s., post paid. Camera, 1, New Road, Northbourne, Bournemouth.

GUARANTEED Quality Plants—Anolis, Vallisneria spiralis, Tyra, Sagittaria, Dwarf Sagittaria, Hieracium 6d., 2s. 6d. dozen; Hygrophila, Ludwigia, Hornwort 5s., 4s. 6d. dozen; Indian Fern, Dwarf Amazon, Riccia, Salvinia, Duckweed 1s., 10s. dozen; Giant Sagittaria, Wisteria, Dwarf Lily, Cryptocoryne Hartwegiana, Cordata, Willow, Giant Hygrophila 1s. 6d. or 2s. each, Elodea Densa, Grapes, Cassidix 4s., 3s. 6d. dozen. Post 6d. all orders. Over 100 varieties tropical and cold-water fish for personal shoppers only. Kingfisheries, 138, Croydon Road, Beckenham, REC. 3716. Closed Wednesdays.

TROPICAL Fish and Plants. Nights after 6 p.m. 798, Bury Road, Brighton, Sussex.

THERE was a young lady from Ryde Who complained that her fish always died, Then she changed to McLynn's, Now she breeds Harlequins And shows off her trophies with pride.

WANTED

PLANTS! Plants! Plants! Wanted, wanted, wanted. I buy breeder's surplus plants. Please write stating what you have for disposal. T. Foreman, 244, Vauxhall Bridge Road, London, S.W.1.

IRIS LAEVIGATA and other water lily urgently required (not wild yellow) also transformers snails. Bennett, 32, Coombe Avenue, Weymouth.

BRISTOL BLUE shubunkins and Bristol Blue youngsters wanted. Write or phone—H. J. Mansell, 150, Roddington Drive, Langley, Slough, Bucks. Tel: Langley 2039.

PARTNERSHIP

WORKING partner wanted in well known Fish Farm. Third share £1,000. Address: Box 1251, The Aquarist, The Barn, Half Acre, Buryford, Middx.

CLUB OUTINGS

DETAILS for 1960. Kingfisheries, 138, Croydon Road, Beckenham, Kent. REC. 3716.

CLUB SECRETARIES, sought to McLynn's Aquarists, Downhams, Ewhurst, Surrey. Bookings for Club visit Saturday afternoon and Sunday rapidly filling up. Hurry to avoid disappointment.

SHOWS

WRITE for your Midland Open Show schedule to-day, details on page 45.

FOR your Diary—The Midland Open Show 24th-27th August, Hagley Hall, Birmingham.

THE CONSTAT
THERMOSTAT TYPE Q.K.
OUTSIDE FITTING

21/-

ASK TO SEE IT AT YOUR LOCAL DEALER

Distributed by

BARRY M. AUSTIN,

95, Crown Road, Twickenham, Middx.

WHOLESALE TO THE AQUATIC TRADE

TACHBROOK TROPICALS

244 VAUXHALL BRIDGE ROAD, LONDON, S.W.1

Telephone: VICTORIA 5179

Special this month

8 Neons ..	£1 0 0	4 Zebras ..	10 0	4 Red Swords ..	10 0
4 Angels ..	10 0	4 Lemon Tetras ..	10 0	6 Black Tets ..	10 0
5 White Clouds ..	10 0	4 Tigers ..	10 0	4 Black Platys ..	10 0
4 Flames ..	10 0	4 Rainbows ..	10 0	4 Black Widows ..	10 0
4 Harlequins ..	10 0	4 Comb Tails ..	10 0	4 Golden Barbis ..	10 0

NEW STOCK

Glassfish ..	3 4
Emmet Fish ..	3 4
Apoc. Rainbows ..	15 0
Blind Cave ..	4 0
Red Nosed Tetra ..	9 4
Pompadours ..	35 0
Butterfly Fish ..	45 0
Adult Leaf Gouramis ..	35 0
Alates Clasper ..	4 4
Egyptian Mouthbreeders ..	2 4
Belgian Flag Tetra ..	1 4

PLASTIC AQUARIUM

Cleaning Appliances

Air Receptor ..	10 0
Hand Receptor ..	15 0
Air Receptor Spare ..	1 4
Hand Receptor Spare ..	1 4
Automatic Siphon ..	5 0
Fish Tail Siphon ..	2 0
15 In. Dip Tube ..	3 4
Hand Receptor Spare ..	3 4
Balls ..	3 4

