

# The Aquarist

and Pondkeeper

JUNE, 1962



MONTHLY  
Vol. XXVII No. 3

**TWO SHILLINGS**

## WALTER R. SMITH

For Complete Tropical  
and Coldwater Aquaria

80 VARIETIES OF TROPICAL AND  
COLDWATER FISH USUALLY IN STOCK

1,000 Gauge Polythene Sheeting. Ideal for Garden Ponds. £1 per running yard, 12 ft. wide, including P. & Post.

### 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 THERMOMETERS
- 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.

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

## WALTER R. SMITH

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

Manchester 4

Telephone: Deansgate 3961 and 1330

## 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. Club visits by appointment.

### M. & R.

465 PAISLEY ROAD WEST, GLASGOW S.W.1  
Telephone: 288111 Office 3613 Open Sundays 11 am—2 pm.

## Today's best value in heavy gauge STEEL SHELVING £3.15.0



DELIVERED FREE, ON THE  
MAINLAND OF ENGLAND,  
SCOTLAND & WALES.

Brand new — Manufactured in our works. Shelves adjustable every 1000. Heavy gauge shelves will carry 500 lb. distributed weight each. Heavy enamelled dark steel. 5 shelves per bay — Extra shelves 8/- each. Quantity discounts on orders for 500 bays or more.

Also available in white at £3.25.0

SEND FOR CATALOGUE OF  
OTHER STORAGE EQUIPMENT

Unassembled ready for erection

## N. C. BROWN LTD

A. P. Wing, Heywood, Lancs. Tel. 49015

## "LIQUIFRY"

THE FIRST FOOD (IN LIQUID FORM) FOR BABY FISHES

The World's most recommended fry food.

This photograph shows Miss Helena Hong with the banner and cup awarded to the Liquifry Company Ltd. at the 3rd Singapore Aquarists' Show.

"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 tubes 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**



**ANNOUNCING**

THE  
**NEW**  
FULLY GUARANTEED  
**'PRESET-matic'**

A precision built aquarium heater  
with incorporated thermostat  
and neon light.

Preset to maintain a constant  
75°F year in—year out— but  
readily re-set if required.

In three sizes :—

50 watt—8½"

100 .. —10"

150 .. —12"

IT'S  
**'ARISTAQUATIC'**  
TO GO  
"PRESET-matic"

**Price 24/6**

(Tax Paid)

FROM YOUR DEALER

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

AN  
**ES45**  
PRODUCT

**Now—**

*Ask your dealer for  
the greatest advance in aquarium feeding to date*

**No. 1**  
**FOODEX**

**THE COMPLETE TROPICAL FISH DIET  
A COMPOUND FOOD CONTAINING**

- PROTEIN CONCENTRATES
- LIVER
- ANIMAL FATS
- DEXTRISED WHEAT
- BLOOD
- LEAF MOULD YEAST
- CHLOROPHYLL
- BODY SALTS
- MINERAL TRACE ELEMENTS

**3/-** per  
box

including measuring spoon  
and instruction booklet

**EXOTICTRADE (NATURALISTS) LTD.**  
269 Goswell Road, London E.C.1

FOR THE BEST FISH-FOOD

## McLYNN'S FISH-FOOD

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

*From your Pet Shop  
or direct from us:-*

**McLYNN'S AQUATIC FOODS**  
DORKING, SURREY  
Telephone: DORKING 2373

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

# McLynn's

FOR THE BEST FISH & PLANTS

## McLYNN'S AQUARIUM

CLUBS AND  
VISITORS WELCOME  
BUY DIRECT FROM  
THE BREEDER

*ALL STOCK FREE FROM DISEASE  
SOLD UNDER A WEEK'S  
GUARANTEE*

S.A.E. FOR LIST WHOLESALE, OR  
RETAIL

*Direct from:-*

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

# CLAROX

## THE SAFE WATER CLARIFIER!

CLAROX keeps ponds crystal clear. They look nicer and are healthier for fish and plants. CLAROX water Clarifier and Oxygenator clears the cloudiest water, destroys all algae. Harmless to fish and plants.

10 oz. bottle treats 160 gallons water .. .. . 2/6d.  
1 gallon can treats 2600 gallons water .. .. . 25/-  
Tablets, 12 per box treats 2 gallons water .. .. . 1/-

### KALORA FISH FOOD

Balanced Vitamin diet keeps fish healthy.

Medium Drum .. .. . 9d.  
Large Drum .. .. . 1/6d.

### DRIED MONGOLIAN DAPHNIA

First quality, Medium Drum 1/-

### GROUND SHRIMP FISH FOOD

Ensures correct proteins.

Small Drum .. .. . 6d.  
Medium Drum .. .. . 1/-  
Large Drum .. .. . 1/6d.

### ANT-EGGS (Scandinavian)

Grade A, Small Drum .. .. . 9d.



### WHEAT GERM MEAL

The Germ of sun-ripened wheat is the natural form of Vitamin E. Eagerly taken by all fish, bird and animal life with the most beneficial results.

Large Drum .. .. . 9d.

## KALIUM PRODUCTS

*From your usual supplier. If in difficulty write to:-*  
**KALIUM PRODUCTS (REDDITCH) LTD.,**  
Adelaide Street, Redditch, Worcs.

**The  
"SILENTA DE LUXE"**



One of the most powerful pumps on the market. Internal filter prevents dust and impurities from entering aquaria. Built-in magnet giving tremendous power. No vibration; noiseless. Long life with plug attached. Spare diaphragm. Six months written guarantee.

PRICE 55/- each

**"HALAMID"**

A certain cure for White Spot and Fungus. One wholesaler wrote: "It was only 'Halamid' that kept me out of trouble." Don't wait for disease to ruin your aquarium—keep a supply handy. (A pinch every week stops algae from forming in the aquarium.)

PRICE 2/6 plus 6d Purchase Tax = 3/- each

**INFUSYL**



Essential to all breeders. Simply drop a tablet into the aquarium and *real infusoria* is produced in about an hour. Not a substitute for infusoria, but the real thing!

PER VIAL  
of TEN TABLETS 2/6

**AQUARIUMSTOP**

By applying a little 'Aquariumstop' to the outside of a tank, you can cure a leaky aquarium without having to empty the tank.

PRICE 2/6 each

IMPORTERS OF TROPICAL FISH AND AQUARIA EQUIPMENT

**HILLSIDE AQUATICS**

44, WOODBERRY WAY, N. FINCHLEY, N.12

Telephone: Hillside 5430

Members of the Pet Trade Association Ltd.



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

### BOW-FRONTED AQUARIUMS

48in. x 10in. x 12in. bow-fronted aquarium with wrought iron bookcase stand £28/0/0 complete.  
36in. x 12in. x 15in. bow-fronted aquarium with wrought iron bookcase stand £18/18/- complete.  
Available in penny bronze, black & gold, and cream

#### WITH PLAIN STAND

60in. x 10 x 15	£21.0.0
36 x 12 x 15	£15.10.0
24 x 12 x 15	£11.10.0

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

### STANDS

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

### REMEDIES, etc.

Broaden White Spot	2/6	Clarin (Not by post)	2/6
Cure	2/-	Liquinox	1/6
Vivo Salts	2/-	Diagnose	2/6
Sea Salt	1/6	Broaden Fertilising	1/6
		Tablets	1/6

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.

### THERMOSTATS

Control External	each 22/-
Control New External	22/-
Type OK	21/-
UNO	
Out. Ad.	18/-
Int. Ad.	15/-
Int. Ad. "Popular"	10/-
"Popular" with meter	
Indication	11/6
"Ea-Er" limited	20/6

### THERMOMETERS

Mercury	each 6/6
Gen.	6/6
Plastic Backed	6/6
Spot Blue Gen.	5/-
"Ea-Er" Change	6/6

### FILTERS

"Windmill" Plastic	each 19/6
Outside Filter	19/6
"Windmill" Biological	
Aquarium Filter 12.6, 15-	
"Windmill" Beams	
Inside Filter	10/-
Corner Filter	6/-
Air 125	1/6
"Silent Eco" Outside	
Filter	17/6
"Klar King" Outside	
Filter	22/6
Berman Filter	8/3
Ornamental Rock	17/6
1 Filter (see Liberty advert.)	

### AERATORS & PISTON PUMPS

Mommsen	each 21/-
Gen.	24/-
"Ea-Er" Fairy	27/6
Sea	26/-
Footpump 2nd	25/-
Hydro Jockey	107/6
Hy-So "A"	130/-
Hy-So "B"	165/-
Hy-So "C"	230/-

### HEATERS

"QUEENSBOROUGH"	each
25w. 80w. 100w.	
75w. 100w. 120w.	
150w.	18/-
"Ea-Er" Filament Heaters	
(100w. and 120w.)	19/-
"Ea-Er" Thermocouple Heaters, 100w. and 150w.	36/-
Heater Hatters	2/-

### BACKING PAPERS

STRATA ROCKWORK	
PEBBLE BEACH	
SEA & SHORE	
26in. long x 20in. high	2/6
per sheet, or 8/3 per foot.	
(post free)	

### LIVE FOODS

Brian String Eggs	1/6 and 4/6
Cultures of	
Nest Worm 1 oz.	7/6
2 "	12/6
White Worm	3/-
Micro Worm	3/-
Tubificor worms	1/6 and 2/9
post free	

### BOOKS

Guide to Tropical Fishkeeping	
(J. H. P. Bryson)	35/6
Diseases of Fishes	
(C. Van Dujo)	35/6
All about Tropical Fish (Maloney)	7/-
Encyclopedia of Tropical Fishes (H. K. Austro and W. Voerdwinkler)	62/6
Electricity in your Aquarium	
(L. Warburton)	8/6
Illustrated Dictionary of Tropical Fish (Hans Frey)	87/6

All prices include postage

### FOODS

"Quamthrough" Tropical Fish Food	1/6 and 2/6
Exotic Flakes	1/6
Hydro Flakes	1/6
Bromian	1/6 and 2/6
Bromian Frygals	1/6
Bromian Worms	6d. and 1/6
Lilyfish Nos. 1 and 2	2/6
Inlet	2/6
Elbe	2/- and 4/6
Dried Daphnia	Our 6d.
Ground Shrimp	1/-
Fish Food	1/6
in 3 sizes	
Anti Egg	6d.
Wardley's Trout Pw.	
7 kinds of food	4/6
Hi-Glow	4/6
Glow Tabs	3/6

### SEDIMENT REMOVERS

"Windmill" Air	each 28/-
Relecoers	28/-
"Windmill" Hand	
Relecoers	15/-
Feltall	3/-
Siphon Tubing	7d. 0
Hand Type Plastic	4/6

### FULLY-GLAZED AQUARIUMS

Pressed Steel	Aluminium	Angle Iron
inches	inches	inches
12 x 6 x 4	18 1/2	6 1/2
14 x 8 x 8	24	12
16 x 8 x 8	30	12
18 x 10 x 10	36	15
		18
		24
		30
		36
		42
		48
		54
		60
		66
		72
		78
		84
		90
		96
		102
		108
		114
		120
		126
		132
		138
		144
		150
		156
		162
		168
		174
		180
		186
		192
		198
		204
		210
		216
		222
		228
		234
		240
		246
		252
		258
		264
		270
		276
		282
		288
		294
		300
		306
		312
		318
		324
		330
		336
		342
		348
		354
		360
		366
		372
		378
		384
		390
		396
		402
		408
		414
		420
		426
		432
		438
		444
		450
		456
		462
		468
		474
		480
		486
		492
		498
		504
		510
		516
		522
		528
		534
		540
		546
		552
		558
		564
		570
		576
		582
		588
		594
		600
		606
		612
		618
		624
		630
		636
		642
		648
		654
		660
		666
		672
		678
		684
		690
		696
		702
		708
		714
		720
		726
		732
		738
		744
		750
		756
		762
		768
		774
		780
		786
		792
		798
		804
		810
		816
		822
		828
		834
		840
		846
		852
		858
		864
		870
		876
		882
		888
		894
		900
		906
		912
		918
		924
		930
		936
		942
		948
		954
		960
		966
		972
		978
		984
		990
		996
		1002

# QUEENSBOROUGH FISHERIES

111 GOLDHAWK ROAD,  
SHEPHERD'S BUSH, W.12  
(1 minute from Shepherd's Bush Market)  
Telephone: SHE 2730  
Hours of Business: MON. to SAT. —  
9 a.m. - 4.30 p.m. THURS. 9 a.m. - 7 p.m.

