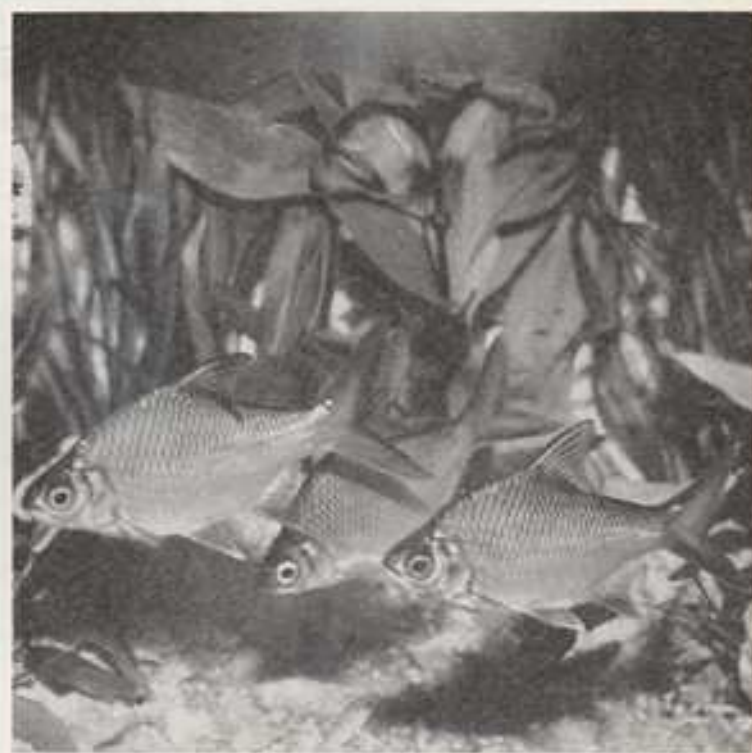


The Aquarist

and Pondkeeper

NOVEMBER, 1961



MONTHLY
Vol. XXVI No. 8

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
- PROCTER 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
- ZOUBEKO 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 2941 and 2528

Heavy Gauge Steel SHELVING

£3.15.0

DELIVERED FREE.



THE ONLY HEAVY GAUGE SHELVING AT THIS PRICE

- Brand new — Manufactured in our works.
- Shelves adjustable every inch.
- Heavy gauge shelves will carry 400 lb. distributed weight each.
- Stove enamelled dark green.
- 6 shelves per bay—Extra shelves 8/- each.
- Quantity discounts.

Other sizes available.
Also available in white at £5 per bay

N. C. BROWN LTD.

A. P. WING

HEYWOOD · LANCS · TEL: 69018 (6 lines)



a
warm
friendship...

A mutual attachment that has earned world-wide reputation for EVANS Heaters. Renowned for quality and trouble-free service, they provide constant warmth throughout the year, in shorts—the best that money can buy.

HEATERS 9/8 THERMOSTATS 18/-



ELECTRONIC DEVELOPMENTS LTD

Evans Works, Shady Lane, Birmingham 21A.
Telephone: Great 891 (3 lines)

"LIQUIFRY"

THE FIRST FOOD (IN LIQUID FORM) FOR BABY FISHES

The World's most recommended fry food.

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

"LIQUIFRY" No. 1 (red tube) for egg-layer fry produces natural infusoria in the minimum possible time.

"LIQUIFRY" No. 2 (green tube) ideal for young livebearers.

Price 2s. 6d. per tube



"PLEASURE"

The Super Food for all
Aquarium Fishes



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

Please send stamped addressed envelope
(3d. stamp) for Free Sample.

"YOUR FISH WILL THRIVE ON PLEASURE"

"LIQUITOX"

The proven specific treatment
for FUNGUS and FINROT

Colourless—effective—does not
harm the plants.

Standard size 1s. 9d.
per carton of 2
capsules.

Breeders 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**

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

RETAIL ENQUIRIES FROM
 ALL LEADING WHOLESALEERS

*Windmill Products always
 make excellent gifts for Christmas*

THE ORIGINAL PREMIER BIOLOGICAL FILTER

***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 AQUARIST

WE WISH! A HAPPY XMAS and PROSPEROUS NEW YEAR TO ALL!

WE DO SUGGEST YOU SHOP EARLY FOR XMAS AS THERE IS AN UNPRECEDENTED DEMAND FOR FISH, AQUARIA, and EQUIPMENT. AN EARLY ORDER MAY AVOID DISAPPOINTMENT. SPECIAL XMAS PRESENTS—ZOOBEKO SILENT PUMP 75/- DICTIONARY OF TROPICAL FISH 65/- ENCYCLOPEDIA OF TROPICAL FISH 60/-

NEW ARRIVALS

- Large Goldfish 10-12" .. 15/-
- Medium Orfe .. 7.8
- 7" Calicut Catfish .. 15/-
- Medium Goldfish .. 3/- to 7.8
- Small Goldfish & Dwarf .. 1/- to 2.8

ALL POND PLANTS STOCKED

THERMOSTATS

- Prockers .. 44.8
- Constant Electrical .. 36/-
- Constant New Electrical Type QK .. 21/-
- UNO ..
- Out/Adl .. 18/-
- In/Adl .. 15/-
- In/Adl "Popular" .. 18/-
- "Popular" with neon indicator .. 12.8
- "In-Ex" Sentinel .. 26.8

AERATORS

- Zooloek Total .. 75/-
- Itesco .. 45/-
- Montrose Major .. 24/-
- Montrose Minor .. 21/-
- "In-Ex" Filter .. 27.8
- Prockers .. 60/-
- "In-Ex" Model D .. 67/-
- Dymak Mk. I A.C./D.C. .. 29 8 0
- Dymak Mk. D A.C. only .. 29 5 0

PISTON PUMPS

- Hy-Bo Junior .. 107.8
- Hy-Bo "A" .. 130/-
- Hy-Bo "B" .. 165/-
- Hy-Bo "C" .. 250/-
- Loam, Model I .. 117.8

Thermometers

- Mercury .. 4/-
- Blue Gem .. 6.8
- Mercury Gem 6/-
- Dumpy .. 6.8
- Sundries ..
- T Pieces .. 9d.
- Clamps .. 1/-
- Aspirator ..
- Tubing 3d. yd. ..
- Ribbon ..
- Tubing 1.8 yd. ..
- Glass Wool 1/-
- Filter Carbon 2/-

Filters

- Corner .. 4.8
- Outcrop .. 18.8
- Windmill Hand ..
- Reactor .. 15/-
- Windmill Air ..
- Reactor .. 10/-
- Consort .. 19.8
- Princess Bio ..
- logical Sub ..
- Grand Filter ..
- 12.8, 15/-
- Sodium .. 8/-
- With Bellows 16/-
- Spin Jim .. 17.8
- Klein King .. 22.8
- Bottom Filter 8.2
- Rock Filter 17.8

PLANTS

- Sagittaria .. 6d. each 2/- doz.
- Valis. Teres .. 6d. " 2/- "
- Valis. Spiralis .. 6d. " 2/- "
- Ambulia .. 6d. " 2/- "
- Ludwigia .. 6d. " 2/- "
- Hygrophila .. 6d. " 2/- "
- Cyrtocornus .. 2/- and 3/-
- Wintersia .. 1.8 " 2/-
- Giant Hygrophila .. 1.8 " 2/-

By post, add 1.8d.

HEATERS 25w to 150w

- F.S. Standard .. 7.8
- Wizard .. 9.8

TROPICALS

Large Neons, 6 for £1; 2.8 each

- Rosacrus .. 2.8
- Angels .. 2.8 & 3.4
- White Cloud ..
- Mollies .. 2.8
- Flames .. 2.8
- Siamese .. 2.8
- Black Widows .. 2.8
- Platy, various .. 2.8
- from 2.8
- Swordtails ..
- various, from 3/-
- Schubert barb 3/-
- Schwanke 3/-
- Guppy/zebra 1.8, 3/-
- Harlequin .. 3/-
- Cherry barb 3/-
- Nigger barb 3/-
- Chequer barb 3/-
- Red Eyed Tetra 3.8
- Red Nosed Tetra 12.8
- Picochromis ..
- 10.8, 12.8, 15/-
- Blue Acan 2/-, thick lip 3/-, dwarf or head 3.8, Kissing 4/-, Opaline 3.8, Gouramis ..

BREEDERS!

ALL GLASS AQUARIA, 5 sizes, 10 x 6 x 6 to 16 x 9 x 9. Callies only.

BOOK CASE

- 48 x 16 x 15 .. 25 10 0
- 36 x 12 x 15 .. 18 10 0
- Standard Box £21 £15 10 £11 5 0

RARE FISHES

- Pelmatochromis Kribbens .. 12/- each
- Elephant Nose Fish .. 20/- each
- Black Veined Guppy .. 15/- pair
- Crown Barb (2 inches) .. 6/- each
- Syngnathus Case .. 10.8
- Terrapin Case .. 10/-
- Red Tailed Shark .. 20/- to 30/-
- Whiptail Case .. 15/-
- Parula Day .. 5/-
- in Linnatus .. 5/-
- Knife Fish .. 15/- to 20/-
- Crown Loach .. 12.8 & 15/-
- Scam from .. 7.8 to 20/-
- Malayan Angelfish .. 7.8 to 15/-
- Ramirez .. 6/-
- Discus .. 40/- each
- Weather Loach .. 5/-
- Blackshark .. 15/-
- Pleurocentrus .. 4/-
- Blind Cave Fish .. 8.8

Our minimum order for fishes is £2, a charge of 12d. bid. is made for container. Carriage charges, by fast passenger train and telegram stating time of arrival.

REPTILES

- Large Common Alligator 20" .. £2 10 8
- Green Lizard .. 7/-
- Wall Lizard .. 7/-
- American Tortoise .. 7.8
- Green Snake .. 5/- & 6.8

STANDARD AQUARIUMS

- (Light Gauge) ..
- (Angle Iron) ..
- 12 x 8 x 6 .. 18/-
- 15 x 8 x 6 .. 8.8
- 14 x 8 x 8 .. 14/-
- 16 x 8 x 8 .. 15.8
- 18 x 10 x 10 .. 21/-
- 24 x 12 x 12 .. 45/-
- 34 x 12 x 15 .. 52.8
- 30 x 12 x 15 .. 70/-
- 36 x 12 x 15 .. 82.8
- 45 x 12 x 15 .. 110/-

COVERS

- 18 x 10 .. 14.8
- 24 x 12 .. 21/-
- 30 x 12 .. 20/-
- 36 x 12 .. 25/-

STANDS

- 18 x 10 x 36 .. 22/-
- 24 x 12 x 36 .. 40/-
- 30 x 12 x 36 .. 45/-
- 36 x 12 x 36 .. 50/-

Aquarium covers sent by post only at customer's risk.

FOODS

- Exotic Flakes .. 1.8
- Hydro Flakes .. 1/-
- Bromium .. 1.8 & 2.8
- Roach .. 6d. & 1.8
- Staring .. 6d. & 1.8
- Dry Daphnia .. 6d. & 1.8
- Liquid .. 2.8
- Infusor .. 2.8
- Elter .. 2.8 & 4.8
- Hobby .. 2.8 & 7.8
- Mel's .. 1.8, 2.8, 6.8, 17.8
- Brite Shrimp .. 2.8, 2.8, 15/-
- Mix & Veg .. 1/- each
- Burman's .. 1.8 & 2.8
- Wardley's .. 8/-, 4.8, 2.8, 2.8, 1.8

THE CENTRAL AQUARIUM

Situated on the A41 Route, opposite Hendon Central Station
 391 HENDON WAY, HENDON CENTRAL, N.W.4 Phone: HEN 9700
 OPEN 8.00 a.m.—7.00 p.m. Emergency Phone: HEN 9700

THE BEST SELLING FISH FOOD BRITISH & BEST

The food in the plastic box
will not foul the water

1s. 6d. - 2s. 6d. - 5s.

6s. 6d. - 17s. 6d.

McLynn's

THE FOOD
FOR ALL FISH

Made by D. McInerny

of McLynn's Aquarium, Ewhurst.

Author of 'All About Tropical Fish'

From your dealer or

McLYNN'S AQUATIC FOODS · DORKING · SURREY

Author of *Exotic Fishkeeping*

MARSHALL'S AQUARIA

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

It is quite easy to get to Buckhurst Hill. By tube train out the Central Line thirty-five minutes from the West End, and we are three minutes from Buckhurst Hill Station. Or by bus routes 20, 38, 167 to Bald Faced Stag, five minutes walk from there. There is always someone in attendance at the Hatchery as you can inspect at any time including week ends. Over 130 different species of fish for sale. Fifty varieties of plants available, collected from our hundreds of tanks for each order and sent direct to you. They cannot fail to grow.

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

Very Large Moors	..	..	..	50/-
Medium Size Moors	..	..	..	20/-, 25/-
Medium Size Fringetails	..	..	..	15/-
Large Orandas	..	..	..	40/-, 50/-
Medium Pearl Scails	..	..	..	50/-
Medium Brass Yellow Lionhead	..	..	..	55/-
Large Lionhead	..	..	..	60/-, 80/-
Medium Scaled Telescope	..	..	..	15/-
Medium Calico Telescope	..	..	..	20/-
6" Black Lace Angels	..	..	..	pair 40/-
Kribia	..	..	..	each 6/6 to 15/-
Discus	..	..	..	30/-, 40/-, 100/-, 200/-
Marble Cichlids	..	..	..	8/6
Severum	..	..	..	1/6, 2/-
Red-Tailed Sharks (Garis)	..	..	..	15/-
Large Breeding Pairs Rainforest	..	..	..	pair 50/-
Special offer, all good plants: Water Rose 3/6, Water Poppy 3/6, Water Clover 2/6.				

Send S.A.E. for our list of over 120 species of Tropicals.
Fish by Rail—12/6 Carriage Pack and Telegram.

Shop suited small tanks for sellers only. From 6/- each.

Dealers—Send for wholesale price list

Broad Leaf Amazon Sweet Plants 10/-, E. Radiant 10/-, Cellophane Broad Plants 10/-, Cape Fear Spurnetock 6/6, Round Southern Spurnetock 4/6, Underwater Orchid 6/6, Bicolor Plants 6/-, Dwarf Lily 5/-, Anubias 6/- doz., Calanthe 7/- doz., Red Ludwigia 6/6 doz., Distalda 1/-, Waterlily 1/-, Giant Hyacinth 1/6, Giant Bacopa 6/- doz., Utricularia 2/6, Twisted Vallis 5/- doz., Mixed tropical or coldwater plants 10/- 1/2 parcel 5/6, Malayan Snails 2/- doz., assorted snails 3/6 doz. all post paid.

Our Fish Food is the finest obtainable and contains a very high proportion of the best liver and young haddock heart. Test direct from here so that it is in perfect condition and ensure that it is not adulterated in any way. Your fish deserve the best food you can give them. N.O.F.F. (Nature's Own Fish Food) is the best. Any of the Cichlids eat it greedily. A generous sample will be sent post free for 2/6. Try it and give your fish a real treat. Triple quantity 6/-.

Everything we sell is the best on offer. We supply everything for the Aquarist in the way of equipment and post free. Our offer of a Thermometer, Heater and Thermometer at 10/- post paid is still open.

PLEASE NOTE

The books written by Thos. H. Marshall: 'Breeding the Egg-layers', 'Breeding the Livebearers', 'Breeding the Labyrinth', 'Breeding the Cichlids', 'Aquarium Management and Fish Farming', 'Aquarium Plants and Snails', are all available from here at 2/- per volume, post free, or a complete set for 42/6 post paid.

We are always prepared to give advice on all phases of fish keeping and tropical breeding tanks set up for many different species of fish can be seen in our Hatchery. We are pleased to welcome Club visits, see previous advert. At the moment we have many breeding pairs of various fish to offer—notably very large Black Lace and Black Veiled Angels, King Gouramis 6" long, several species of Large and Dwarf Cichlids, write for details.

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

TROWER'S

the best fish foods . . .



For nutriment value and palatability start feeding today on these hygienically packed fish foods—foods for all varieties of tropical and coldwater fish, blended by the fish specialists; in colourful drums. Available from all aquaria and pet shops

TROWER & CO. LTD. *Established 1876*

TREMADOC ROAD, CLAPHAM,
LONDON, S.W. 4



ANT EGGS *Drum 6L*



TROPICAL FISH FOOD *Drum 6L*



GRANULAR FISH FOOD *Drum 6L & 1L*



SHRIMP FISH FOOD *Drum 6L*



DRIED DAPHNIA *Drum 6L & 1L*

Christmas Gifts

BOOKS

Guide to Tropical Fishkeeping (J. H. P. Brymer)	36/6
Diseases of Fishes (C. Van Doin)	15/6
Illustrated Dictionary of Tropical Fish (Hans Frey)	67/6
All about Tropical Fish (McInerney)	77/-
Encyclopedia of Tropical Fishes (H. L. Axelrod and W. Vorderwinkler)	62/6
Electricity in your Aquarium (L. Warburton)	8/6

(Books post free)

Order now to avoid disappointment

REMEDIES, etc.

Bronzer White Spot Care	2/-	Charox (Not by post)	2/6
Yivo Salt	2/-	Liquor	1/9
Sea Salt	1/6	Dissolvin	2/6
		Bronzer Fertilising Tablets	1/6

BOW-FRONTED AQUARIUMS

48in. x 30in. x 15in. bow-fronted aquarium with wrought iron bookcase stand £28/5/0 complete.
36in. x 24in. x 15in. bow-fronted aquarium with wrought iron bookcase stand £18/18/- complete.
Available in penny terracotta, black & gold, and crystal

WITH PLAIN STAND

Teiler 48 x 30 x 15	£21.0.0
" 36 x 24 x 15	£15.10.0
" 24 x 12 x 15	£11.0.0

Complete with Stand and Hood (17in. to centre of base)

STANDS

All Standard Sizes of Aquaria in Stock. Any shape or size made to Customers' Specifications. Installation a Speciality.	18 x 10 x 36 ... 35/-
	24 x 12 x 36 ... 45/-
	30 x 12 x 36 ... 50/-
	36 x 12 x 36 ... 55/-

THERMOSTATS

Constant External	each 35/-
Constant New External	20/-
Type QK	20/-
UNO	10/-
Out. Adj.	15/-
In. Adj.	15/-
"Popular" with stem indicator	15/-
"Ex-Ex" Stemless	26/6

THERMOMETERS

Mercury	each 6/6
Gen.	6/6
Plastic Backed	6/6
Spirit Blue Gen.	5/-
"Ex-Ex" Dismey	6/6

FILTERS

"Windmill" Plastic Outside Filter	each 19/6
"Windmill" Biological Aquarium Filter 12in.	15/-
"Windmill" Ringless Inside Filter	10/-
Current Filter	6/-
Air Lid	2/6
"Slim Jim" Outside Filter	17/6
"Klear King" Outside Filter	22/6
Bottom Filter	9/3
Ornamental Rock Filter	17/6

(see Liquidity advert.)