AQUARIUM SCRAPERS

Slide Scrapers ..	2 4
Aluminium Scrapers ..	2 4
Rubber Scrapers ..	2 4

AIR PUMP ACCESSORIES

Tubing - Glass, 1/4" ..	1 4
Plastic, 1/4", 3/8", 1/2" ..	1 4
" 1/2", 3/4", 1" ..	1 4

DIFFUSER STONES

Chasing with tube insert 1/3 ..	1 4
Chasing with 1/2 in. insert, 1/4 ..	1 4

DIFFUSER STEMS

Plastic 12 in., 5/8" ..	1 4
Plastic 15 in., 6/8" ..	1 4
Plastic 24 in., 1 1/2" ..	1 4

PLASTIC TUBING

P.V.C. Flexible, Non-Toxic ..	1 4
Clear Air Tubing, 3/8" per ft. ..	1 4
or 3/4 in., sold for 7/4 ..	1 4

BREEDING APPLIANCES

Universal Breeding ..	15 0
Tray ..	15 0

AIR PUMPS

Vibratone A.C. only

Fairy ..	£1 7 4
Monroe Major ..	£1 1 0
Monroe Major ..	£1 4 0
Ex Ex Model D ..	£3 7 4
Proctor ..	£3 8 0

PISTON PUMPS

Leon Single Piston ..	£4 19 4
Leon Double Piston ..	£5 17 4
Leon Fish House ..	£10 10 0
Hy-Flo Junior ..	£4 12 4
Hy-Flo "A" ..	£5 12 4
Hy-Flo "B" ..	£7 17 4
Hy-Flo "C" ..	£12 10 0

PUMP SPARE PARTS

Fairy Diaphragm, 1/4" ..	1 4
Air Chamber, 1/4" ..	1 4
Proctor Diaphragm, 1/4" ..	1 4
Leon Spare Piston ..	20 0

FILTERS

Premier Base Filter ..	12 4
Size "3" 18" x 10 in. ..	12 4
Size "4" 24" x 12 in. ..	15 0
Consort External ..	19 4
Filter ..	19 4
Reagent Internal Filter ..	19 0

STANDS

18" x 10" x 10 in. ..	£1 7 4
18" x 12" x 12 in. ..	£1 13 4
24" x 12" x 12 in. ..	£1 17 4
24" x 15" x 12 in. ..	£2 2 4
20" x 12" x 12 in. ..	£2 7 4
26" x 12" x 12 in. ..	£2 15 0
24" x 15" x 12 in. ..	£2 19 0
48" x 12" x 12 in. ..	£3 12 4



ANGLE IRON YANKS

18" x 10" x 10 in. ..	£1 38 0
18" x 12" x 12 in. ..	£1 35 0
24" x 12" x 12 in. ..	£2 7 4
24" x 15" x 12 in. ..	£2 12 4
20" x 12" x 12 in. ..	£2 7 4
26" x 12" x 12 in. ..	£4 0 0
24" x 15" x 12 in. ..	£4 15 0
48" x 12" x 12 in. ..	£5 10 0

PRESSED STEEL

10" x 7" x 7 in. ..	10 0
12" x 8" x 8 in. ..	10 0
12" x 8" x 8 in. ..	12 4
14" x 8" x 8 in. ..	14 0
16" x 8" x 8 in. ..	17 4
16" x 10" x 10 in. ..	£1 0 0
18" x 10" x 10 in. ..	£1 5 0
18" x 12" x 12 in. ..	£1 10 0

HEATERS

E.F. 40, 60, 75, 100, 120, 150 watts ..	9 4
Ex Ex Standard-25, 30, 75, 100 watts ..	1 4
Ex Ex Super-25, 30, 75, 100, 125, 150 watts ..	10 0
UNO ..	9 4
TT Heaters-25, 40, 60, 75, 100, 150 watts ..	9 4