QUEENSBOROUGH HOUSE,  
Ferry Lane, Rythe End,  
Wraysbury, Nr. Staines  
Telephone: WRAYSBUURY 2885  
Sundays only from 10 a.m. to 4 p.m.

16 PICTON PLACE,  
LONDON, W.1  
(1 minute from Selfridges)  
Telephone: WELBECK 0428  
Hours of Business: MON. to FRI. —  
9.30 a.m. - 4 p.m. SAT. 9.30 a.m. - 3 p.m.



# The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



THE BUTTS, HALF ACRE, BRENTFORD,  
MIDDLESEX

Telephone: ISLeworth 6221

PUBLISHED MONTHLY  
SUBSCRIPTION RATES

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

## QUERIES

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

Correspondence with intending contributors is welcomed.

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

The Editor accepts no responsibility for views expressed by contributors.

VOL. XXVII No. 3

1962

## Editorial

**M**OST people consider the spawning act in fishes to be a rather casual and unexciting business, and indeed a plain description of what is involved for most species would encourage such a notion. But for anyone who has seen a variety of species at spawning times the impression that spawning is accompanied by a state of considerable excitement in fishes is certain to be gained. The commotion to be seen at shallow pond edges at spawning time can be such as to make the water appear to boil with fish, as large numbers of them twist and flick their bodies out of the water. Among tropical fishes, one of the most unexpected forms of behaviour is that shown by the anabantids. In few other fish groups does such a sustained close contact of male and female occur, the contact seeming to be necessary for the eggs to be extruded. It has recently been shown by scientists in Japan that in the medaka (*Oryzias latipes*), another species in which an embrace by the male occurs, the contact provokes egg-laying by stimulating internal nervous and chemical mechanisms within the female and not merely by squeezing out eggs as a result of external pressure on her.

**A**NNOUNCEMENTS of the formation of a company to plan, build and administer on the south coast of England an "oceanarium" costing 5 million pounds have raised the hopes of aquarists with marine interests that Britain is to have at last an exhibit of the kind that has proved so popular in other parts of the world. The oceanarium will not only provide an aquatic zoo for the display of seldom-seen marine animals of all kinds but will serve also to increase our knowledge of these animals, from scientific studies to be carried out there. Provisional plans are for three giant pools in which marine mammals such as whales, porpoises, dolphins and seals, and large fishes such as swordfish and sharks, can be housed, in addition to a collection of more conventional aquaria for smaller species. The company concerned, Marineland U.K. Ltd., has not yet settled the location of the oceanarium, but Eastbourne and Brighton have been mentioned as possible sites.

## Contents

	Page
Editorial .. .. .	45
The Ideal Fish House .. .. .	46
Plant-baiting for the Fish Pond .. .. .	48
Far and Wide .. .. .	49
Aeration and Filtration .. .. .	50
Hatching and Feeding Fry .. .. .	52
The Minnow .. .. .	53
Owls and the Garden Pond .. .. .	54
Breeding Golden Orfs .. .. .	55
Do Fishes Sleep? .. .. .	56
European Reptiles .. .. .	57
The Fantail .. .. .	59
A Fish Out of Water .. .. .	60
Our Readers Write .. .. .	61
Book Review .. .. .	62
News from Aquarists' Societies .. .. .	63

# The Ideal Fish House

by PETER DENDY

**R**EALLY there is no such thing as an ideal fish house, as an arrangement which is perfect for one aquarist may be entirely unsuitable for another. However, I expect that we will all be prepared to admit that our own fish houses leave something to be desired, even if the requirement is only for a little more space.

My own fish house is fairly well organised and is commented upon from time to time by visitors, but I am by no means satisfied with it, particularly as it is in two parts. The original fish house, which is part of the house, started to bulge at the seams and eventually with many concessions gave birth to an annex in the garden, which is now in the same pragmatic state as its parent.

I have no intention of further enlarging the present set-up, but what will happen when my current breeding programme gets into its stride I shudder to think. At the very least I will have to try and find homes for quite a few secondhand fishes to give me rearing room for the new arrivals. What a problem this fish-keeping can be; ideally you should always have several empty tanks, to give flexibility as the pacific population waxes and wanes, but in practice empty tanks always seem to tempt you to go in for something else and the number of empty tanks rapidly dwindles to nil. There may be aquarists about with enough will-power to retain empty tanks for a period, but I have not met one yet.

If you are a keen aquarist then fish occupy a good portion of your time and your thoughts, and your greatest delight is being with your fish as much as possible. This, of course, involves a certain amount of domestic comment, and it is a very loving wife indeed who allows her husband to spend all the time he wants to with his fish without making pointed remarks about it, at least. Ideally the keen aquarist would choose to live with his fish and surround the walls of his lounge with tastefully arranged tanks so that he can observe in comfort and have something to distract his attention from the ever-present "google-box".

Such an arrangement requires that the wife is as daff about fish as the husband, and probably is rarely possible if a reasonable level of domestic harmony is to be maintained. The most any man of my acquaintance has been allowed is one community tank in a corner and heaven help him if he spills any water when he is cleaning out, or is careless enough to splash the wall. My own lounge tank had its visa rescinded when it was inconsiderate enough to split its glass and thoroughly wet the carpet and a large pile of glossy magazines.

I wonder how many people find that work interferes with fish-keeping to an annoying degree (although they probably appreciate that unless they go to work they could not afford to keep fish at all)? Whoever said that fish-keeping was a cheap hobby, by the way? That ideal fish house must of necessity wait for the right time and opportunity, probably retirement, as its production is bound up with several things, not the least of which is money. In the meantime it can always be planned for, thought about,

amended and produced in plan form ready for the day when it can start to become a reality.

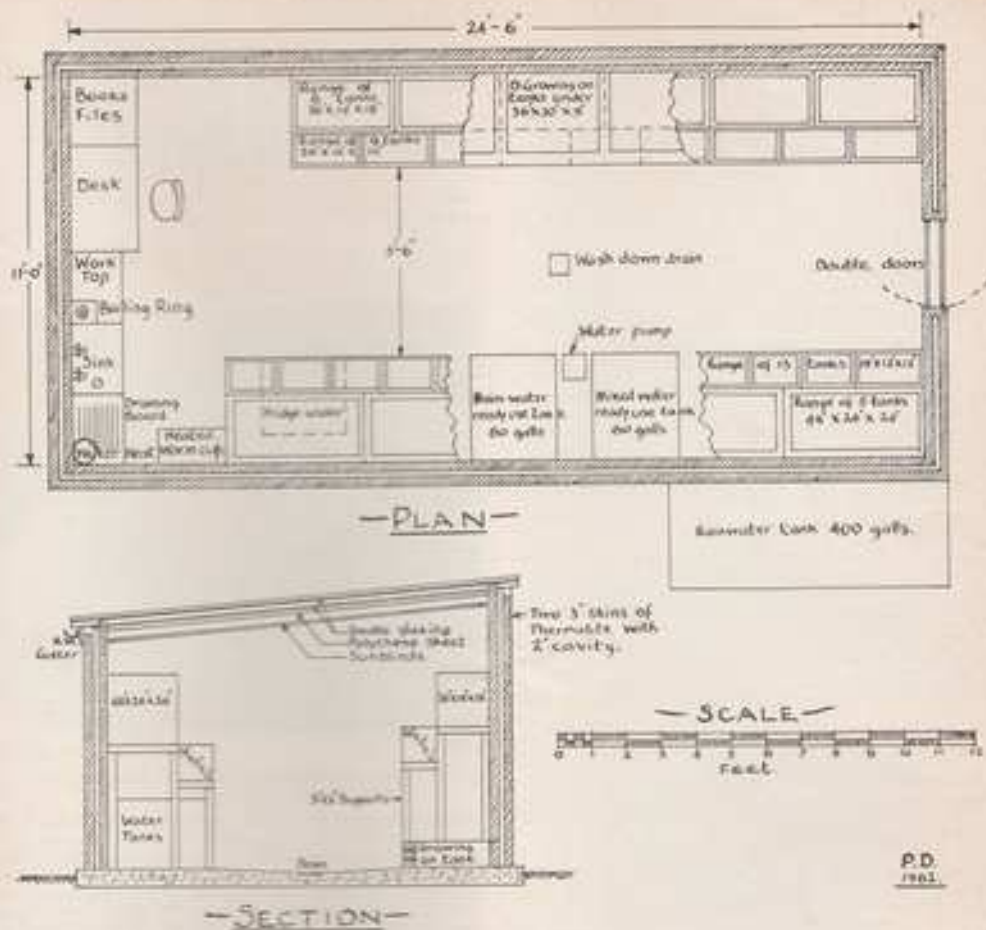
The ideal fish house must satisfy certain basic requirements about which there can be little argument. It is in the arrangement and organisation of detail that opinions will differ, and in the number of additional frills that are added to make maintenance easier and enjoyment greater. The various points to be thought about for the fish house seem to fall into two categories, those that are essential and those which might be described as optional extras.

These are, to my mind, essentials:

- (1) Adequate space for present and likely future needs (this is probably impossible to attain, but you must draw the line somewhere).
- (2) Satisfactory insulation to avoid heat losses and keep running expenses to a minimum.
- (3) A tank-supporting system that allows easy access to all tanks and does not involve either a step-ladder to reach the top tanks or lying on your stomach to see into the bottom ones.
- (4) Lighting only from the top and preferably natural illumination backed by artificial light to extend the shorter winter days. Adjustable blinds are also necessary to decrease the light reaching the tanks during the summer.
- (5) A tank-heating system that is trouble-free and does not require daily attention. This is satisfied by individual electric tank-heating or electric or gas space-heating. Solid fuel or paraffin space-heating is undeniably cheaper but is out on the grounds of nuisance in maintenance.
- (6) A sink and working top with running water laid on, for all the odd jobs and washing that is to be done.
- (7) Provision for the raising of Grindal worm, micro worm and brine shrimp, which all require a certain amount of heat, and white worm, which must be kept cool.
- (8) A medicine cupboard equipped to cope with all the common complaints and microscope giving a reasonable degree of magnification.

Optional extras are the following items:

- (1) A concrete floor with a slight fall to a central drain for easy washing down.
- (2) A ready-use mains-water tank kept at the right temperature for immediate topping up or re-filling of tanks.
- (3) A rain water storage tank and a ready-use tank for a 1:1 mixture of rainwater and tap water, though the need for both of these items will depend on the hardness of your main water supply.
- (4) A small electric pump for lifting the ready-use water to the various tanks and incorporating a float switch on the delivery nozzle to shut off the pump when the tank is full.
- (5) An electrical water heater over the sink and a boiling plate for sterilisation of nets etc., and preparation of foods.
- (6) A small refrigerator for storing those foods which must be kept cold to prevent them going bad.
- (7) Adequate storage cupboards for foods and accessories so that the place may be kept tidy and odd items stored out of sight.



(8) A desk at which to write up notes etc., and a filing cabinet and shelves for keeping all the literature which an aquarist accumulates around him.

(9) A Daphnia stock pond from which you can draw as required. If it is large enough, of course, you can breed your own water fleas.

(10) An easy chair or two so that visitors may be allowed to relax whilst they matter.

(11) A radio to keep you in touch with the outside world. (Notice that I did not say a television set!)