AERATORS & PISTON PUMPS

Moment	each 21/-
"Ea-Ea" Fairy	24/-
"Ea-Ea" Fairy	27/6
Star	36/-
Zodiac Total	75/-
Hy-Do Junior	107/6
Hy-Do "A"	130/-
Hy-Do "B"	165/-
Hy-Do "C"	250/-

HEATERS

"QUEENSBOROUGH"

2in. - 40w. - 60w.	75/-
7in. - 100w. - 120w.	150/-
150w.	18/-

"Ea-Ea" Flexible Heaters (100w. and 150w.) 18/-
"Ea-Ea" Thermostatic Heaters, 100w. and 150w. 36/-
Heater Holders 2/-

BACKING PAPERS

STRATA ROCKWORK

PEBBLE BEACH

SEA & SHORE

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

LIVE FOODS

Brine Shrimp Eggs	2/6 and 4/6
Columns of Nematodes	1 in. ... 7/6
White Worm	3/-
Mouse Worm	3/-
Tadpole worms	1/6 and 2/6 post free

SPECIAL OFFERS

30 Assorted Tropical Plants 10/-
30 Assorted Cold-water Plants 10/-
40 Special Tropical Plants 20/-
(Tropical and Coldwater Fish List on application S.A.E.)

FOODS

"Channabough" Tropical Fish Food 1/6 and 2/6

Exotic Flakes	1/6
Hydro Flakes	1/-
Bronzer	1/6 and 2/6
Bronzer Frygins	1/6
Bronzer Growth	6d. and 1/6
Liquidity Nos. 1 and 2	2/6
Infant	2/6
Elite	2/- and 4/6
Dried Daphnia	Our 6d.
Ground Shrimp	1/-
Fish Food	1/6

Ants Eggs 6d.
Wardley's Trout Pac. 7 kinds of food 8/6
Hi-Glow 8/6

SEDIMENT REMOVERS

"Windmill" Air	each 10/-
Keyston	10/-
"Windmill" Hand	15/-
Keyston	15/-
Futrol	5/-
System Tubing	7d. 0.
Hand Type Plastic	4/6

FULLY-GLAZED AQUARIUMS

Pressed Steel	Aluminium	Angle Iron
12 x 6 x 8 10/6	8/6	24 x 12 x 12 50/- 21/- 8/6
14 x 8 x 8 13/6	7/6	24 x 12 x 12 55/- 21/- 8/6
16 x 8 x 8 15/-	7/6	30 x 12 x 12 70/- 27/6
18 x 10 x 10 22/6 18/- 8/6	8/6	36 x 12 x 12 85/- 32/6

Carriage extra

PLANTS each

Valisneria spiralis	6d.
Elodea densa	6d.
Hygrophila	6d.
Rorippa	6d.
Sagittaria nutans	6d.
Sagittaria nuda	6d.
Valisneria spiralis	9d.
Ludwigia	9d.
Myriophyllum	9d.
Sparganium	3/6 and 5/-
Cryptocoryne Beckwithii	2/-
Willard	2/6 and 5/-
Carolea	2/6 and 5/-
Marstonia	2/6 and 5/-
Water Wistasia	2/6
Giant Hygrophila	2/6
Giant Sagittaria	2/6
Najas Microdon	2/6
Amazon Chain Sword	1/6
Duckweed	per portion 6d.
Riviera	per portion 1/-

SUNDRIES each

Breeding Trap	15/-
Agave Sponges	5/-
Agave Tongue	3/6
Suckers Knob or Shank	4d.
Double	6d.
Planting Sticks	1/3
Razor Scraper	2/-
Dry Floating Rings	1/-
Squares	1/6
Hydro (4 in. out) Feeder	2/3
Worm Floating Feeders	1/6
Worm Cradle with Sucker	1/6
"Windmill" Diffuser	1/- to 1/6
"F" Piece	1/-
Aerator Tubing	1/6
Rubber	1/6
Plastic	1/6
4 Way Piece	1/-
Clamps	1/-
Carbon	1/-
Glass Wool	1/2
Nylon Wool	1/6
Colorfines	1/6
Coloured Chips	1/6
Arbolic Glazing Compound - 2 lb.	4/3

Post 1/0 extra

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

QUEENSBOROUGH FISHERIES

<p>111 GOLDBAWK ROAD, SHEPHERD'S BUSH, W.12 (1 minute from Shepherd's Bush Market) Telephone: SHE 2738 Hours of Business: MON. to SAT. 9 a.m.-4.30 p.m., THURS. 9 a.m.-1 p.m.</p>	<p>QUEENSBOROUGH HOUSE, Ferry Lane, Hythe End, Wraysbury, Nr. Staines Telephone: WRAYSEBURY 1385 Sundays only from 10 a.m. to 4 p.m.</p>	<p>16 PICTON PLACE, LONDON, W.1 (1 minute from Selfridges) Telephone: WELBECK 0438 Hours of Business: MON. to FRI. 9.30 a.m.-4 p.m., SAT. 9.30 a.m.-5 p.m.</p>
--	---	---

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.

Contents

	Page
Editorial	155
Oddities in the Aquarium	156
Heating Troubles	158
The Rosy Tetra	159
Stocking the Garden Pond	160
The Chapter	161
When Fishes Migrate	162
Breeding <i>Aphyonion bistratum</i>	163
Newts in the New World	164
Readers' Queries Answered	167
The Cow-fish	168
Our Readers' Write	170
Raising Big Guppies	172
News from Aquarists' Societies	173

VOL. XXVI No. 8

1961

Editorial

THE age to which fishes will live in aquaria is a topic about which there is very little reliable information. Isolated reports on the longevity of individual specimens of a particular species are not specially helpful, because, from our knowledge of the variability of living things, considerable differences would be expected to be found from strain to strain and from individual to individual and indeed for the two sexes. Only by prolonged study of large numbers of a single species kept under identical, constant and near-ideal conditions can the range of expectation of life for the fish become known. Such a study is no minor undertaking, but aquarists who specialise in one or two kinds of fishes could help to provide useful information here by keeping accurate records of births and deaths. Even for the commonest fishes longevity records are scanty.

How long, for example, do you expect your guppies to live? In the course of experiments on the effects of ageing in these fish Dr. Alex Comfort, of University College London, has observed that some females live for 5½ years. Dr. Comfort's stock is kept under strictly supervised conditions and have a simple diet of *Tubifex* worms with monthly provision of Bemax. He has recently published (in the scientific journal *Gerontologia*) some results of studies on the reproductive life of the female guppy, and these show that the fish of his strain are capable of mating and producing young at least up to the age of 3 years. Those females that were kept apart from males (in a state of "chronic spinsterhood") were found to become fertilised and to produce young when placed with a male for the first time at about 3 years of age. One female, mated for the first time at 1,003 days, was still fertile at over 5 years (1,810 days)!

This last-mentioned finding is surprising, because it is known that male guppies kept apart from females for about 7 months (over 200 days) lose their capacity to become fathers; they still produce sperms but appear unable to mate successfully. These great ages reached by the guppies under experimental conditions are, of course, unlikely to be attained in natural surroundings.

Oddities in the Aquarium

(PART III)

by R. E. MACDONALD

IN this article we meet a few more odd fishes typical of the many strange creatures that can be found beneath the surface of the water that surrounds the continents and islands, or inhabiting rivers and streams.

One-sided Livebearer

A very odd species is the one-sided livebearer (*Jenynsia lineata*), of the family Poeciliidae. As with other live-bearing fishes, the male possesses a modified anal fin or gonopodium that is used as the intromittent organ. The peculiar feature of this species is that the gonopodium is restricted to movement in one direction only, either to the left or to the right. The male fish cannot move its gonopodium in both directions.



One-sided livebearer (*Jenynsia lineata*)

As if to make matters worse, the female is similarly affected, for her genital opening is covered by a large scale that hinges either to the left or to the right. Thus a "right-handed" female, for example, can only be fertilized by a complementary male. The same applies to "left-handed" fish. One positively shudders to think what would happen if all male and female fish were born of an uncomplimentary nature. However, Nature takes good care to ensure that there is a reasonable distribution of both "left-handed" and "right-handed" types!

Chameleon Cichlid

Unlike the one-sided livebearer, the chameleon cichlid (*Cichlasoma fasciatum*) possesses a most co-operative reproductive system, but for some obscure reason this fish is able to change its colour at the drop of a hat! Normally this fish is olive-green with dark blue-black bands or vertical bars, but with its changing moods and fancies, gold, yellow, green, purple or red can readily be procured.

I say for some obscure reason this species changes colour because there appears to be no apparent reason why it should do so. Observation indicates that there is no sexual link with the colour change although the colours become most brilliant at breeding time. Nor can it be on the grounds of an inferiority complex because this particular species is extremely predatory and can grow to a length of some 10 inches. It can become quite a formidable character in fact! The only reasonable explanation



Chameleon cichlid (*Cichlasoma fasciatum*)

must be that it prefers to change colour for the same reasons that a woman consistently changes her mind!

Archer Fish

A species not so frustrating is the archer fish (*Toxotes jaculator*) that hails from the far east. Nearly all the specimens in this country are imports. These fish are capable of spitting drops of water at insects or over-inquisitive aquarists some distance away and with some considerable velocity.



Archer fish (*Toxotes jaculator*)

The effective range of the missile lies between 3 and 4 feet. Many a tasty insect is "shot down" in this manner for food. The fish is known as a surface-feeder. I have also known archer fish to leap completely out of the water to catch insects on the wing in their mouths.

The Aquarist has previously published articles on the archer fish by Jack Hems (November, 1960) and by myself (January, 1961).

Headstander

Many aquarists are already familiar with the antics of the headstander (*Abramites microcephalus*), a fish that spends hours standing on its head at an angle of 90 degrees from the horizontal. This yellow, brown and black fish is an inhabitant of the lower Amazon, and, as the breeding process appears to be something of a mystery, all specimens



Headstender (*Abramites microcephalus*)

here are imports. This fish is most decorative and amusing to watch.

Walking Fish

The walking fish (*Anabas testudineus*), however, is a sheer delight for those aquarists who wish to study the many peculiar habits and particularly the biology of fishes. As its name implies, this species is capable of walking over land for some considerable distance and has the ability to utilize atmospheric oxygen.

Why does this species leave the water? Well, there are various reasons, the main ones being: (1) in search of fresh breeding grounds; (2) in search of better environmental conditions; (3) because actually living for a while on land has become part of the normal procedure in the life of these fish. Walking fish do not leave the water in search of food, although they may devour any insects or worms that happen to cross their path during their wanderings.



Walking fish (*Anabas testudineus*)

Before an aquatic creature is able to absorb atmospheric oxygen it requires the presence of an accessory branchial organ in addition to the usual gill respiratory system. This special branchial organ consists of a series of thin, concentrically arranged bony plates that are covered with a mucous membrane containing blood vessels capable of absorbing oxygen. The hollow nature of the branchial cavity enables it to retain water for some considerable time so that it can be used to keep the gills moistened; without this the fish would die. The normal gill structure represents only a small percentage of the total respiratory area; the major part of the fish's respiration is performed by the extra-branchial organ.

A fish of this species, if prevented from reaching the surface of the water by means of a wire mesh, soon begins to suffer from the lack of atmospheric oxygen and indeed actually suffocates if sole reliance is placed upon the normal gill system for absorption.

The progress of this fish across land is extremely ungraceful but comparatively fast. Propulsion is achieved by a series of jerks, lateral motions of the tail being used to give the forward impetus, and the paired fins (e.g. pectoral fins), rather in the manner that seals use them, to maintain an upright position.

This species is rather drab in colour (a uniform dark brown), but this is to be expected if the fish is to leave the water for any period of time. Bright colours would immediately cause the defenceless fish to become conspicuous.

The walking fish is a member of the Anabantidae family, which includes the fabulous Siamese fighting fish (*Betta splendens*), and it is also known as the climbing perch.

How the name "perch" ever came to be applied is something of a mystery, for this fish is not even remotely related to the true perches. Apart from the ability to walk on land and to breathe atmospheric oxygen, this species also possesses extremely good vision in air and a "homing" instinct, both of which are somewhat rare in fishes.

Mudskipper

The mudskipper (*Periophthalmus barbarus*) has very similar habits to those of the walking fish. This fish can jump as well as walk and lives in mud holes and mangrove swamps and can jump any distance up to 20 feet. Unlike the walking fish, which uses its tail for locomotion, the mudskipper uses the pectoral fins, which are extremely muscular.



Mudskipper (*Periophthalmus barbarus*)

By far the most peculiar feature of this fish is the manner in which the two great eyes are situated on top of the head. These are fitted to extensions similar to those of snail's eyes (though perhaps not so exaggerated) and can be raised or lowered at will! The eyes also possess independent vision, which means that there are times when the mudskipper will be observed swimming with one eye searching below the surface of the water and the other eye above. This species is best kept in an "aquaterrarium."

Japanese Weatherfish

Last, but by no means least, is the Japanese weatherfish (*Misgurnus anguillicaudatus*). It is called the weatherfish because of its sensitivity to barometric changes. The lower the glass falls, the greater becomes the fish's agitation. In fact, an imminent summer storm appears to drive this species nearly crazy, which results in gravel being strewn to the four corners of the tank and a vast uprooting of the vegetation. I can think of more peaceful forms of barometers!



Japanese weatherfish (*Misgurnus anguillicaudatus*)

To say that the species introduced in this and the preceding articles amount to the sum total of all the oddities in the aquatic world would be very foolish indeed, for there are over 40,000 different known species of fishes alone on our planet. Even this figure would not account for even a very small percentage of the amazing beings found all around us.

Ever since man walked the earth he has turned his eyes outward to the stars and has sought knowledge away from his native planet, wondering all the time about the strange creatures that will eventually be found out there. Yet how often are we reminded that two-thirds of our planet is covered with water and as yet this greater mass remains unexplored. Surely this amounts to being the greatest oddity of all?

Heating Troubles

by R. E. MACDONALD

THE very first tank that I ever set up was stocked one Saturday afternoon. During the following night the contacts in the thermostat stuck and by Sunday morning all the fishes had been boiled alive, with the exception of a few guppies and zebras that appeared to be thoroughly enjoying themselves.

It is not until an accident of this nature actually occurs that one realises the full fatal consequences. Many aquarists, if not all at some time or other, become afflicted with this or a similar disheartening disaster.

It is only fair to say that the many well-known thermostats and heaters of proven quality on the market rarely give trouble, but as with so many other goods, there are always unscrupulous manufacturers only too willing to produce cheap and shoddy articles at the expense of the unfortunate less-wealthy hobbyists. However, many of the heating failures experienced have absolutely nothing to do with appliances and can be caused by such things as blown fuses, faulty wiring or power-station failures; I wonder how many aquarists were caught on the hop during that last little episode in the London area when almost every electrical service was "blacked out."

The normal procedure is to keep the tanks under constant observation and, after allowing for the prevailing weather conditions at the time, any abnormalities can soon be detected; but no matter how ardent an aquarist may be, at some time or other he must sleep or perhaps succumb to the desire to watch a particular television programme—what then? If the situation calls for it, e.g. if expensive stock is involved, some form of warning system should be installed. This warning must be audible and automatic, for unless one virtually keeps one's eyes glued to the tanks there is no apparent indication that things are going wrong.

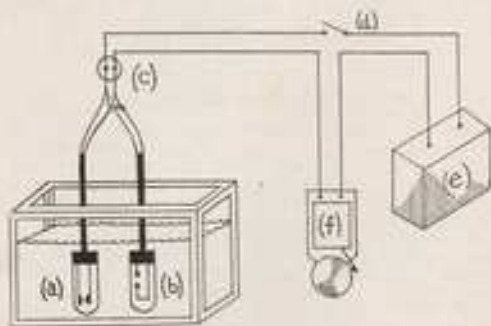
The problem of supplying an audible warning to indicate an excessive temperature rise or fall is a comparatively simple one. To warn of an excessive temperature fall, a simple circuit consisting of a "tried and trusted" thermostat, a 6 volt bell and a 6 volt battery should be wired as illustrated. The thermostat should be set for a temperature just below that of the minimum reached by the thermostat operating the heater and then immersed in the tank. Should the water temperature fall and the heater thermostat fail to switch the heater on, the lower set thermostat on the warning circuit will operate, causing the bell to ring until the fault is rectified or the temperature of the water rises. To stop the bell ringing, a lead to the battery can be disconnected or a switch placed in the circuit to break the current.

The current feeding the warning system should come only from a battery and not from any other source such as a mains bell transformer, as a battery circuit will keep the warning system independent and therefore free from outside influences such as power-station failures or blown fuses.

A warning of overheating, i.e. an excessive temperature

rise caused by the contacts in the thermostat sticking, can be provided for in the same way as already explained except that a mercury switch designed to close a circuit when a given temperature is reached is installed in place of the "tried and trusted" thermostat. The circuit should be wired also as illustrated and the mercury switch set at a temperature just above that of the maximum reached by the thermostat operating the heater. The circuit will then give an audible warning if the heater thermostat fails to switch the heater off.

It is because of the possibility of power-station failures, that can mean quite a long period without electricity, that I prefer tanks with a slate bottom. Burners that have been previously trimmed and adjusted to give the required heat can be kept handy and moved into position to keep the water in the tanks warm while the failure lasts.



Arrangement of apparatus to give warning of fall in aquarium water temperature: (a) thermostat; (b) thermal mercury switch; (c) flex connector (this can be used to break the circuit in place of switch d); (e) 6 volt battery; (f) 6 volt bell

Obviously, the only sure way of eliminating heating troubles is to move to a country with a warmer climate, where the temperature of the water is maintained at a comfortable 75°F by natural means. Such ideal conditions, to the average British aquarist, are reserved exclusively for fire-side day-dreaming when thick, "pea-soup" fogs swirl menacingly outside closely shuttered windows on November evenings and when the slightest sign of frost sends the agitated aquarist scurrying to his fish house to watch tenderly over his stock! I shudder to think what would happen if I awoke one winter morning to find half an inch of ice in my tropical tanks—that thought alone made me devise a suitable warning system!

The Rosy Tetra

by J. STOTT

FOR a number of years the rosy tetra (*Hyphessobrycon rosaceus*) has maintained its position among the more popular tropical aquarium fishes. It has a peaceful disposition and is, of course, a favourite species for inclusion in the ornamental community tank. When in a healthy condition the colour of this tetra is, in the main, a deep rose darkening on the upper parts of the back with a brownish tint and tinged on the under side with a greenish silver sheen. The fins are flushed a deep pink and the dorsal carries a large black spot with a white tip. Both the large anal fin and the pelvic fins are tipped with white, but the pink is deepened towards the edges with a brown flush. The colour of the male is a little more intense than that of the female but the principal feature of identification is the much larger and pointed dorsal fin of the male.

When fully grown the fish is around 1½ inches, the male being slightly larger than the female. The female is rather deeper in the body when mature.

As far as breeding is concerned the rosy tetra can be very temperamental and troublesome at times. It is suggested that the following conditions are needed as an aid to success, although they by no means guarantee that spawning will take place.

First of all, breeding stock should be at least 12 months old and the selected pair fully conditioned. It is essential that the water in the breeding tank should be acid, say around pH 6.4 to 6.6, at a temperature of 80°F. The intended breeding pair should be conditioned on live foods for about 2 weeks before being introduced to the breeding tank. A temperature of around 72°F should be used while they are under conditioning and the water about pH 6.8. Before setting up the breeding tank subject it to a thorough disinfecting and then wash out with tap water which has been boiled (do not use the water until it has cooled, to avoid cracking the glasses). Use coconut fibre or willow root for a spawning medium but first sterilise it by boiling.