THERMOSTATS

Ex Ex Fluor Submersible ..	10 0
Ex Ex Minor ..	10 0
Ex Ex Sectional Outside Control ..	£1 4 4
Comet 250 watts ..	10 0
Comet 250 watts with neon ..	12 4
Comet 500 watts ..	15 0
Constant Outside ..	£1 13 0
Fitting ..	£1 16 0
Proctor Outside ..	£1 16 0
Fitting ..	£1 16 0
E.F. Thermostatic Heater combined inside fitting ..	£1 2 4
Use Popular ..	10 0
Use Popular (Glowlight) ..	12 4
Use (submersible) ..	15 0
Use Outside Control ..	10 0

THERMOMETERS

Dunlop Compass ..	4 4
Comet Plastic Back (mercury) ..	4 4
Flapping (spirit) ..	2 4
Perseus Act ..	5 4
Stick on (spirit) ..	8 0

PUBLICATIONS

Handbook of Tropical Fishes ..	100 0
The Encyclopedia of Tropical Fish ..	40 0
Tropical Fish ..	30 0
Exotic Aquarium Fishes ..	84 0
All about Tropical Fish (Mercury) ..	75 0

STOCKISTS AND SUPPLIERS OF AQUARIUMS AND STANDS ALL TYPES OF AQUARIUM ACCESSORIES AQUATIC AND POND PLANTS DRY AND LIVE FOODS TROPICAL AND COLDWATER FISH

You are cordially invited to visit our extensive display of animals furnished Aquaria without obligation. Our staff are always willing to give advice and guidance.

ALL ABOVE EQUIPMENT SENT BY POST & RAIL
 Add 1/- extra postage orders up to 10.-; 1/6 up to 20.-; 2/- up to 30.-
 Our full Catalogue containing many more lines willingly sent on application, postage 3d.

Shirley Aquatics Ltd.

WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: SHIRLEY 1300

Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

TROPICAL FISHES

of interest in July

INTERESTING FISHES FROM S.E. ASIA

ARCHER FISHES	12/6, 15/-, 17/6
PUFFER FISHES 5/- & 7/6
MONODACTYLS 10/-, 12/6, 15/-
SCATS 10/- & 12/6

all above are acclimatised to fresh water

HARLEQUINS — beautiful well-grown fishes 2/6 and 3/6 each. CLOWN LOACHES — 12/6 each. BLACK SHARKS — 10/6 each. FLYING FOXES — 12/6, 15/- and 17/6 each.

We have also our usual selection of well over 100 species — send S.A.E. for list.

Aquarium Plants

(Send S.A.E. for lists)

APONOGETON LORIAE

a useful introduction from AUSTRALIA beautiful translucent foliage varying from pale green to reddish brown. Pale yellow flowers above the surface 10/- each

BUNCHES OF ELODEA CALLICHTROIDES

useful for spawning and decoration in cold or tropical aquaria 1/- each 12 for 10/-

Shirley Special this month

ANGEL FISHES IN VARIETY

Angel fishes (small) - 2/6
Veiltail angels - 5/- & 7/6
Black angels - 10/6 & 12/6

Shirley Blue fighters back again unsexed 5/-, pairs 12/6, 20/-

Over 120 plants illustrated in our book

A MANUAL OF AQUARIUM PLANTS

7/6 post paid or from your dealer

GOOD STOCKS OF POND FISHES AND PLANTS STILL AVAILABLE

SHIRLEY SPECIAL PLANT PARCELS

30 plants in variety 10/-
30 plants including unusual species 16/-
Please add 1/6 post & packing.
From Cold or Tropical aquarium

Try your luck at raising Madagascan lace plants.
They seedlings 12 for 10/-, 30 for 20/-
(This month only)

Seeds available also of the following—
Echinodorus cordifolius 5/-, Ech. Bertonii 5/-,
Ech. Martinii 10/-, Ech. longistylus 15/-
per small packet. (This month only)

A NEW RED-LEAFED FORM OF CABOMBA CAROLINIANA 2/6 each, 6 for 10/-
CABOMBA FLAUVYENSIS a VIOLET FLOWERED SPECIES 3/6 each

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, pass the door, slight left "The Cross", Monkspath.
HOURS OF BUSINESS—Weekdays 10 a.m.—6 p.m. Sundays 10 a.m.—12 noon. May—July Sunday Afternoons also.
TERMS OF BUSINESS—Cash with order please. Fish sent by rail. Tropical minimum order £5, insulated container and carriage 10/-. Cold-water minimum order £2 plus 10/- van and carriage. Plants by post (minimum order 10/-) please add 1/6 post and packing.