A plan and section of the type of fish house I visualize accompanies this article and is basically simple in construction. The walls are 8 inch cavity work with two 3 inch skins of Thermalite or other insulating building block, treated externally with a cement paint for weather proofing and internally with distemper for appearance. The roof is of a lean-to type fully glazed with double glazing and further insulated with an additional skin of polythene to cut out condensation completely. Double doors are

provided and heat loss from a structure of this nature should be down to the very minimum.

The space under the tank rows, where not required for ready water storage tanks and cupboards etc., can be used for growing-on tanks constructed of 4 1/2 inch brickwork, 9 inches high, built on the floor and rendered with waterproof cement. The concrete floor is finished with a dustless preparation and slopes gently to the central drain, which is fitted with a lift-out container for catching gravel etc. that would otherwise find its way into the drain pipes and could cause trouble.

The cost of this fish house, starting from scratch with all new equipment and assuming that you do all your work yourself, is estimated to be:

Fish house construction	£270
Tanks, stands, heaters, thermostat etc.	£210
Optional extras	£180
<b>Total</b>	<b>£660</b>

## Plant-Hunting for the Fish Pond

by ERIC HARDY

THESE thoughts struck me when a friend took me to see his new garden in Cheshire, with a fair-sized pond between his garden and the corner of the field, which he wished to plant and improve, as it had become rather barren in appearance. All that he wished to keep from its rural days was a pair of moorhens, which nested on the rubbish dumped in it and picked about his garden. I first suggested dragging out most of the dead leaves from the bankside trees, and letting no more accumulate there. Then to introduce some of our native white water lilies, which take well to ordinary field ponds and in their purity can look any of the coloured hybrids in the face. On the one muddy bank that he wished to keep open so that sunlight could fall upon the pool, I suggested a carpeting of plants like creeping jenny, spotted yellow American *minutula*, cranberry with its little pink flowers, insectivorous sundew, deep-blue Irish butterwort with its starfish-like arrangement of pale-green hairy leaves flat against the ground, and even bog-bean's tripartite leaves and the fuzzy whiteness of its flowers, if kept within bounds.

These were all native plants, and I suggest for the pondkeeper who intends to stock an out-door garden pool



Photo: W. J. Flower

The collector at work with a rake at the edge of a stream



1, Cranberry; 2, cowberry

with native pond fish, rudd, carp, tench etc., coupled, if he is rural enough, with a pair of moorhens, that his plant-hunting takes him to the natural water life of our countryside, where many aquatic plants are very interesting, though not always very colourful. My friend's garden already had the floating oval leaves of *Potamogeton natans*, but this gets out of control easily and covers the surface if not checked, or removed.

Although the six-stamened, three-petalled waterwort *Elodea hexandra* is a rare plant of the wild, its slender prostrate annual growth can be found in the low water of droughts, and encouraged in the muddy banks of most ponds, if not too deep. For a century or more it has grown in the large lake and the Mizzey lake in Knowsley Park, neither much more than 4 feet deep, and it also grows in Bodorgan Lake (Llyn Coron) in Anglesey, the north side of Llyn Badr, Cwm Glas, the south side of Glasfryn, near Llanallhau and Llanberis lake in Snowdonia. More mere near Knutsford is another site in Cheshire. Its rarer four-petalled relative, *E. hydropiper*, shares its station at Bodorgan Lake. You would hardly consider these tiny plants allied to the carnation family, but theirs is the next order, and they have some 40 species in the world.

Horned pondweed, *Zannichella palustris*, is less scarce and rather more attractive in its thin, waxy nature. In the north-west I have found this in the watery pits on

either side of Rufford railway station in Lancashire, and in the Mollington Canal near Chester. We searched in vain for the site on the Hodder at Seed Holme Nook, given in the old *Flora of Strangford School*, quoted in the *Flora of West Lancashire*; but in 1940 we found it in seed, a rare event in the north, in the canal at Lydiate. The Formby-Halhall moss-dykes and the pond in Hainhead Park, near Whiston Church, are other Lancashire sites, and a field pond on the cars behind Hoylake, and in Budworth and Tabbly meres, are Cheshire sites. The rarer stalk-fruited, *Z. pedunculata*, is now recognised only as a variety, growing in the River Gowy at Guilden Sutton, near Chester, for instance.

The creeping, varied-leaved pondweed, *Potamogeton heterophyllus* (or *gracilis* nowadays) and its hybrid form *mixtus* grow in the lake at Knowsley Park, and the perfoliate pondweed, *P. perfoliatus*, in the Rufford-Lydiate canal in Lancashire and the Beaman Canal and Rostherne Mere, Pickmere etc. in Cheshire. Some of these rarer pondweeds are also found in the slower backwaters of rivers. The last-named, for instance, grows in parts of the Dee above Chester, as well as in the London Thames at Preston Hook, the River Colne and the Ducent at Horton Kirby. Cranberry (*Oxycoccus palustris*) is generally regarded as a moorland or woodland plant, delicately foliaged, most attractively flowered in tiny daisy pink flowers with reflexed petals like miniature cyclamens, and as such it still grows as near to Liverpool (Kirby) factories as the north end of Seacombe Wood Moss. As a pondside plant, however, it is equally attractive, and grows luxuriantly with the sundew and cotten-grass beside the water-lily pond in the Manchester Scout Camp Wood at Sandway, near Cuddington, in Cheshire; and the swamps by the shooters' clough near the moorland Cat and Fiddle Inn, the Galley Pool at one end of Rostherne Mere, and a moss at the gallery end of Oakmere, not to forget Wylbury Moss near Nantwich.

Another creeper, the evergreen cranberry or red whortleberry (*Vaccinium vitis-idaea*), is a true moorlander growing wild where the grouse-shooters go, but like the cranberry



1. Six-stemmed waterwort (*Elatine hexandra*); 2. Horned pondweed (*Zosterella palustris*); 3. varied-leaved pondweed (*Potamogeton heterophyllus*); 4. *Potamogeton perfoliatus*.

it can be cultivated on the mud beside ponds if, as is usually the case, this is of an acid nature. It becomes quite shrubby in a small way. It shares cranberry's haunts near the Cat and Fiddle, as well as on Peckforton Hill. Its white flowers are tinged with pink. Neither of these two berry-bearing plants minds a little bit of shade, provided that it is not wholly darkened.

Garden "wild" ponds need pondweeds, of course, for fish to shelter in and to spawn in in spring, and low-growing, creeping edge-plants to clothe the mud in colour and give some plant form, without screening the sun off the water as would trees and shrubs all the way round the bank. I hope to see my friend's pond again when the water plants are established and the old dead leaves have been dug away in his garden, sweetened with lime, where they are of more use than choking and poisoning the pond.

## FAR and WIDE

### Give Away

A REPORT from an American weeks club tells how at a recent get-together and open house of local clubs two members stood for 2 days giving away pairs of guppies to strangers. In the event, upwards of five hundred people accepted these finny gifts. It would be helpful to know just what effect this novel approach had on introducing new enthusiasts to the hobby.

### The Malacca Research Institute

THE Tropical Fish Culture Research Institute of Malacca, Malaya, has issued an annual report, which makes interesting reading. Aquarists often bewail the fact that the general public does not show enough interest in the fish culture hobby, but this is not true in Malaya, where visitors have made the Institute a tourist attraction, so that now only those interested in scientific research work, a few top firms of schools and distinguished visitors are shown over the estate.

Hobbyists will take heart from some of the findings. For example, transport between ponds is now by Land Rovers, which can negotiate the terrestrial weeds without difficulty, although these weeds choke rail tracks. Weed growth alongside the 1 acre ponds remains a problem, as the hot, humid climate causes rapid growth, which mechanical cutters only partially control as the faster

areas. They cannot be used at all along the pond edges or pipes, of which there are some 14 miles. The main drain from the ponds becomes choked with submerged weed, for which spraying is of little use. The best method of removal is hand-weeding. The 10 and 100 acre ponds have given trouble owing to the bottoms developing leads that are hard to seal. Although clay-bottomed, large cracks appear and this particular clay is not like London clay but tends to become almost like liquid and seeps through cracks and hollows in the harder subsoil. Experiments with an insecticide (Rogor) which is used against rice stem-boring insects shows no toxic effects against fishes. Where ponds are lined but not fertilised *Chara* tends to be the dominant plant. Where phosphates are added it is replaced by *Eskydzia*. Neither grass carp nor *Pomoxis javanicus* seem to eat *Chara* and its dense growth can cause depletion of the nutrients normally available for plankton growth. Unfertilised ponds have extreme clarity. Some experiments with four ponds of 4, 2, 1 and 1/2 acre are being made to compare the effect of the surface area of the pond on the growth rate of fishes. There are many comments on growth and breeding experiments which frequently do not turn out as expected, often because of climatic or chemical conditions locally, and one realises that, for all its drawbacks, England is not such a bad place to have a pond even if we are limited to goldfish, orfe and a few other species.

Raymond Yates

# Aeration and Filtration

by E. H. DALGLIESH

**A**ERATION and filtration are subjects that seem to have been neglected to some degree in most of the standard works on aquaria. On the whole the books seem to describe the equipment available, but do not give a great deal of information on the mechanics or the value of aeration and filtration.

Many experts claim that aeration is not necessary unless it is required to crowd a tank for some reason, and filtration only serves to eradicate variations from the ideal "balanced" aquarium, which are due to causes external to the tank, e.g. lack of care by the aquarist himself. However, this does not help the aquarist whose tank is not balanced.

The first thing that must be realised is that a filter, with an inert medium, e.g. glass or nylon wool, can only remove solid matter from the water, and then only if the matter is large enough to be caught.

An undergravel filter works on an entirely different principle: it uses the gravel itself as the filter medium, and relies on bacteria which thrive in the gravel, especially when this is continually flushed by clean water, to reduce organic matter, uneaten food etc., to harmless salts. In passing it may be mentioned that these salts, together with the increased oxygen content in the fresh water surrounding the plant roots, induce a much stronger root formation than would otherwise be the case. Without this action, organic matter left to decompose in the tank would soon pollute the water. It must not be assumed, however, that an undergravel filter is a licence to tip food into the tank with gay abandon, or to leave dead plants in the tank. The purpose of a filter is to help to keep a tank clean, not to work miracles.

On the subject of aeration, it has been said that oxygen passes into the water as a result of the increased surface area due to the bubbles. Although it is true that a small bubble has a large surface to volume ratio a quick calculation shows that if the bubbles have a diameter of  $\frac{1}{16}$  inch, then, to double the surface area of a 2 ft. tank, the stream must contain about 60,000 bubbles at all times. For normal aeration this is unlikely, but even so, many more fishes may be kept in a tank with quite a gentle stream. This fact appears to indicate that most of the effect from artificial aeration is not due to increased surface area, but to disturbance of the surface of the water, reducing its resistance to the entry of oxygen. In view of this, it may be deduced that most kinds of filter go a long way to aerating a tank, killing two birds with one stone. A corner filter confines the disturbed surface of the water to a very small area, and will thus have little effect on the oxygen content of the tank.

Up to this point, I find myself in agreement with the aforementioned experts: the aquarist should not have to rely on artificial methods to keep his tank clean and oxygenated. However, a quick experiment brings to light another important point. If the average tank, with top lights but without heater, is checked with a thermometer it will be seen that the temperature at the top can be 10°F

(5°C) higher than at the bottom. Since in a planted aquarium convection currents are considerably restricted, a heater aggravates this condition and the temperature range, top to bottom, can be as much as 15°F (8°C). This is somewhat incongruous when one thinks of the trouble usually taken in floating a jar containing a new fish in order to equalise temperatures.

If now an aerator is switched on it is found that within a few minutes the range of temperature is very much reduced, in 5 minutes down to 2° to 3°F (1.0° to 1.5°C), eventually reaching the condition where there is virtually no difference between top and bottom.