Spread the spawning medium fairly thickly over the base of the tank and anchor it down here and there with a small stone, in such a way as to leave a space of about 2 inches clear between the top of the spawning medium and the water surface. This is to permit spawning over the top of the medium, as the rosy tetra so frequently does this, especially in the early stages of the spawning.

Once the pair have been introduced to the breeding tank it should be shaded or the tank put into such a position that it will receive only very subdued light. Usually 2 or 3 days will elapse before spawning takes place, and then it will last about an hour, after which the pair should be removed, for they are keen egg-eaters.

Hatching occurs in about 36 hours and the fry become free swimming in 3 to 4 days, when Infusoria feeding can be commenced. They should be kept on this for about 3 weeks, and then newly hatched brine shrimps may be



Rosy tetra (*Hyphessobrycon rosaceus*). Upper fish, female; lower fish, male

given; but keep the Infusoria feeding going for at least another 4 or 5 days, when it may be stopped altogether and micro worm can be given. This can be followed by screened *Daphnia* and shredded white worms. During the rearing avoid overcrowding or heavy losses will occur. Gentle aeration should be given if there is any fear of space being limited.

For the first 3 months the growth of *H. rosaceus* fry is rather slow, but after this the rate of growth increases rapidly and by the time they are 6 months old they should be approximately an inch in length. By the tenth month they should have reached mature size.

Stocking the Garden Pond

by A. BOARDER

WHEN stocking a garden pond for the first time it is probable that the pondkeeper will wish to include many kinds of fishes, with the idea of making the pond similar to a natural lake. This is all very well if the pond is of a reasonable size, but to try to keep too many kinds of fishes together in a small pond is just asking for trouble. It may be very nice to be able to say that there are specimens of most of the coldwater fishes in the pond, but there is such a thing as overcrowding and this will encourage trouble from the outset.

There are many kinds of fishes suitable for including in the pond and there are also a few which are better left out. Let us consider which types are the most suitable. It is always better to stock with types which can be seen most of the time, and this consideration is most important. It seems rather senseless to use fishes which spend most of their time at the bottom of the pond, where they can rarely be seen. I think that the finest fish for the medium pond is the golden orfe (*Ictalurus var. orfatus*). It is a stream-lined fish and one which likes to inhabit the upper areas of the water. It can then be seen most of the day as it swims rapidly about in its search for food. It has many good points and so few bad ones that I consider it to be the very best fish for most ponds. Its advantages are that it is very active, can be seen most of the time, is an easy fish to feed and a fast grower. The only fault I have to find is that in a few years orfe can grow very large, up to 18 inches long, and then are in great danger in a small pond of being suffocated during very warm or close weather.

Small orfe about 3 inches long will double their size in a year if fed well and grow very fast as long as they have plenty of swimming space and enough food. As for food, they will readily take most live foods such as garden worms, white worms, *Tubifex*, maggots, bluebottles and even wasps. They will also take the dried foods that are fed to goldfish and so their feeding presents few problems. For a pond of about 8 ft. by 8 ft. area half a dozen young orfe are enough. Do not buy large fish as small ones seem to become established better and soon grow on, whereas large fish which have spent some years under different conditions may find it harder to get used to the changed condition and may not recover from the initial change. If fish 3 inches long are introduced into a good pond in the spring it is possible that they will be 6 inches or more in length by the next winter.

When the orfe grow to a large size, say a foot or more in length, you must watch the water carefully in the summer. These fish are fast swimming and very active all the time, and so need a great deal of oxygen. If the pond water becomes foul the large orfe are soon in trouble and may even die if fresh water is not run into the pond to give more oxygen. If a fountain or waterfall can be provided, to be put in action during the nights when it is close and thundery, it will save the orfe from being suffocated. It is possible to breed from these fish in a large pond, especially one which is fed with running water. The orfe is rarely troubled by pests or diseases and in my experience is easier to keep in good condition than any other pond fish,

provided that, of course, it has enough room and is fed correctly.

Having claimed the orfe as the best fish for the pond, which is my second choice? I plump for the scaled fantail goldfish as being a fine hardy fish, more handsome than the common goldfish but one which is hardy enough to go through the winter in an outdoor pond. The red scaled fantail is a type which is active without being one which rushes madly around, and it is also one which likes to inhabit the upper levels of the water and so is usually on view. Having kept scaled red fantails in a garden pond for well over 20 years I can say quite definitely that they are one of the finest fishes both for the pond and for the indoor tank. The scaled type are harder than the calico or shubunkin types. It is possible to winter the shubunkin type in the pond but it may be found that they are more prone to swim-bladder trouble and fungus disease than the hardier scaled types.

The fantails seem to winter much better than veiltails out of doors and the flowing finnage of the veiltail goldfish does become attacked by fungus, fin competition and fin-rot. The veiltails are not as active as the fantail and so may spend much of their time near the bottom of the pond and not be seen.

The next favourite fish for the pond is the shubunkin. A good strain can be very brightly coloured and so will show up well in the water. A good strain of shubunkin which has been bred under cool conditions can be quite hardy and can pass the winter quite safely in the garden pond. The shubunkin is an active fish with few faults as long as the water is not fouled by decaying vegetation or unclean food. Then we have the old favourite, the common goldfish. I cannot speak too highly of its importance as a fine introduction to any pond. I suppose that 98 per cent. of beginners with a garden pond will start with the common goldfish. They will also probably be well rewarded, as if conditions are right the common goldfish soon makes itself at home and thrives as long as fair treatment is given.

When buying your goldfish do try to pick out the ones which have an erect dorsal fin. I have yet to see an ailing goldfish with its dorsal fin erect. Many of the goldfish are imported these days and have a tough time surviving often overcrowded conditions, but if carefully chosen it is possible to get these fish in much better health after a few days when they have space in which to swim instead of trying to exist like sardines. Many dealers seem to think that it is imperative to exhibit their goldfish in tanks which are very overcrowded, and why this is so I just cannot understand. It would surely be better to show a few fish in a well set-up tank, living under conditions which would enable them to show off their beauty.

The common goldfish can be had in all gold, all silver or gold and silver. Many small goldfish may have black markings but these usually disappear as the fish matures. There are so many varieties of the goldfish that the newcomer to the hobby may be a little bewildered about which kind to buy. I would advise such people to gain some

experience with the more common kinds before launching out with some of the more uncommon and perhaps difficult ones. Later on when some experience has been gained it will be possible to try some of these unusual varieties. The moor is a black fish with protruding eyes and one which I would not recommend for the pond. The eyes could be damaged on rockwork or the fins could be damaged by fungus or fin-rot, especially in the winter. This fish is also a poor swimmer and even in a tank it will lie on the bottom for hours, and so is not likely to be seen much in a pond. For similar reasons the veiltail, although a very handsome fish, is not so good for the outdoor pond. These fish have a very short round body with restricted intestines and so are rather prone to attacks of swim-bladder trouble, especially when the water gets cold in winter. The finnage is also very flowing and soft and this is often spoilt by fin congestion during cold weather. This disease causes red blood streaks on the fins and if it persists can be the start of fin-rot, when the edges of the fins become badly frayed.

The oranda is a similar fish to the veiltail but has a large protuberance on the head. This same formation is carried by the lionhead, but this fish has no dorsal fin and has the tail of the fantail. It is therefore less likely to be attacked by fungus etc. in the pond than the types with flowing

finnage. The celestial, with its upturned eyes, is not a good fish for the beginner and is better kept in a tank. The bubble-eye is also a fish which would be better in an inside tank as the bulbous eyes could be damaged very easily by rockwork in the pond.

The comet is a fine fish for the pond if it is available but it seems that there are few of these offered for sale to-day. This fish is a stream-lined type of goldfish with a long flowing tail. It used to be available in several colours, gold and silver being the most favoured. It is better than the common goldfish for the pond as it is a faster swimmer and appears to like the upper levels of the water. It does not appear to be attacked by disease as much as some of the fancy varieties of goldfish. If comets can be obtained then they will be a worthwhile buy. Such fish as the pearl scales and pom-poms are not very suitable for the pond as their individual peculiarities would not be very obvious there.

As for fishes other than goldfish varieties there are several to choose from, but as some can be dangerous to other fishes and some remain at the bottom, some thought should be given before introducing them to the pond. Good kinds are: rudd, both golden and silver; tench, green and golden; carp, both hi-go and common; minnows. Fishes which can be dangerous are pike, perch and catfish.

The Chaperi

by JACK HEMS

ALTHOUGH the chaperi (*Epiplatys chaperi*) is native to West Africa, from Sierra Leone to Nigeria, it thrives best in the lower temperature range, that is from the middle sixties to the low seventies. In this respect it resembles the charming White Cloud Mountain minnow, which dislikes, nay, often weakens and dies, in tropical heat.

The history of the chaperi as an aquarium species goes back a long way, for pioneer German aquarists first kept the fish more than 50 years ago. Incidentally, in the early days of the hobby, it was formally referred to as *Haplochilar chaperi* or *Panchax chaperi*.

E. chaperi is a member of the family Cyprinodontidae, which is represented to aquarists by about 70 species. In the main they are characterised by an elongated body, depressed towards the head and compressed posteriorly. Further, the dorsal and anal fins are set back near the tail.

The male chaperi has a dark-brown back and greenish sides adorned with four or five black bars. His lower lip and throat are splashed with scarlet. Many of his scales reflect green, blue, gold and red lights. The bottom edges of the anal and caudal fins are lined with black. The lower part of the caudal fin is prolonged into a short, thorn-shaped extension. Some red dots are present in the pointed dorsal fin. The female has a greenish olive body marked with several dusky bars and smaller and rounded fins. Fully grown, the species attains a length of about 2½ in.

Generally speaking, the chaperi is a sluggish fish which spends most of its time loafing in the plants growing near or at the surface of the water. It is none the less capable of extremely rapid movement when its appetite has been stimulated by the sight of live food, or when it is out to

elude capture in a net. It is also an accomplished jumper.

Thread-like worms, dispensed from a perforated feeder, *Daphnia*, brine shrimps, gnat larvae and the like help towards keeping it in robust health. But it is not faddy over food, and will accept almost anything small enough to be swallowed. Unless the water is very shallow, it seldom takes food from the bottom.

Although *E. chaperi* is peaceful and can be kept with other fishes, it really deserves a tank to itself. A tank measuring about 18 in. by 10 in. by 10 in. is large enough to accommodate a pair. It should be well stocked with plant life. The most satisfactory plants to use are those with bushy or thread-like foliage, among which the fish likes to court and lay its eggs.

There is nothing spectacular about the spawning procedure. The couple (the female assumes fuller sides when she is ready to spawn) take up a side-by-side position and, after some wriggling movements and spreading of fins, the female deposits a single sticky egg. This performance is repeated every now and again over a period of a week to a fortnight. Some breeders, greedy for fry, give an energetic and brightly coloured male several wives. He will look after them all in turn.

After spawning is over, it is a wise precaution to transfer the parent fish to another tank because though they seldom develop a taste for their eggs, they are not above making a banquet of their fry. Conversely, vegetation containing eggs may be incubated in a separate container.

At a temperature of 72° to 75°F the eggs take about 14 days to hatch out. The newly hatched fry look all eyes and measure roughly ½ in. long. They are easy to feed, for aside from Infusoria, they are large enough to take powdered dried food, micro worms, sifted brine shrimps and so on from the very start.

As the eggs are laid on different days, it follows that the fry are of odd sizes. To preclude the larger ones picking on the smaller ones and bullying them away from food (or even looking on them as food), it is a good idea to sort them out every now and then. A Pyrex dish floated in the aquarium makes a good temporary home for the tiniest fry. Normally the youngsters reach full size within the space of a year. Ordinarily, 50 to 70 eggs are laid at a spawning

When Fishes Migrate

by DAVID GUNSTON

MIGRATIONS in Nature are popularly associated with birds and less commonly with other animals, but of course fishes generally undertake considerable migratory journeys, many of which are just as remarkable as those undertaken by birds. Just as there are virtually no completely non-migratory birds, so there are hardly any fishes that make no migrations at one time or another during their life cycle, save for the enforcedly static inhabitants of small self-contained lakes or ponds.

It is generally accepted that the reasons why birds and land animals migrate are to obtain food and, to a lesser extent, to visit those regions most suited for their breeding. But although both these factors influence the movements of fishes, many other reasons for fish migrations may be traced. Few fishes are natural nomads, wandering about the waters aimlessly. Always there is present one or more reasons why a fish, singly or in company with others of its kind, sets off on a journey.

The temperature of the water in river, lake or sea vitally affects the fish, as does the amount of sunlight that may penetrate the surface. Other physical factors that may set the migratory instincts in motion are the varying salinity of the water, its acidity or alkalinity, its oxygen content, the turbulence or otherwise of currents, as well as the age, power of smell and even the faculty of memory of the fish concerned.

Fish migrations usually follow definite patterns, and may be of four separate kinds, though some fishes pursue more than one. These are the movements from salt water to fresh, and vice versa, and internal migrations within salt or fresh water.

The best-known example of a salt to fresh water migrating fish is the salmon, which must return from the sea to the fresh waters of a river before it can spawn. Atlantic salmon often travel many hundreds of miles to reach their redds in Europe, and Pacific salmon may journey thousands of miles before attaining their North American river spawning grounds. Movements into fresh water are usually mass ones taken for breeding purposes, as with salmon, sea trout, lampreys and other fishes, notably eels. These last, of course, make migratory voyages that are unique: after starting as eggs spawned off the Bermudas, they move some 3,000 miles or so by a strange process of first drifting and later swimming, growing all the time and eventually entering rivers as eelers. Both sexes of eels migrate to the uppermost reaches of their chosen rivers, the females of American eels having been known to run upstream for 1,500 miles from the sea, reaching altitudes above 7,000 ft. Sturgeon, mullet, flounder and other fishes occasionally enter rivers, but only after food.

The fishes that leave fresh water for salt may be of several different groups. They may be salmon or sea trout "spent" after spawning, some of which in Europe regain the sea and build up again after continuous feeding, though Pacific salmon, like all lampreys, invariably die after spawning. They may be the new young of these same

fish instinctively seeking marine waters, or they may be eels in the mature silver stage leaving their rivers by night on the long fast trek back to the Sargasso Sea to reach fulfillment in procreation, and eventual death. Keeping to the slowest currents and never feeding *en route*, they nevertheless cover immense distances very quickly: recoveries of marked eels have given such feats as 174 miles in 19 days and 750 miles in 93 days. Or they may be the odd river-brooding fishes that drop down to the edges of the sea either to feed, or more rarely, like charr and perch, to breed in brackish water.

With all fishes moving between completely fresh water and the sea, the swim bladder becomes adjusted to the new water density gradually, which is one of the reasons why a sudden artificial change proves disastrous for most fishes.

Migrations within fresh or salt waters may be less spectacular, but they are just as common and necessary for the continuance of the species concerned.

Sea fishes may make the most immense journeys, as we know from lengthy experiments with marked plaice, cod and herring. Plaice and herring movements may be measured in hundreds of miles, but those of many cod are far more extensive, particularly to and away from the great breeding grounds off Iceland, Newfoundland and the Lofoten Banks. The movements of cod and herring to warmer or cooler waters, from shallow to deeper and richer feeding grounds, have probably been studied more closely than any other fish migration, owing to their commercial importance. Some other fishes, notably mackerel, make extensive migrations on the vertical plane which may be quite striking.

Similar mass movements to and from deep water, though on a smaller scale, are the regular practice of many freshwater fishes, especially those like carp and chub, which spend cold winters in a semi-copied state at depths of 90 ft. or so. Freshwater fishes also tend to drop back into the depths after spawning exertions have been completed, and many lake fishes instinctively prefer to deposit their eggs up tributaries, where the more aerated running water provides better conditions for the fry. Other fishes, perhaps moving individually, may cover fairly considerable distances across inland lakes or along rivers, and few fishes live a static existence all their lives. Trout are great inland travellers, and carp and bream make less conspicuous but to them equally important migrations into shallower water each summer.

The reasons for all these migrations may sometimes be simple, but are often complex. The need for food is the primary simple reason, but it leads to big migratory movements chiefly in gregarious fishes like cod and herring. Fishes living in small groups find food needs less pressing, but they may be especially sensitive to temperature changes. For example, the shad is so sensitive to temperature changes that in some glacial tributaries it swims along the warmer side of the stream, where in fact the water may be only 4° warmer. Refusing to move up rivers unless their

temperature is higher than that of the sea, it therefore keeps to a progressive time-table for its runs up American rivers: in Florida these start in November, in New Brunswick as late as the end of May.

The varying degrees of salinity in the water affect fish movements a great deal. All members of the mullet tribe have strict tolerances of salt content, moving about only within their special limits. And, of course, salinity greatly affects floating eggs, many of which if laid in the sea may sink and die if they drift into the less dense coastal waters.

Salmon are notoriously sensitive to currents and the overall turbulence of their waters, lingering perhaps for weeks at the mouth of a river until a vigorous stream of fresh water encourages them to run upstream. Old fishes tend to stay longer in rivers before dropping back into the sea after spawning than the more active younger fishes. This is notably true of sea trout, which in their prime may

enter a river, spawn and return to the sea within 24 hours.

If the chemical content of water affects fish movements, so does its general movement of tides and oceanic streams, as well as the light that falls upon it. Many fishes prefer to travel mostly at night, others seek moonlight for mass feeding treks, or come up from their usual depths only when the nights are darkest.

Even the sense of smell may have a relation with migratory movements, as experiments with American sockeye salmon have shown: of 500 marked specimens, many of the 250 which had their nasal nerves severed went astray on their customary migrations. Certainly there is a strong "homing instinct" in fishes, comparable with that of birds, which enables eels, salmon, cod and many other fishes to make the long return journeys connected with breeding. Of this our knowledge is still limited, but we are certain that although few fishes are in fact stay-at-homes, their movements are governed by inherited instincts only.

Breeding *Aphyosemion bivittatum*

by AQUARIUS

ONE of the most handsome of the lyretails is *Aphyosemion bivittatum* (Linnberg), and it is a species which the advanced aquarist may like to breed. It is rather difficult to breed these in numbers unless special conditions are produced, which makes the breeding of this fish a challenge to the tropical breeder. At the outset it is easy to sex them, as the male is larger, more colourful and has a tail like the double sword of the guppy of that variety. The female is more soberly coloured and has rounded fins. The general colour of the male is a reddish brown with an olive colour to the rear of the body. There are crimson spots on the body and two dark-brown stripes running along it. The dorsal, anal and caudal fins are pointed and rather long, spotted with red. The female has not the bright colours, and shows the horizontal lines although these are not so plainly marked. This species reaches a length of 2½ inches.

If young fish can be procured for breeding purposes it is much better than getting adult fish, as these may be past their best. As these fish live for about 3 years there is no knowing how old adult fishes are and they may be getting too old for the best results. If young fish of not more than 6 months of age can be procured there is every chance of successful breeding. The fish do not like fresh tap water and are much happier in well-established tank or even pond water. A good clear water of rather acid reaction is best and the breeding tank should be well furnished with plenty of plant life. Some floating aquatics such as *Riccia* should be provided, but good-sized clumps of other plants such as *Myriophyllum* and *Pontederiacia* should also be included. The breeding fish should then be well fed with as much live food as can be procured. Although they will take some forms of dried food their preference is for live. They can be given small earthworms, white worms, *Tubifex*, *Daphnia* and broken maggots.