A similar effect occurs with an undergravel filter, but not with a corner filter. This appears strange at first, but a little thought shows that it is not circulation due to filtering, but stirring action due to the bubbles disturbing the water. With a corner filter, of course, the bubbles are confined in the air lift and disturbances of the water are very effectively damped out by the filter box. An outside filter also has little effect on the temperature gradient, even though a certain amount of disturbance occurs as the water flows back into the tank. This suggests that the top of the air lift of an undergravel filter should be below, rather than above, the surface of the water. This gives a good stirring action, and good aeration. Further evidence that it is not circulation, due to drawing water through the filter and redistributing this in the tank, that causes evening of temperature, is obvious when one realises that the average air lift takes several hours to move the water content of a normal tank.

On the basis of the above remarks either floating a jar in the tank is a waste of time or it is essential to generate some form of artificial circulation, especially when the top lights are on. I have kept a tropical tank for over a year without forced circulation and the fishes do not appear to have suffered any ill-effects from the large temperature gradient. I am, however, prepared to believe that they would be more comfortable in a tank with a more uniform temperature.

In a heavily planted tank, aeration is more important, as apart from an even distribution of temperature, plants produce carbon dioxide in the dark, and it is not unknown for fishes to be suffocated during the night in exceptionally heavily planted tanks.

A short description of the filtering equipment available, and its operation, might prove helpful in clarifying some of the foregoing remarks for the newcomer to the hobby.

There are four basic types of filter: bottom, corner, outside and undergravel. All of these need an air lift, and hence an air pump. This may be a vibrator, or a more expensive, but heavier duty, unit. The air lift with the greatest water displacement is shown in Fig. 1. It is often incorporated into a simple undergravel filter. Bubbles from the diffuser stone carry water, drawn through the gravel, up the funnel and back into the tank. This air lift can move up to 2 gallons per hour, and can, of course, be

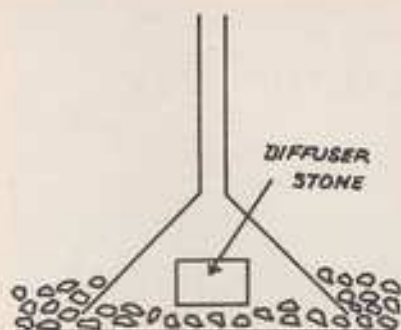


Fig. 1



Fig. 2

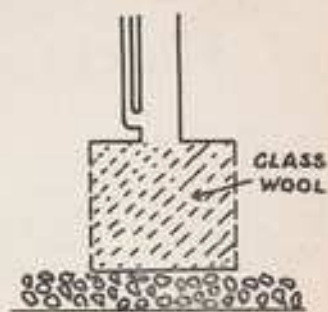


Fig. 3

used with any other filter when rapid water circulation is required.

The most common type of air lift, however, is simply a tube into which air is injected, the bubbles carrying the water up the tube (Fig. 2).

The bottom filter consists of a perforated box containing the filter medium, resting, as its name suggests, on the gravel at the bottom of the tank. The water is drawn through the box, passes up the air lift and flows back into the tank. This filter is not very common nowadays, having been replaced to a great extent by the corner and outside filters (Fig. 3).

The corner filter has the filter box attached, usually by rubber suckers, to the side of the aquarium. The water from the air lift flows through the filter medium and back into the tank, under the action of gravity, in contrast with the bottom filter (Fig. 4).

In the outside filter, the water is taken out of the tank by the air lift, through the filter medium (which may be divided into several grades placed in separate compartments) and returned to the tank via a simple siphon (Fig. 5).

The undergravel filter may be a system of perforated tubes or a slotted plate under the gravel (Fig. 6). The action of this filter has already been described.

The most common filter medium in use is glass wool; unfortunately this tends to splinter when handled, and can

cause irritation. Apart from the use of rubber gloves, it is well worthwhile soaking the wool in water before handling it to any extent. An alternative to glass wool is nylon wool; this does not splinter and so is more pleasant to use. As a matter of interest nylon wool makes a good substitute for marbles for protecting the eggs of some of the more cannibalistic egg-layers.

Another useful filter medium is activated charcoal; this is worth trying if green water is present in the tank. It also does remove sulphuretted hydrogen, but it loses its efficiency after about a week.

Finally, well-washed peat may be used to acidify water, either to correct an alkaline condition or to produce acid water for breeding certain fishes. The peat may be used in the filter compartment of an outside or corner filter. Alternatively, it may be put at the bottom of the tank with an undergravel filter; in this position it will be beneficial to plant life, but, of course, adjustment of the pH value is considerably more difficult.

It is hoped that the above remarks may clear up some confusion in the minds of beginners, and perhaps give food for thought to the more experienced aquarist.

This article was prepared in connection with an evening course organized by the Manchester Education Committee and acknowledgment is made to M. Pugh Thomas, Ph.D., M.I.Biol., of Manchester University, for assistance freely given.

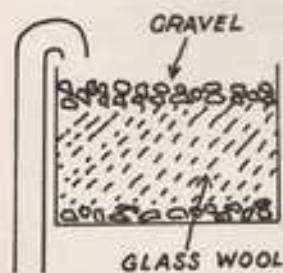


Fig. 4

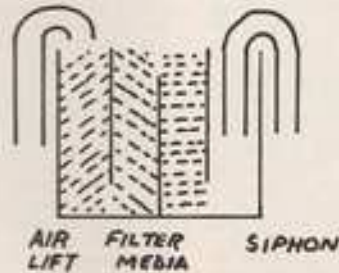


Fig. 5



Fig. 6

# Hatching and Feeding Fry

by A. BOARDER

If all has gone well some fry will hatch out in 3 or 4 days. This will happen if the temperature of the tanks has been about 70°F (21°C). I say "about" as it is sure to vary a little with the weather and the time of day. A slight variation will not matter although it must be realized that if the temperature falls below 70°F (21°C) for some time the hatching will be delayed as the time taken for hatching is governed entirely by the temperature of the water.

The fry will be seen as tiny glass-like splinters which dash with an erratic course when disturbed. They then anchor on water plants or the sides of the tank, where they may be seen hanging motionless for most of the first couple of days. Any slight disturbance of the tank will cause the fry to swim about but it is well to disturb them as little as possible as they need to rest and absorb the yolk sac with which they are born, before having to swim around too much.

Once some fry have hatched a sheet of paper should be drawn across the surface of the water to remove any film. This film will prevent the fry from getting air at the surface. The question whether fry have to get air from the atmosphere in order to fill the swim bladder or not is debatable. I have certainly watched fry soon after hatching struggling to get to the top of the water as if to take in air, but I am not sure if this is to fill the air bladder. The time to start feeding is governed by the time taken to absorb the yolk sac. This can rarely be seen but there is one sure sign that it has happened. Once the fry are ready to start feeding they swim freely in their search for food. Obviously this first food must be very small, as the mouths of the fry are tiny and so incapable of taking anything but the smallest particles of food. The first natural food of many fishes is the smallest forms of algae and Infusoria found in most pond waters. This should be introduced into the fry tank at frequent intervals. It can be done by removing some of the water in the tank and replacing with some algae-infested water from a pond or by allowing a drip-feed from a suspended container.

The drip-feed must be accompanied by a method of disposal of the surplus water. This must be arranged so that no fry will be washed over the top. The best way is to have a piece of clean rag hanging over the side with the outside end reaching well down to near the bottom of the tank. The other end must reach only about an inch into the tank, and then as the water height rises it will soak into the rag and escape over the top. The danger with the drip-feed is that it is possible for it to become clogged during the absence of the aquarist and so the supply of food is stopped. It is most important to examine the water under a microscope to make sure that it contains some living matter, either Infusoria or algae. I find that a student's microscope, with a magnification of  $\times 70$ , is ideal for the job; it enables one to see how many Infusoria there are in a drop of water. A very powerful instrument will show only individual creatures and not always give a true indication of how many there are to a drop.

After a couple of days the fry should be feeding well all day long and can be seen to travel around the sides of the tank, occasionally making small dashes at something too

small for our eyes to see. This will probably be an Infusorian. A good supply of Infusoria should have been cultured whilst waiting for the eggs to hatch. There are many methods used by aquarists to make a good culture and each aquarist is inclined to claim that his is the best. The fact is that almost any decaying vegetation will provide Infusoria when left in water for a few days. Some use boiled spinach or hay, others crushed lettuce leaves; often a fine supply is found in water in a vase that has housed flowers for a few days. Whatever method is used to make a culture it is essential that it is examined frequently to make sure that it really does contain some living creatures and not be just smelly water.

Infusoria can be fed to the fry for about 10 days after hatching, although it is impossible to state with certainty as fish develop at irregular rates, often according to the amount of space available and the amount of food. When fry are very crowded they may not get enough food and so their growth will be retarded. A slight artificial aeration may be useful at this stage to ensure that the water contains sufficient oxygen, but this is not essential where there is plenty of space. The aquarist should try to introduce larger foods every few days and the fortunate owner who has an unlimited supply of live food will be able to grow on the fry at a fast rate. From Infusoria they can go on to brine shrimp, then to micro worm and sifted *Daphnia*. After that a whole list of live foods become available, such as shredded white worm, then shredded garden worms (small ones, of course), then larger *Daphnia*. If the fry get plenty of such foods their rate of growth will be rapid. The temperature of the water still plays an important part in the rate of growth as this regulates the amount of food that the fry can digest; frequency of feeding is related to water temperature. If 70°F (21°C) can be maintained then all will be well. After about 4 weeks of good feeding the fry will look more like actual fish and not some kind of larvae.

Where an aquarist does not have the time to culture Infusoria it is still possible to raise many fry with artificial foods. There are on the market to-day various kinds of liquid foods, which are very good indeed and provide the first foods for the fry. These also appear to encourage the formation of Infusoria. A little of the liquid food placed in the hatching tank when fry have hatched will provide Infusoria for them as soon as they are free-swimming and feeding.

What are some of the reasons for hatchings being unsuccessful? The first is that the eggs are not fertilized, which may be because the males have not been in good condition. This is rare and most failures can be traced to happenings after the eggs have been placed in the hatching tanks. Plants on the plants can eat some of the eggs. The water can become foul and the eggs fail to obtain enough oxygen, when they soon die and go milky. Over-heating can almost cook them and kills many; cold conditions do not seem to kill, but retard hatching by many days. See that the water remains pure and that the top film is removed every day.

In the next article the sorting and rearing of fry will be described.





Photo:

Pair of common minnows

Lawrence E. Perkins

## The Minnow (*Phoxinus phoxinus*)

by P. J. NAYLOR

THE common minnow of our rivers and streams is well known to us all from our schoolboy fishing expeditions, and to the angler, who values it for taking the bait intended for larger fishes. The minnow is therefore like the sparrow, frowned upon as a possible pet because of its abundance. Indeed, people still frown when I tell them that I keep minnows in the lounge.

My reasons for adopting this fish are few. Primarily, most of the books in my local library declare that *Phoxinus phoxinus* die in still water aquaria after a few weeks. Secondly, as an angler I had noticed that these fish on closer examination proved to be an interesting mixture of colours and beautifully marked. Therefore to keep this fish was both a challenge and a way to learn more about them.

I prepared an aquarium, 36 in. by 12 in. by 15 in., in the usual way, with smooth granite rocks and sturdy plants. It is important that the rocks are few and devoid of sharp corners, as minnows are very lively fish and they dash themselves against everything in the aquarium. *Elodea* and *Vallisneria* proved to be the best all-round plants, capable of withstanding the rough treatment meted out by these fish. Other of the more common varieties of plants lasted only for a few weeks; hornwort was the first to lose all its leaves. As can be imagined from these few comments, the plants should be given ample time to root before introducing the minnows.

I caught my minnows on a hook and line baited with gentles. Any small hook will do. As soon as the float "bobs" wait a few moments until it vanishes completely, then strike gently. A vicious strike will tear the fish's mouth or sometimes it will decapitate the fish. Some boys use a narrow-necked milk bottle baited with bread and secured by a length of string. As this operation would be carried out in fast-running rivers and streams having pebbly bottoms the dangers in this method are obvious. After collecting a dozen minnows, putting them in milk bottles (they jump out of jam-jars with complete abandon), select six of the strongest ones, less than 2 inches long. It is as well to examine them carefully, selecting those having no evidence of parasites, disease or injuries. During this examination turn them over in the hands, which should

have been wetted beforehand. They will live for an amazing length of time out of water.

Put them into the aquarium in the usual way, preferably at dusk in an unlit room. They settle in very quickly and should any of them have been injured by the rough treatment they will show it within 2 weeks. Such a fish is better removed as the others will tend to bully it. They will eat almost everything, from biscuit crumbs to meat flies. During the winter months I keep mine exclusively on a good proprietary dry food containing dried shrimp, and they thrive very well on it. During spring, summer and autumn I give them dry food, *Tubifex*, *Daphnia*, dead and live flies (live flies dashed on the surface, in either case caught in the garden to avoid insecticide poisoning), gentles, grubs, small worms, in fact anything that creeps or crawls.

If fed from the same spot every day at the same times, the minnows become very tame in a short time, feeding from one's fingers, sometimes jumping half out of the water in eagerness, at other times nipping one's fingertips. I used to use a feeding ring and worm tray combined. Sometimes dry food would settle in the worm feeder. One of the minnows, and always the smallest, would jump into the tray, grab a mouthful of food and then flip back into the water. During feeding they allow a fair amount of food to fall to the bottom. This need not cause concern as they are efficient scavengers, always leaving this until all the other food has been consumed. They have excellent appetites, and the amount of food must be regulated by trial and error.

After settling down, they will grow at the rate of  $\frac{1}{2}$  inch a year, and in a balanced tank will remain surprisingly disease-free. Temperature changes appear to have little adverse effect if the temperatures experienced remain below 65° F (18° C).

When I first caught my fish they were a dirty brown colour on the upper side, silvery grey below with a black longitudinal line. After a few months these colours softened. The black line became more distinct, the underside became a true "baby" silver, and as for the dark brown, this softened into a lighter more pleasant brown.

In winter, however, these fish revert to their drabber "wild" colours. This adaptation to match the compost is a fine example of Nature's camouflage.

I have never been able to breed these fish; indeed, they have never shown their breeding colours. Breeding condition is indicated in the male by a distinct red or orange-red breast, hence the fish's local nickname of "redbreast". Perhaps the introduction of an aerator to simulate the bubbling stream of the natural habitat would encourage this. At other times the male is distinguished by means of small white tubercles on the head.

An aquarium cover is necessary for minnows are prodigious jumpers. Should one accidentally jump out and fall on the floor it will not usually suffer any ill-effects. Switching the light on and off does not appear to frighten them as it does most fishes.

The old controversy of whether fish sleep or not does not seem to apply in this case. Minnows certainly sleep, sometimes against plant stems, at other times hanging nose

down in the plant fronds. Switching the light on and off, and tapping on the glass, will not awaken them for some little time. When I first noticed this phenomenon I was disappointed, thinking that the fish had all died overnight. The only visible signs of life was a retarded respiratory rate.

Another noticeable thing is that they appear not to suffer from constipation or hanging faeces, this in spite of a dry-food diet in winter time.

These fish have given my wife, friends and I much pleasure as they swim in a shoal repeatedly searching the tank for stray particles of food. Their feeding habits are the most entertaining of all. As humble as these fish are, they are beautiful and interesting to watch.

My original six inhabitants are now reduced to four, after 3½ years. The first fatality occurred after only a week, the last one last year, presumably from old age. And the rest are as strong and healthy as the day they were dragged out of the river at the end of a hook and line.

## Owls and the Garden Pond

by A. BOARDER

A LETTER in the March issue of *The Aquarist* again brings up the question whether owls are capable and guilty of taking goldfish from a garden pond. Owing to the contradictory views held by some people I think that it will be as well if the matter is examined more fully in an endeavour to clarify the position. The tawny owl (*Nyctalus aluco*) is in all probability the bird that can take goldfish from the pond. Archibald Thorburn states, in *British Birds*, vol. 2, p. 64: "The food consists of rats, mice, voles, small birds and occasionally fish." W. H. Hudson, in *British Birds*, vol. 2, p. 199, states: "The tawny owl . . . preys on mice, rats, moles, young rabbits, squirrels and birds; and he also, like most owls, occasionally takes fish."

Other books on birds accuse the barn owl (*Scops flammea*) of feeding on fishes occasionally as well. There seems to be little doubt in the minds of most ornithologists that owls do eat fishes and that their strong claws and legs are quite capable of taking them from near the surface of the water. The only letter I remember seeing contradicting the assumption was to the effect that an owl could not dive into the water to take a fish. Everyone should know that very often goldfish lie just under the surface of the water motionless in such a position as to be an easy prey for any owl.

Now let us examine other aspects of the case. A friend of mine living near by has a goldfish pond in the garden and one morning found a tawny owl drowned in the pond. It appeared fairly obvious that the owl had swooped at a fish in the manner used to catch mice. When this is done the owl spreads its wings over the ground to prevent the mouse escaping. If the owl swooped on a fish and spread the wings the water would prevent the owl from flapping its wings clear in order to rise again. The feathers not being dried, as they are in a duck, the water would hang on and weigh down the bird.

A short time ago an account was published in a newspaper of the instance where in the dead of night a large goldfish dropped down a bedroom chimney. The fish was still alive and recovered when put into water. This fish could only have been dropped by a bird and the obvious one is an owl. The bird could have caught the fish in its claws and then, in trying to perch on the chimney, it lost its

hold on the fish, which dropped down the chimney. Few other birds fly and feed at night. The heron could do so but this bird catches its prey with its beak and so need not release it when perching.

A year or two ago I found that I was losing one of my large breeding fantail goldfish every night. These fish were quite large, each with a body as big as the palm of one's hand. I put the loss down to cats and promptly made wire screens to cover the pond. After reading about the goldfish down the chimney I suddenly remembered that at about the time of losing my goldfish I had seen a tawny owl on my arbour just above my pond. The bird was there most evenings and if I walked into the garden the owl would unhurriedly glide away a couple of gardens to a tree. I thought at the time that it was rather nice to have an owl in a London suburban garden, but I am now convinced that the owl was the culprit that took the fish and not cats. At the time I lost the fish it was soon after the winter, when my larger fantails often lie near the surface of the pond. It would be quite easy for an owl to catch such a fish and the fact that one was taken each night running suggests that the regular visit to my pond was sufficient for at least one meal.

After examining all the evidence in the case against the tawny owl I am quite convinced that it can and does take goldfish from a pond and where such a happening is possible it will be as well to provide some protection each night.

### Inadequate Lighting

How can I grow beautiful underwater plants? My aquarium is built into a bookcase and measures 24 in. by 12 in. by 12 in. There is an adequate thickness of washed sand on the bottom, and a 60-watt lamp provides light for about 7 hours every day. Nevertheless most of the plants I buy soon turn yellowish and die down. Do you think I would get better results if I planted them in pots of foam?

What your plants need is a brighter light rather than a richer compost. If you replace your existing 60-watt lamp with one of 100 watts you should not experience any difficulty in growing the regular aquarium plants in sand alone.

# Breeding Golden Orfe

by A. SUMMERS

A FEW years ago a friend gave me six 9-year-old golden orfe of some 15 inches in length—four males and two females. The fact that these fish are rarely bred in this country made my attempt to breed from them the more interesting. Having bred varieties of goldfish for a number of years, this idea became a challenge.

They were placed in a concrete pond measuring 18 ft. by 10 ft. by 2 ft. deep in the centre, sloped to the shallow edge 1 ft. in depth. Spacious quarters and well oxygenated water are essential for their maintenance and certainly for breeding. The pond had a fresh water feed-pipe coming up to the surface in the centre of the pool, the overflow leading to other small ponds and a large iron tank which were to receive plants with the eggs adhering for hatching. This provides the optimum conditions in hot and sunny weather, especially when sultry, warm periods are experienced in mid-summer, which necessitates good oxygenation of pool water.

The hatching tank is a large old iron cistern measuring 8 ft. by 4 ft. by 12 in. deep. This is disinfected and thoroughly cleaned out in early spring. Preparations for spawning are begun about mid-March. Generous feeding with Bernax, porridge-oats, earthworms and pilchards (tinned, the liquid etc. of the tinned fish is washed away before use). It is also interesting to watch the disintegration of a large bread crust thrown into the centre of the pond. This is the orfe's main asset as an ideal pond fish; for it is a surface feeder, rarely cruising along at a greater depth than about 12 in. and hence it can be seen at most times of the day. It seems to prefer shallow water, but it will go deep in the winter months.

About mid-April, fairly large masses of floating (not bunched) Myriophyllum plants are placed at the north-east corner of the pond. Why? Because for some reason or other, although there are plants in the pond, they make for this particular corner of the pond when they desire to spawn. The heavy feeding continues until driving commences, usually in early May. A careful watch is then kept from my dining-room window for commotion and splashing, which compel me to make periodic visits to the area in the pond and examine the plants for eggs.

The eggs are adhesive and white, becoming amber shortly afterwards if fertilised, and sometimes form in clusters, unlike the goldfish egg. The orfe egg is larger, a little over 1/16 in. (that is, not as large as the trout egg).

The plants are removed to the large iron tank and spread around the surface. The patience of the breeder is now to be tested, for the month of May brings variable temperatures, especially at night. However, they hatch out on the average in 9 days. When the fry are free-swimming, sifted Bernax is given until they are large enough to take Daphnia and normal Bernax, with pulped pilchard of a suitable size.

They will have attained their full yellow-orange colouring after about 3 months of age; one or two will retain a little black near the top of the head, but seem to lose it later on. It is a fascinating sight to see them chum in hundreds—



View of part of the pond used by the author for breeding golden orfe.

each making identical movements, flashing and darting about at the least disturbance, making the netting of individual fish impossible. After a few months some fish will grow much quicker than others although the same feeding and conditions prevail.

Sufficient to say that there is a demand for orfe. They are hardy, long-lived and will attain a length of 2 feet in very large ponds or a lake. But the breeding of them will not be easy unless the right conditions are provided; their needs when of the size for breeding are not unlike those of the trout in some respects.

There is a fairly common view that orfe do not spawn before the age of 8 years, but there seems little evidence either to support or rebut it, and the question is still very much open to debate.

It was noticed that the females were an even matt yellow-orange colour, and their pectoral fins white. The males were grey speckled along the back and with orange colour running well along the pectoral fins. This seemed the only marked difference between the sexes, even when breeding.

My first season was disappointing in numbers hatched, but I was delighted to think that I had succeeded where maybe others had failed. However, I reared 70 young fish that year. The next season I had greater success and reared to saleable size no less than a thousand. The following season, becoming wiser each time to their needs, approximately a thousand were reared. Naturally I have retained the obviously good fish with the right colouring,

and those which seem to grow ahead of the rest of the batch, for future stock. The same problem arises as with the goldfish varieties: space and plenty of swimming room with clear and well oxygenated water.

It has been said that a pool with a clay bottom is the ideal environment for orfe, and there may be something in this. Two seasons ago, a dozen orfe about 2 or 3 inches long were sold to a friend for a nominal charge, and he

placed them into just such a pool, of from 15 in. to 2 ft. deep. It was about 12 ft. long and approximately 5 ft. wide. The pond always seems to be stirred up, it is refreshed by the rain, with a periodical flush with the garden hose. The fish are of good colour, about 8 to 9 inches long, although one has refused to grow at all! It will be interesting to observe how these fish grow or survive in these conditions.