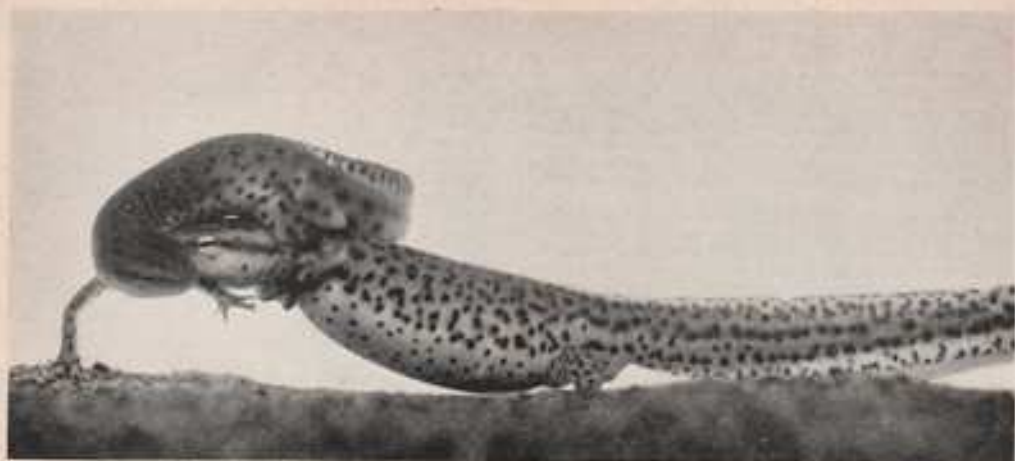
When ready for spawning, that is when the female shows by her distended body that eggs are present, the pair should be placed overnight in the breeding tank with water about 7 inches deep. This species appears to dislike strong light entering the tank and so some shade should be provided.

Covering the surface with floating plants will help here.

The temperature of the water needs to be about 72°F normally and can be increased to near 80°F for spawning. This takes place in a manner like that of many another tropical egg-layer. The pair take up a position side by side and with many shakes and quiverings an egg is laid and fertilised by the male, positioned alongside the female. Eggs are not extruded in large numbers at a time and the eggs are laid singly over several days. The eggs drop into the bunches of plants or to the bottom. There may be about a hundred eggs laid over a period of about a week. The female will show by her decreased body size that most of the eggs have been laid and the pair should then be removed from the tank for the eggs to hatch. If some of the eggs can be picked up with a siphon tube and transferred to a hatching tank it will be a surer way of getting a good hatch. The pair should now be well fed and they can be ready to spawn again in about 3 weeks.

The eggs take from 2 to 3 weeks to hatch and the temperature to give the best hatching results is in the region of 72°F. A higher temperature does not bring any better results. Once the fry are seen to be free swimming they can be fed on the usual fine live foods, such as brine shrimp and micro worms. The fry soon grow on and this is when great care must be taken, to ensure that the larger fry are separated from the others as soon as possible; it is probable that the larger ones will eat some of the smaller ones or in any case bite at their tails and cause damage. It should be realised that as the spawning has taken place over a week there is sure to be margins of time between when the first-laid eggs hatch and the later ones. The earlier hatched can have grown to a fair size before some of the later ones have hatched, thus giving them a great advantage; as all aquarists know, once a few fry grow bigger than the others they get the major portions of food and so grow on at an increased rate.

The sorting of the young should be done every few days so that not only do the large fish lose the opportunity of attacking the smaller ones but they themselves will benefit from more swimming space.



Pair of eastern green newts (*Desmictylus viridescens*) in amplexus. The male (left) is gripping the female by the neck with his hind legs.

Newts in the New World

by RICHARD GUPPY (CANADA)

photographs by the author

IN comparing the amphibian fauna of the New World with that of the Old, the considerable differences we find are only to be expected. Amphibians are mostly sluggish, intolerant of climatic changes and particularly susceptible to cold. Thus while birds, mammals and even insects were making use of temporary land bridges to extend their range, most amphibians were left behind.

I cannot pretend much knowledge of European amphibians. Of the Urodela (tailed amphibians), which I am considering now, the best known other than newts seem to be the spotted salamander (*Salamandra*) and the cave-dwelling *Pleurodeles*. Provided that the rules of nomenclature are being observed the spotted salamander must be more closely related to the newts than to any of the dominant North American families of Urodela. This would be expected, as the tailed-amphibian fauna of Europe seems to consist mostly of newts, that of the British Isles entirely so. There are, to my knowledge, six species of newts found in Europe, of which three occur in Britain, and there are additional species in Asia.

In North America there are far too many families and genera of Urodela to discuss here in any detail, but the newts (family Salamandridae) are the most poorly represented. The dominant families are the Ambystomidae and the Plethodontidae. The former includes mostly terrestrial species having an aquatic tadpole stage, though they are much inclined to neoteny (continued growth as aquatic larvae even up to breeding maturity). The

terrestrial ambystomids enter the water only reluctantly, for the shortest possible time necessary to complete the business of reproduction; to help out, the eggs are laid in a mass like frog spawn. The plethodontids, with the exception of some peculiar, permanently aquatic, cave-dwelling species, are entirely terrestrial. Their comparatively few, very large, eggs are laid on dry land, and the tadpole stage is passed in the egg capsule.

Now, coming at last to the newts of North America, these comprise two very distinct genera, one confined to the extreme west, the other spread more widely over the eastern part. I will consider first several broad distinctions which divide the North American genera, *Desmictylus* and *Taricha*, from the European *Triturus*. The males of Old World newts, when paying court to the female before dropping a spermatophore, do not come in contact with their mates to any extent; rather they rely on displays. It is doubtless for this reason that the males have evolved bright colours, and adornments such as crests, which are less noticeable in the females. With the North American newts courtship always involves amplexus, such as is seen in frogs and toads. Sexual dimorphism is much less pronounced than in *Triturus*; the colouring of both sexes is very similar. In the breeding season males can be distinguished by their wider tails, stronger hind legs, and in *Taricha*, by the smooth slippery skin. The two last-named characters are quite evidently associated with amplexus.

The eastern genus, *Dioscorys*, includes only one species, *D. viridescens*, which can be called the eastern green newt, though in its native land it is just plain "newt." This is divided into two races, typical *D. viridescens*, of Canada and Northern U.S.A., and *D.v. dorsalis*, occurring farther south. Just where the dividing line is presumed to lie, I cannot say; probably the two races intergrade. These are rather small newts, *D.v. dorsalis* being just about the size of the European palmate newt. Typical *D. viridescens* are on average somewhat larger, but the largest I have seen are distinctly smaller than a great crested newt.

In colour these newts are a dark, dull, or brownish green above, pale lemon yellow below. The whole animal is liberally sprinkled with black spots. Along each side of the mid-dorsal line is a row of four or five round bright-red spots, bordered with black. In *D.v. dorsalis* these dorsal spots tend to be oblong and close together, often becoming a broken line of red.

A strange fact about *D. viridescens* is that the terrestrial juveniles are distinctively coloured. I do not know of any parallel case among the Amphibia; usually the adult coloration (apart from breeding adornments assumed by the males) appears at the time of transformation from the tadpole stage. These brightly coloured juveniles are known as red eft (the term eft is not used in America as a colloquial name for any newt). This peculiarity may be somewhat less marked in *D.v. dorsalis*. Specimens sent to me from North Carolina, which appeared to be immature, were coloured like adults. The offspring of these, which I reared to maturity, were never red, rather a dull brown, which soon became the dirty green of the adult. But two well-grown juveniles from Ontario are a dull orange colour, lighter and more yellow below. The red spots of the adult are visible, but the black speckling is much reduced.

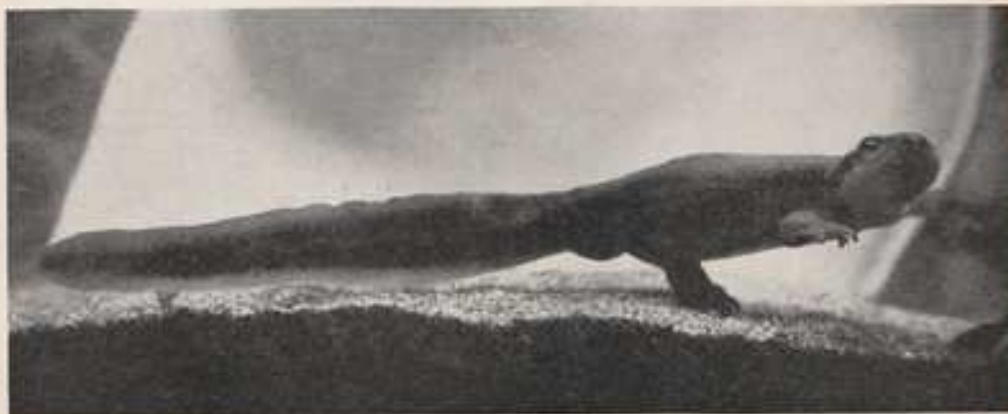
Not one of the several accounts of *Dioscorys* habits which I have read has made any reference to the folding of eggs into leaves of water plants, as *Triturus* species do. Nevertheless, those specimens of *D.v. dorsalis* which I observed, always placed their eggs in this manner, if suitable leaves were made available. The summer here is not warm enough for the tadpoles of this southern race; unless forced with artificial heat they remain in the gilled stage until cool weather sets in, and then die off. As

regards the typical northern *D. viridescens*, I cannot speak from experience as yet.

Of five species of newts which I have been able to test (the others are the three British species, and our native *Taricha granulosa*), *D. viridescens* is unquestionably the most satisfactory for aquarium purposes. It is reasonably showy, not comparing, of course, with a breeding male *Triturus vulgaris*, but retaining some colour all the year in both sexes. Inclined to be a bottom feeder, molluscs probably form a larger proportion of its diet than is the case with other newts. As compared with other species, its ability to recognise edible objects even when they do not move, is noticeable. According to Ernest Miner (*The Aquarium, U.S.A.*, December, 1957) it can be taught to eat ordinary packaged fish food. Mr. Miner's suggestions are, briefly, to keep the newts at a high temperature and to have the food laid before them at all times until they learn to take it. He claims that once they are trained to eat well, they can be kept in tropical aquaria along with fishes. For my part, I find it difficult to believe that any newt could compete with fishes in securing food. I have always found that the best plan for feeding amphibians is to keep the aquarium stocked at all times with the small aquatic organisms on which they feed. They cannot be expected to take food as soon as it is placed in the tank, as fishes will.

The greatest appeal of *Dioscorys* lies in its strongly aquatic habits. Although a tight screen-wire cover is recommended as a precaution, I have never seen them make any serious attempt to escape from an aquarium. They will cheerfully remain in the water the year around. There is little agreement among herpetologists about the habits of *Dioscorys* under natural conditions. Some say that it goes ashore for a time each year as most newt species do, others claim that it is permanently aquatic, except in the red eft stage. Ernest Miner writes of finding specimens during winter, under cover, in the dry bed of a pond. It should be noted that it takes a peculiar climate to produce the phenomenon of a pond which would be dry in winter and containing water during spring or summer.

In my experience, adult green newts taken from the water, even if kept in very damp surroundings, soon became torpid, and would almost certainly have died in a few days if not returned to the water. This statement applies equally to individuals which spent most of their time half out of



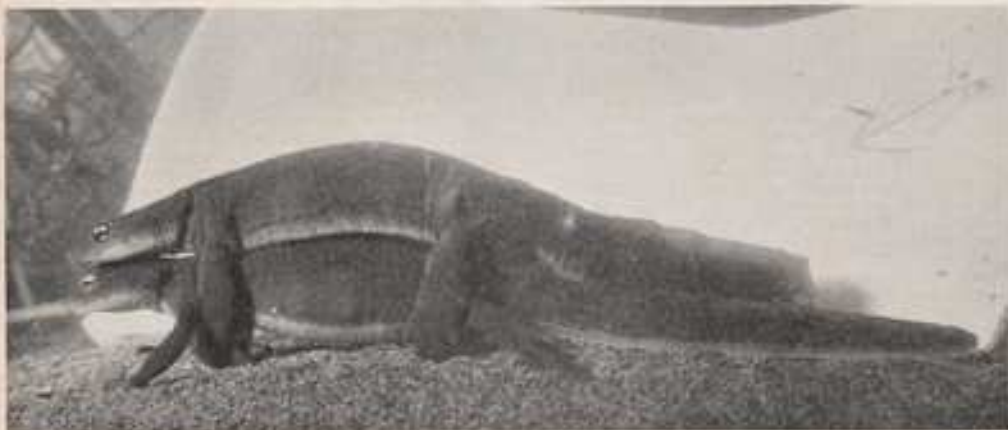
Breeding male of *Taricha granulosa*

water, clinging in the corners of the aquarium, or riding on cork floats which I provided. Some which I kept outdoors prowled on shore on very humid nights, usually when it was raining. I think that, even if free, they would not have lost touch with their pond.

Turning to the western genus *Taricha*, we find a curious parallel with *Dioscorylus* in the east, which, incidentally, also seems to illustrate how vague is the difference between a species and merely a geographical race. There are two common species of *Taricha*: *T. granulosa*, which extends from the extreme northern part of British Columbia, south to San Francisco, and *T. torosa*, which occupies the remainder of California. In addition to these two, *T. rivularis*, a species which has become adapted to breeding in running water, occurs in a restricted territory coincident with the most southern extent of *T. granulosa*. *Taricha*, as a genus, must be poorly adapted to an extreme climate, since except in the south it occupies only a narrow coastal strip.

newts, have not endeared it to me as an aquarium inmate. It is very common here, and my observations are mostly from those breeding in my fish ponds, into which they always find their way in large numbers. I have seen them in the water at all times of the year, also on land except in the early spring. Unlike *Dioscorylus*, they wander considerably. Judging from the numbers squashed on the roads, there must be a regular migration about October, probably towards the breeding ponds. I have seen them paired in spring and autumn. The eggs, as with *Triturus*, are deposited continuously until late spring, so that many of the tadpoles fail to transform before winter. They are, however, perfectly able to pass the winter in the larval stage. The leaf-folding habit is definitely not found in this species. Eggs are attached to rocks, stones or the stems of plants.

Though I do not know whether American newts are being shipped overseas in any number, I think I may



Pair of *Taricha granulosa* in amplexus. The male is on the female's back and holding his position with all four limbs.

Even in California, it is quite shut off by the Cascade and Sierra Mountains, so that most of western North America is entirely without newts of any kind.

In giving an account of this genus, I will confine myself mostly to *T. granulosa*, with which I am personally acquainted. In Stebbins' *Amphibia of Western North America* keys for the identification of the species are based entirely on characters found in their eyes. It is probable that the ordinary observer would see no difference, in appearance or habits, between *T. granulosa* and *T. torosa*.

Taricha granulosa is a large newt, rather larger on the average than *Triturus cristatus*. Breeding males can be 7 inches long. I am afraid that it can by no stretch of the imagination be called beautiful. The upper parts are chocolate brown, the under side dull yellow to brownish orange. Stebbins states that in the southern part of its range, where, as might be expected, several races exist which tend to resemble *T. rivularis* and *T. torosa*, the under part may be tomato red. The skin, except in breeding males, is extremely rough and granular in appearance. Breeding males have a smooth slippery skin, a very long, somewhat widened tail and grotesquely thickened legs.

The dull appearance of this amphibian, and its large size, which makes it a dangerous companion for most other

conclude with a word of warning. A community tank of newts may seem an attractive notion, but I have not found the plan to work out very satisfactorily. Apart from the difficulty of the large newts eating the smaller species, the American newts, *Taricha* if not *Dioscorylus*, will try to mate with the European species. I have kept watch on a pair of green newts, which remained in amplexus for more than 7 hours. During all this time the female, owing to her position with head jammed between the feet of the male, could not get a gulp of air at the surface. Evidently Nature has provided the female *Dioscorylus* with the stamina necessary to withstand this rough treatment, but it would not be prudent to assume that newts not accustomed to the amplexus type of courtship would have similar endurance. Males of *Taricha* I have seen to seize and carry around *Triturus cristatus*, whether male or female. It appears that the smooth skin of *Taricha* males causes others of their sex to release them if they are accidentally seized.

If this smoothness is lacking, the grip will be maintained on any victim approximately the size and shape of a female of their own species. There seems no reason to suppose that *Dioscorylus* males would not behave in the same way towards palmate or common newts.

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I must have hundreds of red *Pleurobia* snails in my aquarium. How can I get rid of them without going to the trouble of emptying the water away, removing and hand-picking the plants and boiling the compost?

Remove every snail that you see crawling on the glass sides. Last thing at night, introduce a piece of lettuce stump into the aquarium. Lots of the snails will mass on this during the hours of darkness, and may be removed the following morning. The baby snails that hatch out from the egg capsules laid on the plants will be dealt with most effectively if you introduce a young paradise fish or Siamese fighting fish into the aquarium. Naturally, a few snails are bound to escape destruction, but regular pecking from the glass will keep the stragglers in check.

Please give me some details about breeding White Cloud Mountain minnows.

White Cloud Mountain minnows breed freely in a well-lit tank containing a thick growth of plant life on the bottom. The species breeds at about 70-77°F. The female scatters small numbers of eggs at frequent intervals over a period of several hours, or even several days. If the tank is thickly planted along the back, ends and surface, there is no need to remove the parent fish, for they are not very interested in either their eggs or fry, and the fry usually make themselves scarce in the plant life when the adult fish draw near. The fry are easy to feed on powder-fine dried food, or the usual microscopic live food (*Infusoria*).

I have just obtained two *Scaphiopus*, and should like to know if they are suitable for keeping with other fishes, and what do they like to eat?

Scaphiopus are inoffensive fish and soon settle down in the community tank. Although they will eat almost anything provided, they do need a lot of algae, duckweed, chopped lettuce or chopped cooked spinach in their diet. They also do best with a small amount of salt in the water.

I recently bought a pair of young blue acaras, but they are as dull as ditchwater compared with the picture of them I saw in a book. Do you think they are unhappy in my aquarium, or are my fish from poor stock?

Young acaras do not wear the sparkling colours described and illustrated in books until they reach a fair size. Most cichlids are poorly coloured until they become mature. At the same time, the best coloured fish are always those which receive plenty of meat, chopped earthworms and large *Daphnia* in their diet.

Is it safe to use water taken from my hot-water system (back boiler and copper pipes)?

Water obtained from the hot-water system is not ideal for fishes, but it will not kill them if the water is allowed to run for a short while before using any to add to a tank. If you have to use water from a tap, it is best to use the water from the cold-water tap, allow it to stand for a few days, then warm up to the desired temperature by adding boiling water (or boiled water) from the kettle.

Please give me some information about the tinfol barb (*Barbus schwanefeldi*).