## Do Fishes Sleep? by DAVID GUNSTON

IT is commonly assumed by many people that fishes do not sleep. Of course, it is not difficult to see how such an odd belief arose. People looked at fishes, saw no ears and therefore assumed that fishes could not hear. Similarly, when they saw that fish had no eyelids so that their eyes could not be closed like our own and those of other animals, they not unreasonably assumed that fishes did not sleep.

Certainly, some observations of more recent origin have tended to support this view. Fishes watched in aquaria appeared to go without sleep. A grey nurse-shark in an aquarium in Sydney, Australia, is said to have kept on the move—apparently without sleep—for 6 years, swimming over 200,000 miles in the process.

The truth is, nevertheless, that all fishes do sleep, at least for some part of their lives. Their concept of "a good night's sleep" may not tally with our own, for perhaps only a few minutes' respite will enable them to keep going for another 24 hours. Some fishes sleep much more than others, and the habit varies not only amongst different species, but also with change of environment, water temperature and the length of daylight hours.

If some fishes manage with, what seems to us, the very minimum of sleep, others like several hours' motionless rest, usually on the bottom. The mere fact of eyes closing or not closing has nothing to do with it. Human beings may close their eyes for sleep, but they have no ways of shutting their ears, and they manage to sleep soundly through all the hubbub of a big modern city with a large volume of noise still impinging upon their ear-drums. Similarly, fishes may be sound asleep, unseeing and unhearing, though their eyes still present to us on the outside the normal seeing appearance. Whatever we are, whether people or elephants or birds or fish, when we sleep our minds are temporarily withdrawn from the outside world.

A fish's eye is fundamentally very similar to our own and it lacks true eyelids simply because whereas we need lids constantly to moisten and clean the surface of our eyeballs in contact with the dirt and dust of the air, a fish has its eyes naturally and constantly lubricated by the water in which it swims. This is vividly illustrated by the four-eyed fish *Anableps*, which lives in Central America. Possessing eyes divided into two sections, one for seeing under water and one for seeing in the air, it lies habitually on the surface for hours on end with the upper half of each eye clear of the water. But this exposed portion of the eyes, although adapted for vision out of water, has no eyelid arrangement, so the poor fish has to keep ducking its head beneath the water every few minutes in order to freshen up the exposed section of its eyes!

The time is a long way off yet when science knows all the answers to the mystery of sleep, but we do know it is a nervous rather than just a physical phenomenon. The

ancient view that sleep came when the accumulation of fatigue products in the blood stream reached a certain level has long been discounted, partly from observations on Siamese twins. These inevitably share a common blood system, yet one can sleep while the other remains wide-awake. So although the sleep of fishes may for short periods be as deep and complete as any other animal's sleep, it is rarely enjoyed for very long periods without a break. The need for immediate sleep can swiftly be over-ridden by external factors more readily than in the human world. Fishes which prefer to sleep in total darkness will go on swimming if they are still hungry. Sea trout and others, dozing perhaps after dusk, will become active as the moon rises and feed happily in the moonlight. Sleeping grey mullet have been known to be immediately woken by artificial light, to re-form their shoals and swim on as if nothing had happened.

The majority of fishes probably sleep resting on or close to the bottom, but some will take up a somnolent posture suspended in the water. Flat fish and one or two other species with unorthodox habits regularly sleep on their sides on the bottom, often deep in mud or sand. Lampreys attach themselves to a stone when wanting to sleep in a swift current. The general, but by no means invariable, rule seems to be that inland and coastal fishes prefer the bottom as a bed, whereas open-sea and the larger oceanic fishes usually sleep suspended in mid-water. A few fishes, like the basking shark, and the opah or moon fish, sleep on the surface. Basking sharks lie with the dorsal fin and part of the back above water, and sometimes they will doze side or even belly upmost. There is no doubt that for much of the time they spend basking in the sun, they are enjoying sleep.

Unorthodox sleeping positions are the exception rather than the rule with fishes, and do not include the variety found in other animal and human worlds. Trigger fish like to sleep head downwards, and most of the wrasses prefer to turn on their sides. One small Bermuda wrasse, known as the "Slippery Dick", can be said to pull the covers over its head when going to sleep. It dives slantingly into the soft sand on the bottom, gives a few powerful wriggles with its tail and immediately disappears from view. Even in a tank it is hard to detect the little volcanic peak of sand, gently rising and falling as the fish breathes, which marks the spot where its gill-openings lie hidden. It can be induced to perform this act if placed in a darkened room even in daytime.

Oddly enough, sudden light or noise, or the pangs of hunger, may wake a sleeping fish faster than if it is touched. Many a soundly sleeping fish in an aquarium can be gently prodded without waking it. There seems to be some evidence, too, that the practice of tickling trout may include the simple factor that the fish caught so readily and amazingly may be simply sound asleep!

THE AQUARIST

## THE OUTDOOR REPTILIARY

# (4) European Reptiles

by ROBERT BUSTARD, B.Sc.

*Photographs by the author*

IT is a most difficult task to list European reptiles that are suited to life in the British outdoor reptiliary, in a single article. Yet I feel that an outline is worthwhile, and, at least, the better-known species can be described in some detail.

### Tortoises and Terrapins

Tortoises are not really suited for close confinement because they love to wander. I much prefer to let them have the liberty of the garden if at all possible. The various species suitable to keep will be treated in an article at a later date. Because of the arrangement of the garden, however, it may well be that they have to share the reptiliary, where, being vegetarian, they will not harm any of the other inmates.

The European pond tortoise or terrapin (*Emys orbicularis*) is well suited to the outdoor reptiliary or even the garden pond, where it can be allowed to hibernate each winter under the ice, provided that the pond has a maximum depth of 2 feet in parts. The reason for this is that terrapins are quite safe below the ice (where the water temperature never falls below 4°C), but if actually frozen they will die. Even in the worst British winters a depth of 2 feet is sufficient to guarantee that they are safe in the mud below the ice. Should terrapins be kept in a garden pond it must have a surrounding wall to keep them in, otherwise they will stray and become lost. In the outdoor reptiliary terrapins do well in a fair-sized pool, and even if this is only 2 feet square this is a larger water area than they are likely to enjoy if kept indoors. If kept in a small pool care must be taken that they do not foul the water, and that uneaten food is soon removed. Some collectors feed them in a separate basin to avoid this. Fish, in particular, when cut into strips for them to eat tends to flake into pieces that may escape notice. It is not uncommon for specimens of the common European terrapin to suffer from eye ailments due to dirty aquarium or pond conditions, and these should be guarded against. The ideal method is to feed solely on live food such as earthworms, but this can become rather laborious as the terrapins have healthy appetites. Raw meat is quite suitable food, as are tadpoles in season.

There are two other European terrapins: the Spanish terrapin (*Geomyza leprosa*) and the Caspian terrapin (*Geomyza caspica*), which require similar treatment but are slightly less hardy than the common species.

### Lizards

The large European family to which most of the lizards that the collector is likely to obtain belong, as well as two of our native lizards, is the Lacertidae. The most popular species in the vivarium or reptiliary are five in number, of which four belong to this one family: the wall lizard (*Lacerta muralis*), of which there are numerous sub-species and races; the green lizard (*Lacerta viridis*), which is a magnificent animal with the males showing a blue throat in the breeding season; the sand lizard (*Lacerta agilis*), which



A gravid specimen of the sand lizard (*Lacerta agilis*) basking in the sun on a flat stone

also has a very restricted range in Britain; the large eyed lizard (*Lacerta lepida*), which commonly measures 2 feet or more in total length and is well built in proportion; the glass snake (*Ophiomorus opimus*), a legless lizard that can be likened to a giant slow-worm.

The sand lizard (a gravid female is illustrated) is a docile species which quickly becomes tame. Females look somewhat like larger editions of the common lizard (*Lacerta vivipara*), but males have beautiful green markings that are most conspicuous in the breeding season. Like the wall lizard, it is about 6 or 7 inches in length. It is quite impossible to describe a typical wall lizard but one sub-species that is commonly available has a green central portion to the back with brown markings on the flanks which run into this, forming an irregular pattern. Black markings are frequently also present. The top of the head is brown and the underside is dirty white. Both these lizards are ideal for the outdoor reptiliary and feed on small insects such as beetles, flies and bluebottles and meal-worms. Spiders, as with so many lizards, are considered a great delicacy.

The green lizard is a most handsome species that does well out of doors, although it tends to suffer from skin complaints indoors under artificial light. Although I have now kept many hundreds of different species of lizards I think it is hard to find a more beautiful species. They are strongly recommended but one must bear in mind that they have large appetites and must be well fed with live food of a similar type to that accepted by the smaller lizards. They will, however, require very much more. This is particularly important before hibernation. The

eyed lizard cannot be recommended for the reptiliary if this contains any smaller species, as it might well eat them. This species comes from S. Europe and North Africa and does not like prolonged wet weather, so the enclosed type of reptiliary is ideally suited to its needs. It will accept pieces of raw meat, which makes it a welcome addition to the collection.

The glass snake (*Ophisaurus apodus*), frequently known by its Russian name of Scheltopashk, is like a gigantic slow-worm. It may measure up to 4 feet in length, as did two specimens I received from Czechoslovakia, and specimens of around 30 inches are commonly available at a very reasonable price. The body, although snake-like, has that rigid lizard "feet". It is not graceful like a snake on smoother ground, yet it can move rapidly through rough ground. The head is decidedly lizard-like, and, of course, unlike all snakes, the eyes are lidless. The glass snake is so called because it sheds its tail rather easily, and as this member may account for about half of its length the animal appears to break in half! It soon becomes tame and makes a very fine pet, which is much better in the outdoor reptiliary than cooped up inside. Its natural food includes snails and earthworms but captive specimens soon learn to take strips of raw meat, which in time will be taken from the fingers. It should be allowed to hibernate in the way recommended for the aesculapian snake (below).

#### Snakes

The grass snake (*Natrix natrix*) has already been mentioned under the British fauna but each year large importations of Continental specimens arrive, mostly from Italy. They require similar treatment to British specimens, although they achieve a larger size and 4 feet or more must not be considered as all unusual for female specimens. This increased size is particularly noticeable in the southern parts of its range and those occurring on certain Mediterranean islands are said to reach a size in excess of 5 feet. The dived or tessellated snake (*Natrix tessellata*) and the viperine snake (*Natrix vipera*) both have the semi-aquatic habits of the grass snake and require similar treatment in captivity. Neither is frequently imported at present.

The smooth snake (*Coronella austriaca*) is widespread in Europe and was omitted from the discussion of British species because of its scarcity, and the fact that British specimens should be protected and not collected by reptile enthusiasts. It grows to about 2 feet and is a most hand-



A snake well camouflaged as a sand background is the smooth snake (*Coronella austriaca*)



One of the most colourful of lizards for the reptiliary is the green lizard (*Lacerta viridis*)

some snake. The smooth snake inhabits dry heathland areas and likes warmth. It feeds on lizards, which may make it unsuitable as a pet to many people, who cannot satisfy its hunger. The prey, if large, is held loosely in the coils, but it is eaten alive as this snake is not one of the constrictors.

There is one species that I have never recommended although certain people have been successful with it. This is the dark-green or angry snake (*Coluber viridiflavus*). I have found them to be decidedly bad tempered and they are often accused of being poor feeders in captivity. On the other hand there is one European species that I rate as highly as many of the popular constrictors from the New World, and it has the advantage of being much less costly. I am referring to the four-lined snake (*Elaphe quatuorlineata*), which is said to grow to a size of nearly 6 feet. Specimens of between 3 and 4 feet are often available and make handsome pets. The coloration is usually brown-orange with, as the name implies, four longitudinal brown stripes, which may be fairly indistinct. This constricting snake is best fed on mice, and it will soon become tame. I recommend it strongly.