The tinfol barb eats anything, has a range of temperature from the lower states to about blood heat, and needs plenty of room, for it grows very quickly. A 2-inch fish will attain a length of about 7 inches in under 3 years. We do not know its maximum size, for it never seems to stop growing if it is given a roomy tank to call its own. It is a peaceable fish, and in its small sizes makes an interesting addition to the community tank. In its larger sizes,

Many queries from readers of "The Aquarist" are answered by post each month, all aspects of fish-keeping being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent so that a direct reply can be given.



Photo: Laurence E. Perkins
Tinfol barb (*Barbus schwanefeldi*)

however, it should not be placed with small fishes or else it will swallow them when it gets hungry. It also eats greenstuff, and when it reaches a size of about 4 inches it will clip *Vallisneria* and other tender-leaved plants to the crown.

I wish to spawn my Siamese fighting fish, and have been told that the surest way to make them spawn is to condition them. What does this mean?

Conditioning a fish means that you bring it into tip-top condition by giving it special attention in the matter of food, temperature and so forth. Separation of the sexes for a week or two often helps to bring them into good breeding condition by stimulating the mating urge when they are placed together again, preferably overnight. You know the old saying, "Absence makes the heart grow fonder."

I introduced some Malayan livebearing snails into my tropical aquarium, but since placing them in the tank I have not seen them. Do you think they have been eaten by the fishes?

The Malayan livebearing snail buries itself in the sand during the daytime, and does not emerge until after dark. Odd individuals are sometimes seen on the plants and glass in the shadiest part of the aquarium, but generally speaking they prefer to crawl about in the dark. Lack of oxygen in the water, however, will soon bring them from their hiding places even in the brightest light. They are very useful creatures for keeping the compost clear of tiny particles of food, but as they breed very quickly, they

Please turn to page 169

The Cow-Fish

by JOHN BOURSOT

THE engaging little marine favourite *Acanthostracion quadricornis* (cow-fish, to the simple tongue that boggles at anything more specific), is one of many species found in all tropical seas, and is included in many tropical aquaria, where it is a model of good behaviour.

The species ranges from the Carolinas to Brazil, inhabiting the shallow grass flats along the coast. It is particularly common among the Florida Keys, and the vast system of quiet bays and lagoons stretching for hundreds of miles up the west coast of Florida on the Gulf of Mexico. These bays, often miles in extent and averaging 12 feet deep with enormous areas of 3 feet or less, are separated from the open sea by long chains of islands ranging in size from anything to several hundred acres. Some are dotted with the villas of city workers, others are still covered with a dense primeval jungle of slash pine, live oak, palmetto palm and virginia creeper: the sanctuary of rattlesnakes, raccoons and sea birds. Impenetrable mangrove thickets reach out into the placid waters of the bays, where their stilt-like roots support thriving colonies of coon oysters. A dark-green blanket of manatee and turtle grass covers the bottom, and broad swift currents ebb and flow with the rise and the fall of the tide.

Water far from the sea is all but stagnant, and is the haunt of fiddler crabs and herons. Porpoises, sting-rays, sharks and barracudas are regular visitors, and myriads of smaller fishes including mullet, sea horses and spiny box-fish share the grass beds with a teeming invertebrate population. In winter the bays toss and foam before the icy winds and heavy seas that surge in through the wide and stormy channels between the islands. In summer the sun burns down as mercilessly as in the Sahara. Temperatures soar to 100° F in the shade, and the sticky moisture-laden atmosphere all but drips water. Towards evening, when gimlet-eyed man-of-war birds drop from their windy stations high in the paling sky, long lines of pelicans cross the bays to roost, and flocks of white ibis, fintheads and egrets descend from the darkening air to favoured mangrove islands, which they fill with their raucous cries, and whiten with their numbers. Long before dark the night-jars are abroad, and trillions of mosquitoes rise in clouds from the shallows to torture man and beast, and fill the hot sultry night with their hum. Such an area, then, is the habitat of the cow-fish.

Arrange the tank for cow-fish in good but simple taste, providing shade and shelter with a minimum of elaborate rockwork and no coral wherein the fish may be wedged and killed. To imitate more closely the natural habitat of the cow-fish, manatee grass (*Cymodocea rostrata*) and turtle grass, *Thalassia testudinum* (not algae, but monocotyledonous seed plants), may be used if planted in an inch of sand. A good light is necessary and a sub-sand filter essential to ensure the removal of poisonous gases. Once established, these marine plants prosper in the aquarium. But failing them, tropical green algae will look well if sufficient light and a sub-sand filter are provided.

If, however, neither the algae nor the grasses are procurable, then no vegetation of any sort is the alternative, as cold water algae will probably perish in a heated tank. A few scattered sea shells will relieve the bareness of the scene, and in time highly useful water-purifying microscopic algae will appear of their own accord on the sand and stones.

The cow-fish belongs to the order Piccognathi, which comprises the leather-jackets, the porcupine or globe fishes, the trigger fishes, the file fishes, the spiny box or rabbit fishes, the trunk or coffer fishes (all well suited to small aquaria) and those giants the sun- or head-fishes, which attaining a length of 10 feet, weigh over a ton and are renowned for both the quantity and the variety of their parasites. In the cow-fish (*Ostraciidae*) the head and body are entirely encased in a rigid cuirass of fused six-sided bony plates. In cross section some genera are triangular; others are quadrangular. The dorsal and anal fins are placed far back and, like the rather long caudal peduncle bearing the tail fin, project through openings in the armour. Stout teeth beset the small protruding mouth, which, like the fins, has its respective aperture in the bony armour. Seen from below the large ceaselessly roving eyes appear deep sapphire blue, but from above they glow like two lighted emeralds in the head of a pagan god. The gills are mere slits in the armour, and respiration is so fast as to be almost a flutter. Pectoral fins are present, but pelvic fins are wanting. In addition to its armour the cow-fish is provided with sharp stout spines, one above and one below the caudal peduncle, one on either side of the rear end of the body and one over each eye, giving the fish a rather bovine expression. The beautiful design is one of blue dots and dashes disposed horizontally on a brown-blotched yellow background. Especially brilliant in the sun, a freshly caught cow-fish is a thrilling sight. However, it is my experience that the colours are apt to fade in captivity. The fish reaches a length of 9 inches.

At a temperature of 75-80° F cow-fish are hardy and do well in the aquarium, readily settling down to tank life if no longer than 2 inches. Larger specimens are hard to get started, and should not be bought.

Cow-fish have big appetites and, when hungry, will rush to the surface to greet their owner as he removes the cover glass. They should be given small pieces of shrimp or raw meat, which are best dropped in full view of the fish or offered at the end of a toothpick. The latter method of feeding may take them a day to learn, but after the first "accidental" feeding all others will be deliberate. As the toothpick pierces the surface they dash at the impaled morsel. If no food is forthcoming they retreat for a better view, squirting out little fountains of water as they watch and wait. Tub/sx and small earthworms are pulled in like vermicelli at lightning speed, and baby guppies are a treat.

The awkward shape and rock-like rigidity of the cow-fish may account for the curious fact that several writers, both old and modern, and possibly writing without actual

experience, brand the fish as a slow and poor swimmer. Nothing could be further from the truth. Cow-fish speed along over the sandy flats at such a rate that many a diver must have wondered what it was that passed him. When alarmed in the aquarium the fish positively shoot back and forth like bullets, smacking into the sides and crashing into the cover glass.

Baby cow-fish, or "Boston beans," are an immediate sensation; not one person in a thousand is able to identify the little black lumps gliding about the tank without visible means of locomotion. Their minute transparent dorsal, anal and tail fins, all in a bunch at the back, border on the invisible. The mystery deepens when, upon closer inspection, the "beans" are seen to resemble a bald human head with huge black eyes and a tiny mouth. Their tank should have no dangerous rock crevices nor coral, and they should be given time to settle down before being fed with brine shrimp. At hazel-nut size, fish roe, tiny pieces of shrimp and raw meat may be offered on the end of a toothpick, most "beans" learning to accept the additional food in a matter of minutes. When suspicious, the little "beans" will accompany the toothpick at a fixed cleverly maintained distance, gliding forward or backward or swinging round it as the aquarist moves it about. "Boston beans" grow rapidly in the aquarium with or without adult cow-fish, though the absence of the latter avoids unjust competition for food, and makes the "beans" the object of the undivided attention they unquestionably merit. However, if the aquarist insists upon variety, a more harmonious combination would be "Boston beans" and dwarf sea horses, as both species require brine shrimp and balance each other in size.

As may be imagined, the box-like body of the cow-fish offers excellent anchorage to parasites, among which *Bouduina mellea*, a trematode, often figures. These 1-1/2 inch, four-eyed pests, bearing two small front suckers and an enormous hind sucker with two pairs of stout hooks inside like wide-open tongues, are paper thin and so incredibly transparent that even heavy infestations escape notice. Nevertheless, the wild and tragic behaviour of the fish themselves will excite suspicion. Furthermore, their markings become blurred or lost in places.

Two newly arrived and very nervous cow-fish were given a 20-gallon tank to themselves, while the accompanying veterinary certificate (!) was handed to the health authorities to give them something to do. As time passed the nervousness of the fish degenerated into constant outbursts of frantic activity at any time of day or night. Ravenous with hunger, they would struggle at the surface at feeding time as though they were drowning, blowing drops of water into the air and pushing themselves up on their tails to get out. Suddenly, for no apparent reason, they would streak off like bullets in all directions, crashing into the sides of the tank as they went. Seconds later they were feeding again. Often one would plunge desperately to the bottom and then, in an explosion of energy, rocket out of the water and fall to the floor with a thud, clearing the tank by several inches. There it would lie like a stone until rescued. Several times each night I would hear them strike the cover glass with a sickening whack. Rising each time to see that all was well, I was often appalled by what I saw.

The faintest gleam of a passing street light in the darkened room, perhaps something vastly more trivial, had sent them into fits. They shot back and forth, looped the loop together at high speed 10, 20, 30 times, stood on their heads slowly spinning like pieces of machinery, covered "panting" in a corner, and made frantic efforts to leave the water. Then came the ensuing calm which I took for the onset of death. But no, this behaviour went on for so long that, with a thousand misgivings, I accepted it as normal. Then their pattern started blurring, especially round the

head. With net in hand I raised a fish to the surface and, by making use of the front and back horns to avoid unnecessary handling, lightly held it between the thumb and middle finger under the microscope. Examination revealed damaged and missing chromatophores, small flesh craters and a broken slime covering, but no parasites. Back in the aquarium the fish was none the worse for its ordeal.

One day one of the fish was resting at the surface of the water in the front of the tank within focusing range of a magnifying glass. The search was negative. I turned to a watchmaker's glass and now, after long minutes of the most intense scrutiny, beheld the cause of the trouble. Against the light of the tank the skin on the belly and horns seemed to be separated from the body of the fish by an infinitesimally thin layer of fluid, and to undulate softly. Suddenly the horrid truth hit like a sledge hammer. The "undulating skin" was nothing but the leech-like movements of flukes. An enamel saucer half-filled with ordinary tap water raised to aquarium temperature was set on the table, and the two 1 1/2 inch cows were popped in for 2 minutes (a safe margin for marine fishes). They were closely watched for signs of serious distress. Mild distress is seen initially with most marine fishes in fresh water, and may be disregarded. Experience alone will teach the difference. The fish stood 5-10 minutes with little discomfort, but over 60 flukes lay dead and drying on the bottom of the saucer! Under the microscope moribund flukes placed afresh in sea water were seen to revive slightly; when again subjected to fresh water their death was instantaneous.

Nervous and excitable in the presence of strangers, cow-fish are best attended only by their owner, who should avoid sudden movements near the tank. Tolerance to white spot and fungus is not remarkable, but the fish responds to treatment.

Wise men have discovered that the cow-fish baked in its shell is as succulent as a beefsteak. Perhaps a genius can tell us how to milk it!

Tropical Aquarium Queries

(continued from page 167)

often become a nuisance in the aquarium, and it is very difficult to eradicate them (if ever you wish to) from a tank.

My aquarium is placed in an alcove that does not get much strong light, but it does receive about an hour of full sun early in the morning. Can you please suggest a few plants that will grow under these conditions?

Cryptocoryna, *Anubias*, fine-leaved willow moss (*Fennellia gracilis*) and *Najas* should flourish in your tank.

I have been keeping some guppies and zebra fish in a small aquarium, and a few nights ago I introduced some White Cloud Mountain minnows into their company. I have since been told that zebra fish and White Cloud Mountain minnows will not live together as they poison the water for each other. Is this true?

From our own experience, this idea that zebra fish and White Cloud Mountain minnows will not live together is a fallacy. Perhaps it arose because the temperature requirements of the two species is not the same. Zebra fish will stand a range of temperature from about 65° to 100° F without suffering any ill-effects. On the other hand, White Cloud Mountain minnows do not like a high temperature and often die when the temperature soars above 78-80° F. They do best in the middle sixties and low seventies. If you keep zebra fish and White Cloud Mountain minnows in the same tank, it is best to maintain a temperature of about 72° F. This suits both species very well.

our readers

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.



write

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

Intrepid Goldfish

THE report in October's Editorial of goldfish travelling into space encouraged me (an old reader) to consult my files of *The Aquarist*.

In 1931 a goldfish (name unknown) broke a record in being the first goldfish to submerge in a submarine to the depth of 300 ft., and to travel 10,000 miles in a submarine. Full details of these exploits can be found in *The Aquarist* of March-April, 1931 and January-February, 1932.

JOHN S. VINDEN,
Birmingham, 15.

Elephant Guppies

I ACCEPT Mr. H. Loder's apologies, made in his article (*The Aquarist*, October) on cichlids, on behalf of the F.G.A., for feeding guppies to his big fishes, though it's evident he hasn't seen our latest "elephants," which we feed exclusively on cichlids!

In his interesting article he says that you can't give a guppy a name. Well, we have just called one of our males "Harry" in his honour. Why?—because this male sports a tail nearly as big as some of those tails Mr. Loder has spun to me over the past years!

JAMES L. KELLY,
Fancy Guppy Association.

I AM very interested in the articles on guppies by Peter Dendy and am of the opinion that the guppy (once I would not have had one in my tanks) is a fish from which much can be learned, but one which, in my own circle of friends, is scorned.

Up until quite recently I was more inclined to bigger fishes (*Aequidens maroni*, *Cichlasoma meeki* and large red swordtails). Then a friend suggested that, as I had a small tank to spare, I might like a couple of pairs of Paul Harnell's strain of veiltail guppy.

With the bigger fishes being heavy feeders, I arranged a 30 in. by 15 in. by 12 in. tank with sub-gravel filters, and I now find that with this type of filter, the water is crystal clear, but that a lot of muck collects in the gravel and has to be siphoned off weekly. The guppies thrive in this tank and breed quite well. One 18-week-old female delivered 30 young in her second brood. Up to now I have always separated young from adults, but Peter Dendy states that Harnell himself does not, and I think I'll try the method of the master.

With regard to feeding I find that up to 10 or 11 weeks

the young will take live food, but seem to prefer dried foods as they get older.

Peter Dendy wrote in one of his articles that guppies are born tail first. This seems to be true, up to a point, as I have witnessed a few born head first, the female trapping one by its tail in her vent for a full 5 minutes.

Another point of interest is that during the interval between births, the gravid spot does a "war dance" inside the female, as the next to be born forces, or is forced, towards the vent of the female.

Thank you once again for the excellent articles in *The Aquarist*.

B. HOLFORD,
Bickershaw, Wigan.

Acriflavine and Fin Rot

MANY people claim that their fish have been successfully cured of fin rot with acriflavine, but others seem to doubt it and consider it almost useless. I have used it and was satisfied with the result. The unfortunate victim was a young *Corydoras paleatus*, and I immersed it in a solution of acriflavine for 3 days and placed it in fresh water for a further 2 days. I then repeated the acriflavine bath for 2 days. The rot was gone and the fish was replaced in the tank. It seemed perfectly happy, but after 2 weeks it died. Was this from after-effects? I cannot say.

As far as I can see there are only two other worthwhile treatments: one is surgery, which is illegal in Great Britain, the other is a proprietary preparation. Have any other readers, cures which are truly efficient and have no unpleasant after-effects?

P. M. FULLER,
Eastleigh, Hants.

Fish out of Water

IN my early days of fishkeeping I was taken to a breeder and dealer in the midlands who I asked how long a fish would live out of water, as I had noticed the carefree way in which he handled his stock. "A good 2 minutes" I was told, and since then I have always tended to panic if I dropped one or if one leapt out of the tank. At times I have not noticed the escape of fish whilst moving them and have been surprised to find them leaping around on the bench or floor, minutes later.

Last Sunday, however, I went the round of my tanks between 6 and 7 a.m. and noticed a "dead" female Siamese fighting fish on the bottom in one of them. It did not

move when touched and when feeding was over I removed it with the tongs and dropped it into half of an old envelope for later disposal. This was just before 7 a.m., and at 8.40 a.m. I was sitting reading when I heard a rustling sound. To my amazement I saw that my "dead" fish was leaping about in its envelope, with movements reminiscent of those seen in fowls after they are killed. I at once took a mug of water from one of the tanks and dropped the fish into this. Close inspection showed a faint quivering of the fins and gills and some minute air bubbles coming from the fish. It was 20 minutes later before careful observation could detect no signs of life.

Is this an exceptional instance? What are experts' opinions on how long a fish will live out of water? When I am better off for fish I propose to do some experimenting!

R. TAYLOR,
Blowbury, Berks.

Time of survival out of water varies with the species of fish and according to the conditions prevailing. On a dry surface and in dry air any fish will quickly die, but stories have been told of carp packed in wet grass being sent alive through the post.—EDITOR.

Aquarist in Nigeria

AFTER about 9 months as a tropical fish enthusiast in England, I am now in Nigeria. Of course, the first place I made a bee-line for was the local river to find out what it contained in the way of fishes. I am not yet organised with any fish-collecting equipment and my first attempts were made with a kerosene tin, a piece of rope and an empty gin bottle. Strangely enough, this equipment proved fruitful and has not yet been bettered.

I caught many small fish, which I think are danios as they bear the small side "whiskers" I noticed on my pearl danios back in England. Three of them now live in a glass trough on my sideboard, and I feed them, for want of something better, on baby's Farex.

A later attempt at the river with a piece of mosquito netting produced more of these fish and a very small fish of the *Panchax* type. This was the fish for which I had really been hunting so I rushed back home and tenderly tipped him out of his gin bottle into the trough with the others. A few hours later he was missing, and I searched the sideboard and floor, thinking that the unfortunate fish had jumped out, without luck. Then I noticed the culprit, a danio, shaking his head, and out popped the mutilated body of the poor *Panchax*.

I have not caught anything other than danios since then but when my thigh boots and cans and large nets arrive I hope to have more luck. Can any reader suggest a book of reference to West African fishes to aid with identification? I should also be grateful to know of any Nigerian aquarists.

PETER BALL,
Bauchi Training College,
Bauchi, Nigeria.

Mr. L. W. Ashdown

WE regret to report the death on 23rd October, at the early age of 34, of Mr. L. W. Ashdown. He was connected with the journal *Water Life* from 1947, assumed editorial control in December, 1955 and continued as Editor when that journal's title was altered to *Fishkeeping*. When that journal was absorbed by *Cage Birds* (now *Cage & Aviary Birds*) he joined its staff and ran its fishkeeping feature. For a number of years he organised the aquaria section at the National Exhibition of Cage Birds held in London each year at Olympia. He was well known by many aquarists. He leaves a young wife, Barbara (also well known to many fishkeepers), who for a long time nursed him at home during a prolonged illness during which his condition gradually worsened. The funeral was arranged for 31st October at Barkingside.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

1. Aquaria beetle (5-7)
10. Before (3)
11. Originally Homo. Diferens
12. Volcanic (2)
13. Add for the girl (3)
14. Add as an archid to (3)
15. Liquid for treating or cleaning injured gear (6)
16. Previously unknown (3)
17. Death could be here (4)
18. Crustaceans whose legs are all alike (7)
22. Keep like this if you hope to make money from fishes (4)
23. Female water (3)
24. Cared as herrings popularly are (3)
25. To row, especially secretly; a bit winky (3)
26. You and me (2)
31. Crustacean (6)
32. Severe of water, real or artificial (8)
34. Fish can see the world (1, 1)
35. Television (1, 3)
36. Fish of herring kind, but ascends rivers to spawn (4)
37. Talk too much but may pay back (5)
38. Could be birds or guppies (6)

CLUES DOWN

1. Fish with poisonous spines, a menace to British paddlers (6)
2. Human skull or opposed to nature found in arthropod (3)
3. Genus of univalves with conical shells (3)
4. Tired stream (4)
5. Soap from the sponges for this kind month (4)
6. Furry and, therefore, describes a type of fish (7)
7. Small fish often verbally coupled with whale (8)
8. Christian era (1, 1)
9. Sea unknown (5)
16. In short, his decision is final (2)
18. Might be described as a water garden pond or an island sea (4)
19. Sea god (7)
20. Rise in the European river that rolled rapidly and flowed easily when sun was low on London (4)
21. School of fishes (3)
22. Fish bones, perhaps (4)
23. Like the thread of a suture or certain snail's shell (6)
27. Massive (3)
28. Abbeyside science (2)
29. Give rays a penny for good measure (5)
31. Cards (4)
33. Eggs (3)
36. This country left the Commonwealth (and the sun) (1, 1)
37. Getting from the hi-god! (2)

(Solution on page 174)

Raising Big Guppies

by PETER DENDY

WHEN breeding guppies for the show bench every effort must be made to produce a fish which will score the highest possible points. In the F.G.B.S. pointing 30 points out of 100 are awarded for size, 10 each for body, caudal and dorsal, so it is obviously desirable to score the highest marks you can for size. Class winners quite often gain their first awards by as little as a mark or even half a mark; thus any extra points you can acquire by getting your fish just a little bit bigger than the next man's could make all the difference. Perfect specimens for type can be seen on the bench which have failed to gain an award purely because they are too small. Looking at them, you can only wish for a bicycle pump to blow them up a bit, but since guppies would not take kindly to this sort of treatment you must turn to their feeding for that extra something you hope the others haven't got.

Male guppies seem to reach their maximum body size at about 3 to 4 months when raised in good conditions. After this the finnage continues to grow until full maturity is achieved at about 6 months. Within its genetical limits the final size of the fish depends on what happens during the initial growing period and more particularly on what happens during the very early stages of growth. Other things being equal, fry allowed to grow up in the company of adult fish do not end up as well as those which are separately reared, as they have to fight hard for their share of the food and often do not get as much as they require for good growth. Under these conditions they may grow tougher and more wiry, but not bigger, and it is size that we are after.

All my gravid females are placed in breeding tanks 12 in. by 8 in. by 8 in. to drop their broods and the females are removed immediately this has happened so that the fry may have every chance. They do not usually seem very interested in food for the first few hours, but after this are ready to take live food in increasing quantities. In my opinion the best food for new-born fry is brine shrimp, which I feed in such an amount that there are always free-swimming shrimp in the fry tank for the first week of the life of the fry. Fed like this the young guppies come on fast and have nicely rounded tummies from the third day onwards.

The brine shrimp are raised in two 10 in. by 7 in. by 7 in. tanks, which are completely blacked out with the exception of one small area arranged to allow the ingress of light. An opaque partition with a notch cut out of the bottom is inserted into the tank, and a heater and thermostat set at about 78°F is added to control the water temperature. This size of tank nicely holds a gallon, in which is dissolved eight heaped desert spoons of sea salt (I use Bay Salt, obtainable from Boots at 1s. 6d. for 7 pounds, which as far as I know is the cheapest sea salt on the market). To the solution is added as many brine-shrimp eggs as can be heaped on a new threepenny piece, and these are put behind the partition in the dark half of

the tank, which keeps the shells where you want them and out of the way. Hatching starts after 18 hours and is substantially completed after 48 hours, when the contents of the tank are thrown away and a new salt solution is made up.

By using two tanks you can start a new tank every day and always ensure a constant supply of newly hatched shrimp. I place a 5 watt bulb against the clear area in the side of the tank to encourage the shrimp to congregate there for easy netting. To net the shrimp make yourself a small net of fine-meshed nylon with a straight bottom edge to assist in scooping the shrimp up the side of the tank against the light. The net can then be swished in the fry tank to release the shrimp. I do not bother to wash the shrimp as I consider that my weekly siphoning out of a quarter of the water in each tank will take care of any risk of salt accumulating in the water.

A culture of micro worms is a useful standby in case of trouble with the brine shrimp, as periods of poor hatching sometimes occur with the shrimp eggs and this usually happens when you want them the most. If you don't want to mess about with brine shrimp then micro worms are a good substitute and will be eagerly taken by guppies of all ages. If you run several tanks then the micro worms need to be produced in large quantities, and I suggest the use of plastic sandwich boxes, the type which are about 2 inches deep. The micro-worm production is much improved by sprinkling yeast over the medium before inoculating it with micro culture and by using milk instead of water when making the porridge oats base.

I have 14 plastic boxes on the go at one time and keep them in the dark in a cupboard thermostatically controlled at about 78°F. Masses of micro worms can be taken from the sides of the boxes with a large damp camel-hair brush, which is whisked in the tank. You will find that you have to be quick about collecting the worms, however, as the light makes them retreat from the sides of the box in a very short time. If you set up half your boxes every week with new food and culture, your guppies will be assured of unlimited micro worms for ever.

I do not favour the use of tubes of liquid fry food as this type of feeding is quite unnecessary with baby guppies and can quickly cloud the water and build up colonies of unwanted Infusoria. At the end of the first week the fry may be introduced to Grindal worms and given a good feed of these once a day, supplemented by a further three or four feeds of specially prepared dry food. When you start on dry food remember that little and often should be your policy.

The dry food must be very fine and can be prepared by sifting a proprietary food through butter muslin so that the particle size is almost like dust. If you are ready to take a little more trouble than a most excellent food can be prepared from liver and I shall be describing this next month.



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.

THE following are the results of the second open show of the Oldham and District A.S. Guppies: 1, C. Walker, Oldham; 2, Mr. Bolton, Manchester; 3, Mr. Goswami, Merseyside; Plaques: 1, H. Swanson, Merseyside; 2, A. Worwick, Oldham; 3, R. Whitaker, Ormskirk; Swordtails: 1, H. Swanson, Merseyside; 2, C. Wilson, Bradford; 3, B. Pagan, Blackpool; Mollies: 1, C. Walker, Oldham; 2, G. Holmes, Bradford; 3, Mr. Bolton, Manchester; Guppies and Minnows: 1, P. Partington, Middleton; 2, H. Swanson, Merseyside; 3, C. Walker, Oldham; Characins up to 3 inches: 1, T. Jerram, Derby; 2, Mrs. E. Swanson, Merseyside; 3, J. Goswami, Merseyside; Characins over 3 inches: 1, Mrs. E. Swanson, Merseyside; 2, R. Pearson, Merseyside; 3, H. Stamp, Liverpool; Catfish: 1, G. Holmes, Bradford; 2, P. Holloway, Derby; 3, F. A. Pilgner, Derby; Labeo: 1, C. Walker, Oldham; 2, A. Worwick, Oldham; 3, J. Ashworth, Oldham; Fishes: 1, Mr. Wilson, Bradford; 2, E. Swanson, Merseyside; 3, C. Walker, Oldham; Barbs up to Nigger: 1 and 3, F. A. Pilgner, Derby; 2, A. Worwick, Oldham; Barbs over Nigger: 1, H. Stamp, Merseyside; 2, Mr. Watson, Ormskirk; 3, Mr. Bolton, Manchester; Labrus and Shobis: 1, C. Walker, Oldham; 2, F. Holloway, Derby; 3, H. Swanson, Merseyside; Aruanidids: 1, H. Stamp, Merseyside; 2, J. Ashworth, Oldham; 3, C. Walker, Oldham; Dwarf Cichlids: 1, 2 and 3, K. Whitaker, Ormskirk; A.O.V. Cichlids: 1, C. Walker, Oldham; 2, J. Ashworth, Oldham; 3, W. Smith, Stafford; Fairy Egg-layers: 1, C. Walker, Oldham; 2, Mr. Waking, Huddersfield; 3, F. Holloway, Derby; Pter. Labeo: 1, F. A. Pilgner, Derby; 2, Mr. Chappell, Middleton; 3, C. Walker, Oldham; Barboras and Danios: 1, Mr. Waking, Huddersfield; 2, F. A. Pilgner, Derby; 3, F. Holloway, Derby; A.O.V. not listed: 1, F. Holloway, Derby; 2, G. Holmes, Bradford; 3, E. Shore, Ormskirk; Best Fish in Show—African Jewel Cichlid—C. Walker, Oldham; Highest Aggregate in Show—C. Walker, Oldham.

THE election of officers for the Tyne-side Aquatic and Biological Society resulted as follows: Chairman, Mr. L. Thompson, Vice-Chairman, Mr. J. Young, Secretary, Mr. D. Mackay, 19, Clayton Road, Jesmond, Newcastle, 2, Treasurer, Mr. W. Archbold, Librarian, Mr. A. Duffield, Assistant Secretary, Mr. J. Mackay. There is a job show every meeting after all queries have been discussed, followed by a talk. Recently Mr. W. Dunn gave a fine show which included all the attractions of the club at local flower shows, exhibitions and excursions. The club meets every alternate Tuesday at the Blue Hill Hotel, Shields Road, Newcastle-on-Tyne at 5 p.m., and visitors can be assured of a warm welcome.

THE annual show results of the Leeds and District A.S. were as follows: Open Furnished Aquaria—1, N. Porter; 2, E. L. Crowther; 3, G. Litzel. Ladies Furnished Aquaria—1, Mrs. J. M. Skinner; 2, Mrs. C. Duckett; 3, Mrs. B. Wilkinson. Inter-Society Furnished Aquaria—1, Bradford and District Society; 2, Altrincham and District Society; 3, Tadcaster and District Society. Gold Water

Furnished Aquaria—1, P. Reynolds; 2, G. Holmes; 3, L. Bath. Fishes—1, A. E. Whitlock; 2, R. M. Faircliff; 3, A. Panton. A.O.V. Labyrinth—1, C. R. Wilson; 2, P. Bentley; 3, G. Holmes. Livebearers—1, S. Abdy; 2, G. Holmes; 3, P. Holloway. Characins—1, H. Cranwick; 2, A. E. Panton; 3, J. Smith. Barbs—1, R. M. Faircliff; 2, H. Cranwick; 3, C. R. Wilson. Cichlids—1, H. Wade; 2, J. H. Crisp; 3, R. M. Faircliff. A.O.V.—1, L. Orsman; 2 and 3, P. Bentley. Breeders: Livebearers—1, D. Prosser; 2, C. R. Wilson; 3, Mrs. F. Bentley. Breeders: Egg-layers—1, R. M. Faircliff; 2, A. E. Panton; 3, S. Abdy. F.N.A.S. Awards—R. M. Faircliff; A. E. Whitlock; Bradford and District Society, A.V.A.S. Awards—Mrs. J. M. Skinner; R. M. Faircliff; Bradford and District Society.

In presenting the Prize Cards the President said that these should be regarded as something of a "Vintage" issue as they would be the last to be awarded from the Troby Hall which the Society had used for their Annual Show for so many years. The old members could not leave the Hall without some feelings of regret because so many fine friendships had been made over the years under its roof. It is hoped that when fresh quarters are found the Society will continue to thrive and make many new friends.

The members are now looking forward to the



The Aquarist's Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue substantial metal emblem for the aquarist can now be obtained at cost price by all readers of *The Aquarist*. The design is pictured here (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 2s. 6d. to *The Aquarist*, The Bury, Half Acre, Bradford, Middlesex, and please specify which type of fitting you require.

Annual Dinner arranged for the 22nd November when an excellent evening's entertainment is assured.

MEMBERS of the Dewsbury and District A.S. recently enjoyed a very interesting visit to the fish-house of Mr. E. Foster (Beverly), who showed the party his breeding and rearing houses, his "workery" etc. Discussion took place on the matters of rearing and feeding. At these last meeting, members heard a talk by Mr. C. B. Wilson on "Breeding Livebearers to Show Standard." The subject was obviously very dear to the speaker's heart and was received with enthusiasm by those present. Mr. Wilson answered many questions.

Mr. E. Tharington (Oxford) won the Table Show for the Playhouse Cup with 82 points for a silver.

THE results of the Blackburn and District A.S. open show were as follows: Goldwater Fish—Common Goldfish and Shoboskin: 1, Mr. Yates, Northern Parkersport Society; 2 and 3, G. Smith, Blackburn; Platy: 1, 2 and 3, G. Smith, Blackburn; Livebearers—Swordtails: 1, 2 and 3, H. Stamp, Merseyside; Plaques: 1, Dr. C. Y. Howarth, Blackburn; 2, Mrs. E. Howarth, Blackburn; 3, H. Swanson, Merseyside; Mollies: 1, Mrs. E. Howarth, Blackburn; 2, C. H. Whitley, Blackburn; 3, Mrs. E. Swanson, Merseyside; Guppies: 1, 2 and 3, W. Green, Blackburn; Characins: 1, Mr. Pearson, Blackpool; 2, Mrs. E. Swanson, Merseyside; 3, G. Smith, Blackburn; Siamese Fishes: 1, Mr. Foster, Accrington; 2, G. Smith, Blackburn; 3, C. H. Whitley, Blackburn; Labyrinth except Fishes: 1, G. Smith, Blackburn; 2, Mrs. E. Swanson, Merseyside; 3, H. Stamp, Merseyside; Minnows and Barbs: 1, R. Smith, Accrington; 2, H. Swanson, Merseyside; 3, H. Stamp, Merseyside; Dwarf Cichlids: 1 and 2, G. Smith, Blackburn; 3, C. H. Whitley, Blackburn; A.O.V. Cichlids: 1, B. Pearson, Blackpool; 2, J. E. Taylor; 3, N. Arnold, A.O.V. Fish: 1 and 2, H. Swanson, Merseyside; 3, G. Smith, Blackburn. The President's Trophy for Best Fish in Show went to Mr. Pearson of Blackpool with 90 points for a Characid (*Micropodus opercularis*). The Ann-Wild Trophy for member of Blackburn Society with the most points was awarded to Mr. G. Smith. The Brian Reid Plaque awarded to member with most points who was a not a trophy-winner went to Mr. W. Green.

AT a meeting of the Hatfield A.S. a special all Classes table show was held—the occasion being the last meeting of the year and as a tribute to the late Chairman, Bob Morgan. The main item of the Table Show was a contest for the Bob Morgan Trophy, and this year was awarded for Catfish as there were two favourite fish. The results of the Table Show were as follows: Catfish: 1, I. Hayes; 2, I. E. Whittaker; 3, S. Dyer. Characins: 1, A. Harrison; 2, A. Smith; 3, J. Wyle. Breeders-Egg-layers: 1, J. Wyle; 2, A. Smith. Livebearers: 1 and 2, J. Wyle; 3, A. Harrison; Fishes: 1, D. Hunter, Cichlids: 1, J. Wilson; Dwarf Cichlids: 1, J. O'Farrell; Barbs: 1, J. Wyle; 2, A. J. Wilson; 3, D. Hunter; Danio: 1, A. Cartwright; A.O.V. Labo: 1, P. Sagrati; 2, I. Hayes; 3, T. O'Farrell; A.O.V.: 1, S. Dyer; 2, A. Smith; 3, D. Hunter. A special section (i.e. best fish entered by member under 15) was won by C. Powell.

THE speaker at the last meeting of the Alreborough and District A.S. was Mr. O. Taylor from Bradford and he gave a very instructive talk on feeding fish. Various microscopic foods were described and methods of obtaining them.

The table show was judged by Mr. G. Taylor and Mr. S. Skinner from Leeds. The show was A.O.V. the placings were: 1, G. Norfolk, Red Wagon; 2, P. J. Myers, Black Swardtail; 3, H. Roberts, Laser Gourami.

AT the annual general meeting of the Preatwick and Bury A.S., the following officers were elected for the coming year: Chairman,

A. Warble; Hon. Secretary, T. B. Whit-
 13, Galesbrook Street, Harparway, Massachusetts;
 Hon. Treasurer, W. Kearney.
 The Society's annual open table show was
 held on 6th November.

RECENT activities of the Yeovil and District
 A.S. included a talk by the President, Mr.
 Bryant, entitled "Mythology on Fish-Keeping",
 and the Annual Dinner held at the Marine
 Hotel. Over 40 people were present at the
 latter function including members from the
 Weymouth and Taunton Societies. At this
 event the President presented the cups and
 trophies to the members who were successful
 at the Annual Table Show. In September,
 the Society staged a successful exhibition of
 Tropical and Coldwater fish at the Yeovil
 Agricultural Show at which there was a very
 large attendance.

MEMBERS of the Cambridge and District
 A.S. heard a very interesting and informative
 lecture by Mr. Ken Kloss, entitled "Fish Foods
 and Feeding".

The talk covered the feeding of the smallest
 newly hatched fry with "green water" through a
 graduated range of live foods according to
 size and development to a wide variety of foods
 suitable to the adult fishes.

A selection of foods taken from local waters
 was shown, together with specimens of some
 fish enemies of which enthusiastic collectors
 must be wary.

ONE of the most successful shows of the
 Blackpool and Fylde A.S. was staged recently.
 An attractive feature was the school children's
 section of thirteen furnished aquaria and al-
 together there were over two hundred entries
 in the show. The prizes were presented by
 Ald. Clifford Cross, J.P., Mayor of Blackpool,
 founder member and President of the Society.
 The results were—Committee "Crown Trophy
 for members of B. and F. A.S.": 1, J. Taylor;
 2, B. Pearson; 3, P. Wilton. Blackpool
 Corporation Silver Challenge Trophy: J. Taylor;
 2, B. Pearson; 3, P. Wilton. Fletcher
 Trophy for best furnished aquaria other than
 trophy winners: 1, B. Pearson. Coldwater
 Fish Section "A": 1, B. Simmons; Goldfish:
 2 and 3, Master J. Yates Corner. Section "B":
 1, Master J. Yates; Bristol Strabankin: 2, B.
 Simmons; Bristol Strabankin: 3, G. N. Hadley.
 Oranda Section "C": A.O.V.: 1, B. Simmons.
 Minnow: Lividocemus—Swedish: 1 and 2,
 H. Stanger; 2, B. Pearson. Plaice: 1, H.
 Crowther; 2, W. Wakeling; 3, H. Swanson.
 Mollie: 1, R. W. Crook; 2, M. Deakin; 3, J.
 Fisher. Guppies: 1 and 2, W. Hickman; 3, J.
 Gascoine. Characins: 1, Mrs. E. Swanson; 2,
 G. N. Hadley; 3, B. Pearson. Labridae:
 1, Mr. Smith; 2, L. B. Court; 3, J. E. Taylor.
 Siamese Fighters: 1, J. Worth; 2, Mrs. E.
 Swanson; 3, G. H. Whistley. Minnow: 1, W.