Another species belonging to the same genus is the aesculapian snake (*Elaphe longissima*), which grows to almost the same size but has a more slender body. It also becomes tame and is a popular species, although personally I have never found its appearance nearly so attractive as that of the four-lined snake. It must be stated that its diet is fairly wide, as is that of the four-lined snake, and they will eat nestlings, amphibians and lizards as well as small mammals. Many people keep the last two mentioned snakes indoors, but they do well out of doors in a sunny reptiliary at least during the summer months. Indeed they can be left to hibernate (preferably in a box of hay in a garage or cool shed) or kept awake during the winter in a heated vivarium. It is likely that in the south of their range they do not hibernate, or only in an exceptionally severe winter.

Current prices of the animals mentioned above are: common European terrapin, 4s. 6d.-8s.; Spanish terrapin, 8s.-10s.; Caspian terrapin, approx. 12s. 6d.; wall lizard, 3s. 6d.-5s.; green lizard, 8s.; sand lizard, 5s.-7s. 6d.; eyed lizard, variable, 25s.-40s.; glass snake, 12s. 6d.-30s.; grass snake, 6s. 6d.-8s.; tessellated snake, 7s. and 8s. 6d.; viperine snake, approx. 10s.; smooth snake, approx. 10s.; dark-green snake, 15s.-30s.; aesculapian snake, 30s.; four-lined snake, 30s.-60s.

## THE GOLDFISH AND ITS VARIETIES

### (5) The Fantail

by A. BOARDER

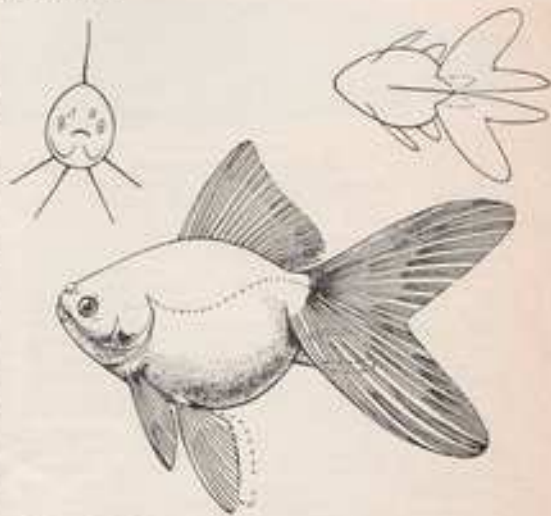
**T**HE fantail goldfish is one of the finest of the varieties. The scaled type is especially attractive in the garden pond, and makes a welcome change from the common goldfish. The short full body and the divided tail give the fish a handsome look and as well as having pleasing shape the fish is active but not too rapid in its movements. It is a hardy fish for the pond and as an occupant for the indoor tank few varieties can beat it. It does not lie on the bottom like many veiltails and moors, nor yet dash around like a comet. It is long-lived and fish of 16 years of age are not uncommon.

The body of the fish should be egg-shaped, with the depth more than half the length. The oval body should have continuous curves from nose to caudal peduncle, with no sign of hump back or stoutness. The lower curve should be a good clean sweep from front to back. The dorsal fin should be erect with the front edge evenly curved and in height more than half the depth of the body. The pelvic fins should be of equal length to the height of the dorsal fin. The pectoral fin should be shorter than the pelvics and the anals, although well developed, should not be too long and flowing like those of veiltails. The anals must be double and single fins will bring disqualification at a show. The caudal fin or tail must be divided completely and held well out in line with the body; any tendency for the tail to droop is a bad feature. The caudal fin must be well forked and the two portions should be of equal shape. Where caudals are not well forked and show a rounded edge it is probable that some veiltail strain has been introduced at some time.

The colour of the scaled fantail can be a rich warm red all over or variegated with red and silver. A chrome-yellow fish is also recognised. A shubunkin-coloured fish is also recognised by the Federation of British Aquatic Societies and this must have the colours required in the shubunkin (q.v.). The minimum length of the body for exhibition purposes is 2 inches.

The chief faults found in fantails are: lack of depth in body and a bad broken curve to the top of the body (this gives the fish a hump-backed appearance). The tail should be completely divided and this is in contrast with the old Standards, where the caudal fin was required to be joined for a quarter of its length. This was stated to be necessary so that the fish was able to hold the tail in an even position and prevent droop. When breeders had fixed this feature in their strain the Federation altered the Standards to make it necessary to breed fish with a completely divided tail. Another fault is when the tail is insufficiently forked. This is usually a sign of veiltail strain in the stock.

The fantail is an easy fish to feed and keep in good condition and it will take all the usual foods given to the common goldfish. It has been stated that this type of fish with a short thick body should have plenty of starchy foods, but I do not think that the type of food makes much difference to the actual shape of a fish. When choosing fish for breeding see that only those with a good deep body are used and then one can expect some good specimens among the fry. It must not be thought that even good fantails will produce all good fry, as there may be many fish that are



Outline of the fantail goldfish (from the Federation of British Aquatic Societies "Show Standards")

not worth the food they eat among a spawning. It is this uncertainty which makes the breeding of fancy goldfish such an exciting hobby.

#### FISH DISEASES

##### (5) Sliminess of the Skin

**S**LIMINESS of the skin of fishes is caused by a unicellular micro-organism that irritates the slime cells into greater production of mucus. The slime cells over-produce and subsequently die, after which they are digested by the parasites as food matter.

The fins of the plagued fish will droop and its colour quickly fades as the slimy secretion adhering to the body begins to resemble a grey, heavy mist. Any prolonged loss of colour, say for 24 hours or more, should always be taken as a symptom of illness in fishes.

The parasites can be killed by immersing the fish in a 2½ per cent solution of salt for 15 minutes. To prevent re-infection, the treatment should be repeated after 2 days. If attacked fishes are not treated, they will soon die. Oddly, this parasite is not found in natural waters but appears to be exclusive to aquarium water.

R. E. MacDonald

# A Fish Out of Water

by DIANE SCHOFIELD

SOME fishes may have their charm and some fishes may have their beauty, but few aquarists will forget any encounter that they may have with the fish who does something that no self-respecting fish should do—walk. *Anabas testudineus*, or climbing perch, does not need to stay in a pond if he has become bored with it.

This fish has only to extend the bony spines which protrude from his gill-plates and strike out for greener pastures. This does not make for smooth ambulation, but rather for a twitching, wobbling motion, which, nevertheless, seems to be effective. As he is especially vulnerable to predatory birds and animals when he is out of his native habitat, Nature has given him a drab, brownish, protective coloration to blend in with any field or road that he might be crossing at the time. Some of the legends of the climbing perch being found in trees come from the fact that perhaps his camouflage was not all that he had hoped for and some bird had swooped down to carry him to its tree for later eating. Although *Anabas testudineus* does well on the ground he could neither climb the trunk of a tree nor particularly care to, as there would be nothing there to interest him.

The climbing perch does not have the streamlined body of other fishes; instead he has a rather large round body that does not taper toward his head. The large head has a peculiar mouth that turns up on the corners in a little "smile". They are rather an awkward fish both in the water and out of it and would not deserve a second glance

if it were not for their extra-curricular abilities. Both sexes are equally drab and colourless.

Since the climbing perch lives both on land and in water, he is equipped for both. He has an air-breathing mechanism similar to that of the anabantids, in addition to the more conventional gills. In Ceylon, India, Malaya, Siam, southern China, the Philippines and the Indo-Australia Archipelago, which the climbing perch calls home, the air is damp and humid. Because of this the perch can sometimes stay out of water for several days, relying on his accessory breathing organs. He can also live in water that is too dirty and foul for fishes that depend solely on their gills to survive. All this goes to make a fish that is unusually hardy. The climbing perch can endure temperatures up to 98° F (37° C) without showing any discomfort.

They also seem to have a thicker and tougher "hide" than do most aquarium fishes. This seems to make them very resistant to white spot, fungus or any of the other parasitic diseases. Though they are largely carnivorous, they won't spurn coarse dry food. Their favourite foods are earthworms, *Tubifex*, white worms and cat food. Plants are left strictly alone.

Although they are not fin-nippers, they do have a relatively large mouth for a fish of their size and should not be kept in with other fishes that could fit easily into such a mouth. A community tank of large peaceful cichlids such as the *Cichlasoma fernandoi*, *C. auratus* and porthole cichlids, seems to fit in well with the habits of the climbing perch. Of course, this tank should have a heavy, tightly fitting cover, as the perch might get bored with it as he would with a pond and think that he could find something more interesting somewhere else.

Rarely the climbing perch may be persuaded to spawn in captivity. Although they belong to a family of bubble-nest builders, the perch does not have a mouth shaped for that sort of thing, so there is no nest. The eggs, being lighter than water, float to the surface where they hatch in approximately 24 to 30 hours. The male does not have any part in blowing the fry back to the surface as his cousins do, so he should be removed as soon as spawning is completed. The babies hang at the surface until the third day, when the yolk sac is absorbed. At this point they should be fed with *Infusoria*, followed later by newly hatched brine shrimp, then *Daphnia* and chopped *Tubifex*.



Photo: Lawrence E. Perkins  
A fish that can leave the water, as shown in this photograph, is the mud skipper (*Periophthalmus*)

## Cacti in the Fish House

SHOULD any rot appear in a cactus plant it should be cut out and the part treated with flowers of sulphur. Should a plant rot off at the root there is no need to throw it away. Cut away all rotted parts and dry it off. Then treat the plant as a cutting. It will soon make new roots and grow on. If the cutting is a tall one do not push it into the striking medium but support it with a stick so that only the base is in contact with the medium.



## 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 Butts, Half Acre, Brentford, Middlesex

### Where do Judges come from?

I WAS interested to read Mr. James Kelly's article in your March issue in connection with show judges, but I think that he has rushed into print without giving sufficient thought to the subject and cannot agree that British fish-keepers are entrusting the job to untrained judges.

The guppy societies are not alone in the issue of an excellent handbook. The Standard Method of Judging, covered by the F.N.A.S. Bulletin no. 5, is a comprehensive publication which has done a great deal to ensure that exhibits are judged in a consistent and unbiased manner by one of the judges on the official list.

The first essential requirements are that a judge must be a man who is sufficiently interested to give his spare time to the job, to travel hundreds of miles in the show season and be in a position even to take time off from his employment for mid-week engagements without compensation.

Mr. Kelly asks a lot of questions but gives us no answers, for the answers are readily available with only a little thought. The phrase which forms his title I first heard several years ago from Mr. Geo. Cooke, the hard-working show secretary to the F.N.A.S. A much better title would be "Where do our next Judges come from?"

The initial training ground for a prospective judge is with his own society, which eventually recommends his appointment, and if good judges are required then it is up to the member societies to select the right men with experience and provide training facilities.

The testing of new judges is provided for in that the societies engaging a judge do not offer a repeat engagement if they are not satisfied with his services. Further, as two or more judges are usually engaged, then a new and a seasoned judge working together can come to the right conclusions and provide actual working experience for the new judge. All judges are therefore tested by a process of elimination.

I know that some go-ahead societies are already providing classes for prospective judges, and they can do lots of good work in this direction, and I wish them every success, for a few new judges will ease the burden on some of us who are overworked.

J. M. SKINNER,  
Judge to F.N.A.S. and A.Y.A.S.,  
St. Wakefield, Yorks.

### Of Peas and Kings

WE were amused at your Burnley correspondent (*The Aquarist*, March) likening the guppy to Acarrington

F.C., and can only feel sorry that he is missing so much in fish-keeping.

The guppy's claim to the title "King of Tropicals" is based on the wide variety of shapes and colours that can be produced by careful selective breeding, in a similar manner to other "fancy" animals and also plants. The failing of the beautiful fishes cited by your correspondent is their monotonous uniformity and the relatively small amount of skill needed to breed them, after the initial difficulties in arriving at the right conditions have been overcome.