Wakeling; 2, Mr. Smith; 3, J. Gascoine.
 Barbs: 1, Mrs. E. Swanson; 2, B. Simmons;
 3, B. Dine. Dwarf Goldfish: 1, R. W. Crook;
 2, H. Barnes; 3, Mr. Smith. A.O.V.: 1, B.
 Pearson; 2, H. Swanson; 3, J. E. Taylor. Killifish:
 1, Miss K. Partington; 2, B. Simmons;
 3, H. Barnes. A.O.V. Tropical: 1, L. B. Court;
 2, C. H. Whistley; 3, W. Ball. Bowfish: Section
 "B": 1 and 2, R. W. Crook; 3, W. Hickman.
 Section "C": 1, F. Partington; 2 and 3, R. W.
 Crook. Best Fish in Show: H. Stanger
 (Merseyide). Best Fish in Show by B. and F.
 A.S. member: E. Crowther. Moss Awards:
 B. Simmons. Blackpool. Schools Furnished
 Aquaria: 1, Harrow Side School; 2, Highfield
 School—girls; 3, Highfield School—boys.
 School Children's Individual Furnished Aquaria:
 1, Master Bryan Crowther (Blackpool); 2,
 Master Anthony Lawrence (Accrington); 3,
 Miss Betty Twissdale (Blackpool).

RESULTS of the Table Show of the Dundee
 A.S. for Swedish-Mollies were as follows:
 1, Gen. M. Gilson; 2, Alex. Cross; 3, Alex.
 Robertson; 4, Peter N. Greening.

The programme took the form of a Coloured
 Slide Show provided by the Dundee Society.
 There was also a very well thought-out and
 interesting commentary along with the slides,
 which were unanimously voted the best so far
 seen.

THE results of the Intra-Society Table Show
 held by Coventry Pool and A.S. were: 1,
 Atherton Society, 11 points; 2, Coventry
 Society, 11 points; 3, Yarnworth Society, 8
 points. The Best Fish in Show was won by
 Mr. H. Jones of Atherton with a Banded
 Goldfish: 1, Mr. H. Jones (A); 2, Mr. E. Badger
 (T); 3, Mr. R. Bagwell (A). Characins: 1 and 2,
 Mr. H. Jones (A); 3, Mr. M. Cox (T). Barbs:
 1, Mr. J. Grant (C); 2, Mr. R. Hunt (C); 3, Mr.
 H. Jones (A). Livebearers: 1, Mr. J. Bagwell (A);
 2, Mr. P. Hulme (T); 3, Mr. Davies (C).
 A.O.V. Tropical: 1, Mr. M. Cox (T); 2, Mr. L.
 Ball (A); 3, Mr. R. Hunt (C). Coldwater:
 1, Mr. E. Bandall (C); Vainall: 2, Mr. S.
 Dodkin (A); Goldfish: 3, Mr. V. Workman (C).
 Strabankin.

The annual dinner has been provisionally
 fixed for Friday, 24th November.

THE new officials of the Cardiff A.S. are
 as follows: Chairman, Mr. K. Owen; Secretary,
 Mr. J. Loader; 20, Manor Lane, Sutton, Surrey;
 Show Secretary, Mr. S. Ben; Treasurer, Mr. H.
 Bagshaw. The Society meet at the Cardiff and
 Llewisham Institute, Halfway Road, Cardiff,
 every Monday at 8 p.m. and new members would
 be welcome.

A BULLETIN from the Friends A.S. includes
 a brief resume of the Society's activities.
 Over 30 tanks have been installed and are being
 maintained in local hospitals. The winner of

the "Best Fish of the Year Trophy" was Peter
 Biscoe, and forthcoming events during Novem-
 ber and December will include three lectures and
 two shows. The annual social will be held on the
 25th November. The new secretary is Mr. J. D.
 Lander, 25, Manor Lane, Sutton, Surrey, and
 new members would be welcome. The Society
 meets every Thursday at 7.30 p.m. at the Lander
 Hotel, Lander Road, London, S.W.8.

THE Bulletin of the A.S.L.A.S. contains an
 invitation by the Chelsea Aquarium Society to
 all members of the A.S.L.A.S. Clubs who
 supported their open show this year to the
 Annual Dinner and Social to be held on Satur-
 day, 18th November, at the Chelsea Com-
 munity Centre, 285, King's Road, Chelsea,
 S.W.10 at 8 p.m. Admission is free. The
 programme will include Novelty Dances and a
 Bingo Session. Recently the members saw
 two colour films—"Life with the Angels" and
 "The Siamese Fighting Fish." Particulars are
 also available from the Training Centre and
 particulars are available from the A.S.L.A.S.
 Secretary, T. F. Ebers, 16, Piccadilly Road,
 Upper Tooting, London, S.W.17.

A LARGE party of members and friends of
 Hounslow and District A.S. went by coach
 recently to the Wild Fowl Trust at Slough, near
 the Bristol Channel. The recent home
 furnished aquaria competition, judged by Mr. R.
 Luff, resulted, Mr. Barber 1; Mr. Woodward 2;
 Mr. Pean and Mr. Boul 3.

At the last meeting, Mr. R. Misland judged
 the first of a series of shield shows for fish in
 the classes: livebearers, barbs, characins and
 coldwater.

Crossword Solution

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

Observations through the Glass

HAVE you ever watched the interesting spawning
 behaviour of the angel fish? For nearly 12 hours
 now a pair in my aquarium have been furiously
 cleaning the leaves of a giant *Sagittaria* plant, and while
 the female carefully flits from one leaf to another before
 making her final choice for the deposit of her eggs the male

plods away on one leaf in a most laborious fashion. One
 begins to wonder when all this activity will end, and then
 without any warning whatsoever the pair will commence
 to court each other in midwater for about half an hour.
 And then, while the female gracefully floats to the selected
 leaf to deposit her eggs, the male waits patiently below.

Two or three eggs are laid on the leaf before the male
 rises to fertilise them, and this procedure carries on for the
 best part of 2 hours.

The average spawning from my pair of angels has been
 250 eggs, and when I have taken out the leaf each time,
 this occurrence takes place about every 14 days. But if
 you wish to continue watching the most graceful behaviour
 of these fish, leave the eggs with them and note the way
 in which both male and female take turns to glide up and
 down the leaf, fanning the eggs as they go.

R. A. Thomas

GRO-WEL
superior
products
the ideal
Christmas
Gift



Moulded of strong, clear polystyrene. These popular and well-tried products are made by GRO-WEL FISH-ADE CO. INC., U.S.A.

OUTSIDE FILTERS

To fit all aquarium frames up to 1' wide.
"SLIM JIM": The slimmest outside filter on the market. A quality filter for only 17s. 6d.
"KLEAR KING": 3-Compartment filter. Separate compartments for glass wool and charcoal. Removable partitions plus a larger siphon stem for faster recirculation. Clip-proof return stem giving a steady, non-splash flow. Price 22s. 6d.

INTERNAL FILTERS

BOTTOM FILTER: For filtering and aerating the tank. Handsomely styled. Unobtrusive and efficient. Price 8s. 3d.
As Recommended in T.F.H. for Marine Apparatus.
Ornamental ROCK FILTER: Looks like a rock but is primarily an efficient filter and keeps tanks up to and including 10 gallons sparkling clear. Price 17s. 6d.

TRAPS

4-WAY CONVERTIBLE TANK TRAP: The most versatile trap available. Can be used for breeding 1 or 2 livebearers, as a food trap for breeding egg-layers or as a self-cleaning display tank for 1 or 2 Bettas. Price 26s. 6d.

Obtainable through your dealer or post free from

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

The Bow Fronted
ARBE AQUARIUM
made from Perspex



The ONLY aquarium with these features — Flush fitting lid • Heater camouflaging panel • Complete electrical circuit which includes — Externally adjustable thermostat • Neon indicator lamp • Heater terminal connector • Power input connector • Press button light switch • Bracket for striplights • FULLY GUARANTEED

	18 x 12 x 11	£8-5-0
FOUR	22 x 12 x 11	£9-17-6
STANDARD	24 x 15 x 12	£12-17-6
11243	36 x 12 x 15	£16-19-0

For further details and your nearest stockist write to:

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

THINKING OF XMAS?

LET T.F.H. BOOKS and WARDLEYS AQUATIC FOODS
SUPPLY THE ANSWER

- AT** At 65s. "HANS FRIEY'S ILLUSTRATED DICTIONARY OF TROPICAL FISHES".
At 60s. THE ENCYCLOPEDIA OF TROPICAL FISHES BY DR. H. R. ANELROD.
At 32s. 6d. SALTWATER AQUARIUM FISH.
YOUR At 34s. A full year's subscription to "THE TROPICAL FISH HOBBYIST" the World's largest selling
monthly Aquarium Magazine.
LOCAL At 6s. "STARTING RIGHT WITH TROPICAL FISH". "GOLDFISH" "GUPPIES".
At 8s. The famous WARDLEY TREAT PAC (Seven different Fish Foods).
At 8s. SUPERRA. Homogenised Micro-pelleted Food.
STOCKIST At 4s. 6d. HO-GLOW 30 COLOUR FOODS Guaranteed to improve the Colouring of most Tropical Fishes.
At 2s. 6d. MOLLYFARE and GUPPYFARE.
NOW! At 2s. 3d. and 1s. 3d. SALMON EGGS, LIVER MEAL, BEEF MEAL, FISH MEAL, SHRIMP MEAT and CRAB MEAL.
At 2s. 6d. WARDLEYS LIQUID SMALL FRY BABY FOOD (LIVEREAKER AND FOOLAYER).

OR WHY NOT A SELECTION OF THE FAMOUS 2s. T.F.H.
PET BOOKS?

T.F.H. PUBLICATIONS (LONDON) LTD.

39 STATION ROAD - REDHILL - SURREY (REDHILL SM61)

the NEW MICHAEL'S FILTER AERATOR



- ★ Aerates the water without additional diffusers.
- ★ Promotes healthy plant growth.
- ★ Positive circulation giving an even temperature.
- ★ Plus a crystal clear aquarium.
- ★ Cheap to install, price 8/6 post free.

Trade enquiries —

MICHAEL'S AQUARIUM 22, NORTH PARADE, HALIFAX
TEL. 3454.
TOM C. SAVILLE LTD., 9, STATION ROAD, BEESTON, NOTTS.
JAMES NORTH LTD., 316, LEE HIGH ROAD, LEWISHAM, LONDON, S.E.13

SUPER OZONIA PUMP 57/6 each
Silent and adjustable, post free.

HOBBY FISH FOOD
Red Box, mixed flakes; green, chlorophyll flakes;
yellow, condition food; 2/- each post free.
Send s.a.s. for fish list.

NOW FREELY AVAILABLE !!

The original inventors and manufacturers have recently taken over distribution and despatch of:

BLACK MAGIC GREEN MAGIC

THE WORLD'S BEST GLAZING
COMPOUNDS FOR AQUARIUMS

SIZE 1 2s. 6d. Postage 2s. 0d.
SIZE 2 4s. 0d. Postage 2s. 0d.
SIZE 3 5s. 9d. Postage 2s. 3d.

Also in 7 lb., 14 lb., 28 lb., 84 lb.
Add 4s. 6d. for Green Magic

TO SAVE POSTAGE, TRY YOUR LOCAL DEALER

All communications to:

CHEMRESKO LIMITED
THE DOCK, PRESTON, LANCS.

Telephone: Preston 26487 Telegrams: BRITPHAL PRESTON
Trade enquiries invited

YOU ARE INVITED TO SEE AN EXHIBITION OF TROPICAL FISH

IN OUR NEW M. & R. AQUARIUM



Over 100 varieties on show and for sale. We are direct importers of tropical fish. We stock Marine Tropicals. Fish for personal shoppers only. Aquarium equipment, wholesale and retail.

M. & R.

446 PAISLEY ROAD WEST, GLASGOW S.W.1

Telephone: 2082 3613

Open Sundays 11 a.m.—2 p.m.

USE
"CORAL"
AS
YOUR
BASIC FOOD

It is a **BALANCED PROTEIN DIET**, not just a cereal filler.

From dealers in 6d., 1/-, 2/- drums.

Keep Them Healthy on Coral

GIVE YOUR FISH

“SUREGROW”

FOR XMAS AND YOURSELF, TO MAKE FISHKEEPING EASIER

“DISEASOLVE”

AND EVERYONE WILL BE HAPPIER

from any good Pet Shop

Trade Enquiries from
South Coast Aquatic Nurseries,
Old Bath Road, Colchester, Essex, Essex.
Telephone Colchester 2477.

Have you seen

BIRDS ILLUSTRATED ?

A monthly magazine devoted to Birds

Well priced and profusely illustrated with the work of foremost bird artists and photographers, this magazine contains a beautiful coloured plate in alternate issues.

Pages are devoted in each issue to the Budgerigar, Canary, Foreign and British Birds, and articles appear regularly on the construction and maintenance of aviaries, ailments, feeding, breeding, the latest techniques of colour feeding, genetics and many other topics of interest to both the advanced aviculturist and newcomer.

SEND TODAY FOR A SPECIMEN COPY
1s. 9d. post free

BIRDS ILLUSTRATED (Dept. A)

The Butts, Half Acre, Brentford, Middlesex
Subscriptions for one year (Inland and Abroad) £1 2s., six months 11s.,
including postage. Canada and U.S.A. \$3 per annum.
Can be obtained through your newspaper.

AQUARIUM PUTTY

Made specially for AQUARIUMS

- ★ WATERPROOF
- ★ A SMOOTH PUTTY
- ★ EASY TO USE

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

BRUMMER LTD. Oyster Lane, Byfleet, Surrey

HAVE YOU READ

FISH FOODS AND FEEDING

by Feroze N. Ghadially

SUMMARY OF CONTENTS

General Principles - Feeding Problems Encountered by the Fish Breeder - Foods of Animal Origin - Vegetable Foods
Dried, Bottled and Frozen Foods - Miscellaneous

Obtainable from:

THE AQUARIST
THE BUTTS, HALF ACRE,
BRENTFORD, MIDDLESEX

Price
4s. 11d.
post free

THE AQUARIST

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—Mixture W. Worms Easy to breed
GRINDALWORMS	3/0—Mature cultures in wooden boxes
GRINDAL FOOD	2/6—High protein content. Rapid results
GRINDAL COMPOST	2/6—Finely ground with organic base
WHITE WORMS	2/6—With complete instructions
WHITE WORMS	3/0—Mature 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.

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

ALL ABOUT TROPICAL FISH

(2nd Impression)

Derek McInerny and Geoffrey Gerard

This book explains all about tropical fish. It is the complete guide for beginners, and the best work of reference for experts. Illustrations are superb: over 300, including 100 in full colour!

★ "Well produced, comprehensive, valuable notes on behaviour, diet, and breeding, excellent photographs in full colour."—*Times Literary Supplement*.

★ "Treatment systematic, information well laid out, standard of production high, illustrations good. The aquarist will be well served by this attractive and practical book."—*New Scientist*. 75/-

From bookshops and pet shops

—A HARRAP BOOK—

HYKRO

AQUATIC APPLIANCES AND FOODS

Hykro Filters:—De Luxus for Crystal-Clear Tanks 13/6. Also The New De Luxus Junior 5/-.
Feeding Rings. Including the four-in-one for Live Food, Dried Food, Floating Worm Feeders.
Be up to date with a four-in-one Tank Scraper.

The 3-way Gang Valve. Popular all over the world. Does away with use of Tees and Clamps.
Very efficient and compact.

HYKRO FOODS CARRY ANALYSIS OF CONTENTS ON EACH CONTAINER.

Hykro Flakes. These are known the world over. Used extensively by exhibitors to get that
condition and bring full beauty of fish.

Hykro Natura. Contains 9 Dried Live Foods, and will feed the rarest tropicals (or coldwater fish).

Hykro Concentrated Goldfish Food. Will keep your fish in tip-top condition, also relished by
many tropicals. Including the ½ lb. pack.

Please note:—in response to many enquiries, we do not supply these appliances and foods direct.

They are obtainable at all the best shops, but in case of difficulty drop us a line and will put you
in touch with nearest stockist.

Plants. We carry big stocks of plants, including Madagascar Lace Leaf, Water Hyacinths,
Water Lettuce and all the popular varieties.

JOE GRASSBY, F.R.H.S.

THE HYKRO DEPOT, MORRERLEY NEAR KNUTSFORD, CHESHIRE

Phone Malberley 3272

PREPAID ADVERTISEMENTS

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

FOR SALE

GLAZED aquaria in all sizes including 36 x 15 x 12, 62x 6d, 18 x 10 x 10, 18x 6d, 24 x 12 x 12, 37x 6d, tanks detached to any part of Britain, carriage extra. Plants, Accessories, Fish. Wright's, 10, Lorne Road, London, N.4. Phone Archway 3820.

PERRY'S for Plants. 1st and 2nd Awards British Aquarist's Festival. Assorted selections Tropical or Cold 5s. 6d.; 7s. 6d. 10s. 6d. Val. Terna, Sagittaria Nana, 6s. per dozen. Cryptocoryne Cordata 1s. 6d. to 2s. 6d.; Willow 2s. 6d.; Berketei 1s.; Harettiana 2s. 6d.; Spatulifolia 2s. 6d.; Seven assorted 17s.; Water Wistaria, Giant Hygrophila 2s. 6d. Post 1s. All Advertised Accessories. C. E. Perry, Professional Aquarist, 615, West Street, Cove.

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

TAYLOR'S AQUARIUM, 76, Manchester Road, Barnley. Tropical Fish in variety. Our top quality Plants gained for us 1st in Tropical Furnished Aquaria, British Aquarist's Festival, 1979.

PERFECT Specimens, Line Bred Blue Scarf Guppies 15s. per pair; Line bred Blue Fishies 15s. per pair; Apono Tetraodon 15s. pair; Madagascan Rainbows 4s. 6d. each, carriage 3s. 6d. C. R. Perry, Professional Aquarist, 615, West Street, Cove.

CALLING ALL AQUARISTS. Gill and see our large selection of Tropical and Coldwater fish, Plants in variety. We also stock all accessories at "The Aquarium," 192, Wellingborough Road, Northampton. Phone 54410.

EASY TERMS. Start your hobby the easy way. Air Plants, Heaters and Thermometers, Filters, Breeding Traps, Nets, Thermometers, Frames and Stands and all accessories. Send a stamp for list "A" Joseph Sanley Ltd., Church Hill, Northfield, Birmingham 31. Phone PRIORY 6630.

GUARANTEED Quality Plants—Hygrophila, Hornwort, Ludwigia 5d. 4s. 6d. dozen, Vallisneria varia, spiralis, dwarf Sagittaria, Sagittaria 8s. 1s. 6d. dozen, Heteropsis 9d., 7s. 6d. dozen, Dwarf Ivy, Wistaria, Giant Hygrophila 2s. each. 120 varieties Tropical and Coldwater fish, personal shoppers only. Post 8d. all orders. Kingfisheries, 138, Croxley Road, Rickmansworth, HEC 3716. Closed all Wednesdays.

WHITE Worms by weight. 1oz. 4s.; 4 oz. 15s. Post paid. Contracts 3s. 6d. ex. V. J. & A. Dene & Son, "Densford," Alchester Road, Farnway, via Alvechurch, Warwickshire.

AQUARIA Stands, Shades, Frames. Guaranteed square. 1 x 1 x 1 in. steel angle. Stands to take 2 tanks 18 1/2 x 12 x 36 in. high 29s. 24 1/2 x 12 x 36 in. high 32. 30 1/2 x 12 x 36 in. high 37s. 6d. 36 1/2 x 12 x 36 in. high 42s. Frames 24 x 12 x 12 in. 20s. 24 x 18 x 12 in. 21s. 30 x 15 x 12 in. 22s. 36 x 15 x 12 in. 26s. 48 x 15 x 12 in. 14 1/2 x 11 1/2 in. angle 26s. All over shades aluminium 24 x 12 in. 15s. 30 x 12 in. 21s. 36 x 12 in. 24s. 48 x 12 in. 30s. Shades sold only with frames and stands. Any wire frame, stand, or shade made to order. Carry paid. C.W.O. Money back if not satisfied. Please, despatch. Hackney Engineers, 30, Somers Street, Leeds, 1. Tel. 25661.

ANGLE IRON AQUARIUM FRAMES all sizes guaranteed square. Mitred Corners Ground Finish. Popped Steel Frames spot welded. Aluminium Hoops. Aquarium Stands with or without Scoffs. All sizes of Aquaria Glazed. For collection only. Spray finished. Trade supplied. S.A.E. please. D. Watson, Engineers, 177, Sharp St, Hill.

TROPICAL FISH. Over 50 Varieties always in stock, also equipment, fittings and weeklies. Oldbury, 94, Paul Lane, Vauxes Cross, Chester. Telephone 35671.

MIDLAND AQUARISTS. . . 2,500 tropical fishes—100 species including many rarities all moderately priced—live foods available. Wilemington Aquatics, 147, Horsley Fields, Wolverhampton. Free Advice and price lists.

AQUARIUM PLANTS at 5s. per dozen: Bristanodora (prayer plant succulent), Hygrophila, Ludwigia, Myriophyllum (green or purple-fother), Sagittaria, dwarf (horata or natans), Vallisneria (straight or twisted). 50 species usually in stock from 2d. to 5s. each.

Try a generous 15s. cold or tropical plant parcel. Mr. Sinclair of Mansfield writes me: "I have purchased several of these parcels and have always been extremely pleased with the contents which I consider to be unbeatable for value."

Add 1s. 6d. for postage, etc., for orders below 15s. please.

Fish Also Now Available, delivery by rail.

Send S.A.E. for detailed list (retail or trade). Business by post only, to: Frank Stone, 51, Nantrop Road, London, N.W.3.

I.G.M. GRINDALWORMS, ideal live food for tropicals. Full of body building protein.

HEALTHY SCHEME for fishes! Food "Wagtail" high-protein foods. Standard 2s., colour 1s. 3d. and 5s. 6d. post paid. Cox, 31, Nantrop Lane, Cheltenham.

I.G.M. GRINDALWORMS, disease and pest free live food, give your fish the high glow of well-being.

BRITISH and JAPANESE Guppies, breeding pairs all show quality and half grown fishes available immediately. Booking accepted for broods of fry. Can also offer some unusual hybrid varieties. Sea Anemones required cash or exchange. Enquiries to Wootton, 51, Villiers Street, Orsett, Longon, Soke-on-Tyem.

QUALITY Tropicals, Plants, Aquariums (all sizes) Thermometers, Heaters, Aeration, etc., obtainable from Stainers Pet Stores, 99, Aldith Street, York.

I.G.M. GRINDALWORMS, ever-ready source of live food. Culture, special food, compost and instructions 7s. 6d. complete.

THIRRE was a young girl of Loddigly.

Said her fish tank was murky and stinky.

Now she feeds 'em McLynn's

It's as bright as two penns.

And she's grown up watching the "Telly."

AQUARIA FRAMES. For quality and accuracy buy direct from the manufacturer. 1 x 1 x 1 steel angle. 30 x 15 x 15, 26s.; 36 x 12 x 12 24s.; 30 x 15 x 15, 22s. 6d.; 30 x 11 x 12, 23s.; 30 x 12 x 12, 22s. 6d.; 24 x 12 x 12, 20s. 6d.; also 18 x 10, 13s. 6d.; 18 x 12, 15s.; from 1 x 1 x 1 in. angle. All mitred and welds 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. B. Henney, 52, Charter Street, Ayrington.

RUSTPROOFED Aquarium Frames, including bow and corner type Ornamental Stands, Glazing Cement and Equipment Manufacturers—Wootley's Barton, Ormskirk.

I.G.M. GRINDALWORMS, from your dealer or post free if any difficulty, from E. L. Arnold, 80, Monaga Road, London, E.7.

GOOD selection Tropical Fish. Popular breeds, mostly tank bred. Keen prices. Greenwood, Alton Nantrop, Newson, Nr. Kotham, 1, 100s.

30 x 15 x 12, 24 x 15 x 12, Working stand, light hood, fish, plants, rocks, etc., 28 1/2s. or separately 24 x 15 x 12 empty 11. 2/6s. 93, Wilberforce Road, London, N.4.

SPARKLING clean tank, it's CLEAR to use McLynn's fish food.

WINNER Time Switches, reconditioned, 250V, 1 amp. Ideal for automatic switching—Aquarium Lighting, Car lights, Radios, etc. 25s. Also Synchrosound, Flushing Units, fully suppressed, 25s. Baitfisher, Dept. A, 6, Park Road, Bromley, Kent.

TROPICAL fish in variety. By rail anywhere S.A.E. for list. Naylor, 44, Darley Dean Road, Holly Oak, Birmingham.

HERTFORDSHIRE AND NORTH MIDDLESEX. Large variety of tropical fish, plants and equipment always available. Breeders surplus purchased. Cuffley 2214, 105, Tolmers Road, Cuffley, Herts.

BRISTOL. Blue Starbuckles, pairs and yearlings. S.A.E. please. Ouseham, 49, Park Lane, Winterbourne, Bristol.

SPECIALISED fish-foods always in stock. Wootley's American foods (42 different packs), McLynn's, Starogrow, White-worm, Tubifex, Wolverhampton Aquatics, 147, Horsley Field, Wolverhampton.

TROPICAL fish, fully quarantined, over 100 species offered at lowest prices. All aquarium requirements supplied. Sterling Fisheries, 62, Myers Road, Wood Green, N.22.

GUARANTEED thermostat, heater and thermometer, 20s. post paid. Stans heater wattage. Sterling Fisheries, 62, Myers Road, N.22.

REPAIRS

GUARANTEED heater rebuilds, 5s. 6d. each. Send old heater and state wattage. New guaranteed heaters which will give long, reliable service, 7s. 6d. each. J. Weir, 7, The Drive, Welwyn, Herts.

WANTED

BREEDERS Sharples Fish and Plants. Wainstield Aquaria, 6, Stanley Road, S.W.19.

EXCHANGE

PAIR Palm Squirrels exchange, vivarium pump, filters, plants, etc. Offer. 7, Ross Street, Ayr, Scotland.

PUBLICATION

FEDERATION of Guppy Breeders' Societies New Standards Handbook. Including Three New Standards, 5s. 6d. post free. B. Aitman, 15, Knights Road, London Road, Romford, Essex.

APPOINTMENTS VACANT

EXPERIENCED Aquarist wanted, preferably with knowledge of retail selling for fish days, of busy pet shop. Advancement to post of Shop Manager to right person ultimately. Box 2661, The Aquarist, The Bute, Bournemouth, Hants.

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 3179

THE BOOK OF THE CENTURY

Illustrated Dictionary of Tropical Fishes by Hans Frey

PRICED AT ONLY 65/- THIS BOOK IS A MUST

WE KEEP ALL THE LATEST EDITIONS OF AQUATIC BOOKS

Illustrated Dictionary of Tropical Fishes (Frey) ..	65/-	All About Tropical Fish (McInerny) ..	75/-
Encyclopedia of Tropical Fish (Axelrod) ..	60/-	Starting Right with Tropical Fish (Gannon) ..	6/-
Exotic Aquarium Fishes (Innes) ..	84/-	Starting Right with Goldfish (Gannon) ..	6/-
Diseases of Fishes (Duijn) ..	14/6	All About Aquariums (Schneider) ..	6/-
Tropical Fish as a Hobby (Axelrod) ..	39/-	All About Breeding Tropical Fish (Schneider) ..	6/-
How to Keep and Breed Tropical Fish (Dr Emmens) ..	32/6	All About Guppies (Axelrod and Whitern) ..	6/-
A Manual of Aquarium Plants (Roe) ..	7/6		

We have many more booklets in stock far too numerous to publish. Send 3d. in postage for list.

PLASTIC AQUARIUM Cleaning Appliances	ANGLE IRON TANKS	BOW FRONTED AQUARIA (Angle Iron)	FOODS	AIR PUMPS
Air Rejector .. 10 0	18 x 10 x 10 in. £1 10 0	Complete Assembly of Tank, Stand & Canopy	Evening Flakes .. 1 4	Vibrators A.C. only
Hand Rejector .. 15 0	18 x 12 x 12 in. £1 15 0	24 x 15 x 12 in. £14.10.0	Hyline Flakes .. 1 0	Fairy .. £1 7 4
Air Rejector Spare	24 x 12 x 12 in. £2 7 4	36 x 15 x 12 in. £12.10.0	McLynn's 1, 2 & 3 .. 17 6	Monroe Filter .. £1 1 0
Bag .. 1 4	24 x 15 x 12 in. £2 12 6	24 x 15 x 12 in. £19.10.0	Flour .. 1 6 & 2 6	Monroe Major .. £1 4 0
Hand Rejector Spare	30 x 15 x 12 in. £3 7 4	36 x 15 x 12 in. £17.10.0	Vega .. 1 0	Ex Ex Model D .. £2 7 0
Bag .. 1 4	36 x 15 x 12 in. £4 0 0	36 x 15 x 12 in. £18.10.0	Moss .. 1 0	Prockor .. £2 0 0
Automatic Syphon .. 3 0	36 x 15 x 15 in. £4 15 0	Aquarium Bookcase and Stand with ornamental Scroll Work .. £14.10.0	Bartram's .. 1 6 & 2 4	Zoobelo Total .. £3 15 0
Fish Tail Syphon .. 3 0	48 x 15 x 12 in. £5 10 0	36 x 15 x 12 in. £17.10.0	Shin No. 2 .. 1 3	Silena .. £2 15 0
15 in. Dip Tube .. 3 0		48 x 15 x 10 in. Bow Front Bookcase .. £25.0.0	Seysium 1, 2, 3 & 10 .. 6 6 & 2 0	Perfecta Aquason .. £1 17 4
Hand Rejector Spare			Dried Diatoms .. 6d. 1 0 & 1 4	
Bulbs .. 2 4			Dried Shrimp .. 4	PISTON PUMPS
	STANDS			Leon Single Piston .. £4 19 4
	18 x 10 x 36 in. £1 7 4			Leon Double Piston .. £5 17 4
	18 x 12 x 36 in. £1 12 4			Leon Fish House .. £10 10 0
	24 x 12 x 36 in. £1 17 4			Hy-Flu Junior .. £5 7 0
AQUARIUM SCRAPERS	24 x 15 x 36 in. £2 3 4			Hy-Flu "A" .. £6 30 0
Slide Scrapers .. 2 4	30 x 12 x 36 in. £2 7 4			Hy-Flu "B" .. £8 5 0
Aluminium Scrapers .. 3 4	36 x 12 x 36 in. £3 15 0			Hy-Flu "C" .. £12 10 0
Rubber Scrapers .. 3 4	36 x 15 x 36 in. £3 19 4			Genova Piston .. £14 0 0
	48 x 12 x 36 in. £3 12 4			Scotts Garden .. £7 19 4
				Fountain .. £7 19 4
AIR PUMP ACCESSORIES	VICTOR ALL OVER BACK LIGHTSHADE	HEATERS	FILTERS	
Tubing Clamps, 1/2" .. 1 0	10 x 10 in. .. £1 1 0	S.P.—40, 75, 100, 130, 150 watts .. 9 4	Premier Base Filter	
Pipes, 1/2", 3/4" w.v., 1" .. 1 4	18 x 12 in. .. £1 2 4	Ex Ex Standard—25, 50, 75, 100 watts .. 7 4	Size 7" 19 x 10 in. 12 4	
1 1/2" w.v., 1 1/2", 2" w.v., 1 1/2"	24 x 12 in. .. £1 5 0	Ex Ex Superb—25, 50, 75, 100, 125, 150 watts .. 10 4	Size 15" 24 x 12 in. 18 0	
	30 x 12 in. .. £1 8 0	UNO .. 9 4	Consort External .. 19 4	
DIFFUSER STONES	36 x 12 in. .. £1 14 0	TT Heaters—25, 40, 60, 75, 100, 130 watts .. 9 4	Filter .. 19 4	
Oblong with tube insert, 1/2" .. 1 0	36 x 15 in. .. £1 17 0		Regent Internal Filter .. 10 0	
Oblong with 1/2 in. insert, 1 1/2" .. 1 4	48 x 12 in. .. £2 8 0		All sizes of filter can be manufactured to your special requirements.	
				PUMP SPARE PARTS
DIFFUSER STEMS	PRESSED STEEL	REMEDIES	THERMOSTATS	Fairy Diaphragm, 1/- Fairy Air Chamber, 1/6; Prockor Diaphragm, 1/6; Leon Washers 1/-; Leon Spare Pistons 2/-.
Plastic 12 in., 5d.; Plastic 15 in., 4d.; Plastic 24 in., 18d.	10 x 7 x 7 in. 10 0	Broslam White Spot Cure .. 2 0	Ex Ex Major Submersible .. 18 0	Uno Popular .. 10 0
	12 x 6 x 6 in. 10 0	Vivo Salts .. 2 0	Ex Ex Minor .. 18 0	Uno Popular (Glowlight) .. 12 4
	12 x 8 x 8 in. 12 4	Sea Salts .. 2 0	Ex Ex Sentinel Outside Control .. £1 4 4	Uno Incombustible .. 15 0
	14 x 8 x 8 in. 14 0	Yeo Salts .. 1 0	Conart 250 watts .. 18 0	Uno Outside Control .. 18 0
	16 x 8 x 8 in. 17 4	Liquinox .. 1 0	with neon .. 12 4	
PLASTIC TUBING	16 x 10 x 10 in. £1 9 0	Olanox .. 1 0	Conart 500 watts .. 15 0	
P.V.C., Flexible Non-Toxic Clear Air Tubing, 3/8 per ft. or 60 ft. coils for 7/6.	18 x 10 x 10 in. £1 3 0	Broslam Fertilising Tablets .. 1 4	Conart Outside Fitting .. £1 13 0	THERMOMETERS
	18 x 12 x 12 in. £1 10 0	Tachbrook White Spot Cure .. 2 0	Prockor Outside Fitting .. £1 16 0	Dumpy Compass .. 4 4
		Fungus Cure .. 2 0	S.F. Thermostat and Heater combined (outside fitting) .. £1 2 4	Conart Plastic Bath (mercury) .. 4 4
		Holamid .. 2 11		Floating (spirit) .. 2 4
				Parapex App. .. 5 4
				Stick on (spirit) .. 5 0

WE KEEP A WIDE RANGE OF FISHFOODS — THESE WE RECOMMEND

WARDLEY'S FISH FOOD
Send for Wardley's Fish Facts FREE!
Hi-Glow 50 Colour .. 4 4
Food .. 4 4
Golden Food .. 4 4
Supramic .. 2 4 & 1 3
Vitalizer Plus .. 2 4
Viva Fare .. 2 3
Mully Fare .. 2 4
Guppy Fare .. 2 4 & 2 3



Fishes .. 2 4
Crab Meat .. 1 3 & 2 3
Beef Meat .. 1 3 & 2 3
Fish Meal .. 1 3 & 2 3
Salmon Eggs .. 1 3 & 2 3
Liver Meal .. 1 3 & 2 3
Fyfare .. 2 4
Treat Pack .. 5 0
Glow-Tab .. 3 4
Liquid Small Fry (Egg) .. 2 4
Liquid Small Fry (Live) .. 2 4

Shirley Aquatics Ltd.

WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: SHIRLEY 130
Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

TROPICAL FISHES FOR XMAS

COLLECTION OF 20 BARBS

4 of each of the following:

50/- TIGER · NIGGER · CHERRY
CHECKER · GOLDEN

COLLECTION OF 20 CHARACINS

2 or 4 of any of the following:

NEONS · GLOWLIGHTS · PENGUINS · WIDOWS
FLAMES · BELGIAN FLAGS · SERPE · ROSY TETRAS

50/-

CONGO SALMON—(featherfin)

Beautiful Specimens

17/6 each

WONDERFUL SELECTION OF
TROPICALS ALWAYS

RUST-PROOF AQUARIUMS

24×15×12 72/- 37×15×12 45/-

LEON PISTON PUMPS

IDEAL XMAS GIFTS

TWIN CYLINDER 117/6 SINGLE 99/6

Silent running

CARDINALS—well grown 12/6

The World's Greatest Selection of Aquarium Plants

(Send S.A.E. for list)

New list now in print

OVER 180 PLANTS ILLUSTRATED AND
220 PLANTS DESCRIBED IN OUR BOOK
A MANUAL OF AQUARIUM PLANTS
7/6 POST PAID

SPECIAL XMAS PLANT PARCEL

- 1 4-LEAF CLOVER
- 1 PENNYWORT
- 1 HAIR GRASS
- 1 APONOGETON
- 1 CRYPTOCORYNE
- 1 CHAIN SWORD
- 1 GIANT VALLISNERIA

ONLY
10/-

SHIRLEY SPECIAL PLANT PARCELS

TROPICAL OR SUBTROPICAL

30 Plants in variety ... 15/-
50 Plants including unusual species ... 30/-
POST & PACKING 1/6

FOR THE BOG GARDEN

Special collection of Aquatic Irises

10 DIFFERENT FOR 20/-

PLEASE NOTE.—All enquiries requiring a reply MUST be accompanied by S.A.E. Our premises are situated on the main Stratford-Birmingham road, 4 miles from Birmingham, Midland "Red" Bus No. 150 from Bull Ring, Birmingham, passes the door, slight at "The Crown," Monkspath.
HOURS OF BUSINESS—Weekdays 10 a.m.—7 p.m. Sundays 10 a.m.—12.30 p.m. (Sunday Afternoons May-July Only)

CLOSED ALL DAY EVERY MONDAY

TERMS OF BUSINESS—Cash with order please. Fish sent by R.A. Tropical minimum order £5, insulated container and carriage 10/-. Cold water minimum order £2 plus 10/- can and carriage. Plants by post (minimum order 10/-) please add 1/6 post and packing.