Most aquarists tire of breeding fish that look like "peas in a pod", and eventually go over to the "King of Tropicals"—the guppy. We look forward to enrolling Mr. Lewis in our ranks.

D. PORTER,

Federation of Guppy Breeder's Societies, Nottingham.

### Chilly Fish

ONE Sunday evening I checked my tanks, situated in our not-too-warm hallway, and noticed that two *Plecostomus* in an 18 in. by 10 in. tank were very sick. The temperature was down to 53°F (12°C). Some little fingers had turned my Constat back to zero!

One fish that showed some life I immediately transferred to another tank running at 77°F (25°C). I held him for a few moments in the warmer water and he swam off slowly.

I then turned to dispose of the other fish, obviously "dead". It was on its side with colour normal, but as stiff as a board. I removed it and was showing a "non-fishy" friend its various features when I noticed its throat move once, so immediately I put it into the warm tank. No further movement could be seen, which was not surprising as it had been out of water in a coldish temperature for 2 or 3 minutes. I then started "artificial respiration" by moving the fish up and down the 3 ft. tank in order to get a flow of water over the gills. This, after a few minutes, produced some life but when the fish was released it sank to the bottom again, "lifeless". I then took it to my gourami tank (surface temperature over 80°F (27°C) and repeated the procedure) this time, after a few minutes it started gulping and after a short rest it started to explore its new abode, apparently none the worse for its experience.

I corrected the thermostat on the original tank, one of a battery of three, and next morning returned the two *Plecostomus* at the normal temperature. Fortunately no other fishes were affected. One tank was empty and the other held a pair of paradise fish, who were, of course, not bothered at all by this change.

This experience raises some interesting points: was this "dead" *Plecotomus* dying or was it comatose (rather like toad in winter)? If so, for how long would it have lived in that state? I have not had any fish badly chilled before or heard of many cases. Most aquarists prefer boiling from my experience! This "artificial respiration" might be of use for any of the larger fishes similarly chilled. Whether the sudden 20°F (11°C) change of temperature, straight into a hot tank, is going to affect them remains to be seen.

I did see a T.V. programme when a shark captured in an oceanarium was walked up and down a tank by its captors to revive it in a similar way. The method would be rather difficult to apply to a tank of neon!

Have other aquarists had similar experiences? Perhaps their fish were disposed of, as mine nearly was, without the realisation that there was still life present.

E. G. ROCKALL,  
Arlingdon, Berks.

#### Owls and Pond Fish

UNFORTUNATELY, because of Mr. Guppy's recent letter (*The Aquarist*, March), I think that I have to reply to his latest arguments on this almost exhausted affair about owls and all the other creatures about which Mr. Guppy seems to have some fairly original ideas. Firstly there is a little matter of ornithology to settle. The owl which is referred to in the previously mentioned letter is best known in Britain as the barn owl or the white owl.

When I wrote in one of my former letters (*The Aquarist*, April 1961) that I considered it ludicrous that owls could catch fishes I was writing about one particular instance. My exact words were: "I do not think it possible that an owl could grasp a fish through 10 inches of water", which I still uphold. Even though it was pointed out that fishes do not always swim at the bottom, there is still the escape factor to consider. I am certainly not denying that an owl could catch a fish in a shallow stream, at the mouth of a brook or at the edge of a lake, where the water is only a few inches deep.

To move on to another aspect of the original article by Mr. Guppy: that of bears and fishes. He expresses extreme doubt about whether bears eat fishes. However, Mr. Corbet of the Mammal Section, The British Museum of Natural History, told me in a letter that both the brown bear and the polar bear eat fishes and told me of a particular brown bear caught in the Pyrenees with its stomach full of trout—a very fast-swimming fish.

And last of all, the cats. All I can say about them is that a friend of mine, an experienced fish-keeper, told me that he had seen his cat on more than one occasion remove fish from his pond. Such visual evidence is indisputable.

Thus I would sum up my arguments: cats can catch fishes; owls, generally speaking, do not; bears most certainly can and do.

P. M. FULLER,  
Eastleigh, Hants.

## Book Review

*Vivarium Life* by Alfred Leutscher. Second edition. Cleaver-Hume Press Ltd, 252 pages, 125 drawings. 25s.

*VIVARIUM LIFE* first made its appearance in 1952—the same year in which Maxwell Knight's excellent book *Keeping Reptiles and Fishes* appeared. At that time there was a genuine demand for a good, fairly comprehensive book on reptile-keeping written by an expert on the subject. This demand still exists, as, in the opinion of the reviewer, the books which have appeared have not completely satisfied it. Before we can do justice to this new edition we must explain that the first edition was really a catalogue and indeed it read like one. It gave little or no practical guidance on how to keep the various animals which it described. The approach was methodical: the scientific name, distribution, external features, colour, habits, hibernation, food and breeding were listed for each species. In addition each was illustrated by drawings which ranged from very good to very bad. The contents not only included a range of reptiles and amphibians but also coldwater fishes, aquarium coldwater plants, pond life and live foods for aquarium and vivarium.

The second edition incorporates a chapter of 22 pages entitled "The Vivarium—its construction and maintenance". This is full of practical advice, and it must be remembered that the author, a life-long naturalist, is a noted herpetologist who was Founder-Secretary of the British Herpetological Society. This additional chapter is excellent, but some will feel that the stiff manner in which the material is catalogued prevents Mr. Leutscher's experience being transmitted to the reader. Let us just take one example. The food of the African clawed toad *Xenopus laevis* is given as: "Various aquatic creatures, sought after in mud with the sensitive fingers and crammed into the mouth. Also creatures which occur at, or fall into, the water surface. Very voracious." This is, of course, all perfectly true, but would it not be more helpful to state that they can be fed on earthworms or raw meat (indeed, in laboratories they are

usually fed exclusively on raw liver)? Feed twice weekly? In this manner the reviewer cannot help feeling that Mr. Leutscher deprives his reader of what would be most valuable to him—the benefit of his experience over the years, and unique knowledge of the animals about which he writes.

Many of the drawings for this new edition have been redrawn by the author and are much more accurate. The number of species described remains the same, and in fact the bulk of the text has not been altered.

*The Giant Snakes* by Clifford H. Pope. Routledge & Kegan Paul, 290 pages, 25 photographs. 50s.

CLIFFORD POPE is a well-known American herpetologist, best known in this country for his earlier book, *The Reptile World*. He is now writing full time and his new book *The Giant Snakes* is most interesting, because seldom is a whole book devoted to so few animals—especially when the animals belong to a group as shunned as the Reptilia! *The Giant Snakes* is subtitled "The Natural History of the Boa Constrictor, the Anacondas and the largest Pythons, including comparative facts about other snakes and basic information on reptiles in general." The four pythons are the African rock python (*Python sebae*), the Indian python (*P. molurus*), the reticulate python (*P. reticulatus*) and the amethystine python (*Liasis or Python amethystinus*), about which comparatively little is known. Mr. Pope is a good writer and story-teller and the present book, like its predecessors, is easy to read and is yet loaded with interesting and out of the way facts. Three of the six snakes to which this book is devoted are popular vivarium pets, at least when small, which adds to the interest of the hobbyist.

In recommending this book to all snake lovers I would add that we are greatly indebted to the publishers for presenting a book which by its very subject must have an extremely limited sale. It is most pleasing to see such specialised books being published and at a reasonable price.

H.R.B.



Quoline Gougeon), A.V. Goldfish: 1 and 2, Mrs. Hill. The prize for highest unsponsored points went to Mrs. Hill.

While the judging was being carried out by Mrs. Meadows a lecture on plants was given by Mr. Katsirky.

A NFW meeting place has been found by the Friends A.S. and future meetings will be held at The Parson, St. Andrew's Church Hall, Goldersland Road, Brentham, S.W.18. The secretary is J. D. Lousley, 26, Manor Lane, Sutton, Surrey.

THE second match of the N.E.F.A.S. Show League was held recently in the headquarters of the Tyenside A.S. the entries being Penzance A.S. The judges were Mr. A. Brennan and Mr. W. P. Dixon of Sunderland A.S. and the results were as follows:—Tetraodon, Barbours and Daines; 2, Mr. G. McParlane (Tyenside A.S.); 3, Mr. J. Blake (Tyenside A.S.); 1, Mr. J. Hewson (Penzance A.S.); Characin: 1, Mr. J. Hewson (Penzance A.S.); 2, Mr. R. Weston (Tyenside A.S.); 3, Mr. R. Stephenson (Tyenside A.S.); Catfish and Loach: 1 and 2, Mr. D. Parry (Penzance A.S.); 3, Mr. J. Herring (Tyenside A.S.); Barbs: 1, Mr. A. Duffield (Tyenside A.S.); 2, Mr. A. Goodfield (Penzance A.S.); 3, Mr. J. Hewson (Penzance A.S.); Labyrinth and Cichlids: 1, Mr. R. Adlam (Tyenside A.S.); 2 and 3, Mr. A. Duffield (Tyenside A.S.); Livebearers: 1, Mr. D. Parry (Penzance A.S.); 2, Mr. T. Ruffin (Tyenside A.S.); 3, Mr. G. Cummings (Tyenside A.S.). The result was a win for Penzance A.S. with 19 points to Tyenside A.S.'s 17 points.

ENTHUSIASM was not lacking at the last meeting of the newly formed Yorkshires (Bradford) Section F.G.A. which was held at Uray Hall, Rawson Square, Bradford, and members were pleased to welcome a guest, Mr. F. Whitham (Lanes. Section) who gave an interesting talk on the American guppy and the use of producing large females (S.A. guppies).

The section also thanked Mr. W. G. Phillips (Horn. Penzance) for the gift of one pair of 50 centigrade guppies, as breeding stock, the young of which are to be distributed amongst members.

THE East Dulwich A.S. (over-20s) show with the Freeland Club, provided a win for the visitors. The judge was Mr. Geoff Creed. Mr. Moore brought along his promoter and slider and gave a very interesting evening's programme.

At the annual general meeting it was decided to have weekly meetings and subscription fees set to be reduced to 15 per cent.

The Hon. Secretary of the East Dulwich A.S. is Mr. A. H. Gled, 18, Chaversfield Green, East Dulwich, London, S.E.22.

MEMBERS of the Northampton and District A.S. issued a talk recently by Mr. A. V. Adfield on his experiences and experiments with guppy breeding. Monthly table show results were as follows: Barbours: 1, Mr. R. Mervoy; 2, Mr. G. Chadwick; 3, Mr. R. Shaw.

THE Thames A.S. issued Mr. Gathorpe of the Yorkshire Electricity Board give his second talk on electricity in the aquarium at their last meeting. An invitation from the Electricity Board to have a display of Tropical Fish at their stand at the last Farmers Show was accepted. The result of the Table Show for Livebearers was: 1, Mr. A. Powell (Surrey); 2, Mr. D. Wells (Gosport); 3, Mr. D. Machin (Ply).

IN the past few months the attendance at the evening meetings of the Brighton Southern Aquarists have risen from 20 to 50 or so. There have been a series of hotly fought Table Shows covering Labyrinth, Labyrinth and barbs with the prospect of six more to follow later on. Other clubs have made visits and given talks on breeding selected fish and included in a busy programme is a visit to the London Zoo.

#### SECRETARY CHANGES

THE following changes have been reported: Hales A.S. (F. H. Hilling), 90, Albany Road, Cradley, Staffs.; Ashton-Under-Lyne A.S. (Mr. E. Byers, 32, Bank Street, Ardwick, Manchester).

#### AQUARIST CALENDAR

24th June: Sloman and District A.S. Open Table Show at the Ambulance Hall, Sloman, 7.30 p.m. All details are available from the Secretary, Mr. E. Bartlett, 30, George Street, Sloman.

7th-8th July: Dagenham Town Show. All enquiries to Show Secretary, Mr. A. T. Smith, 125, Hester Avenue, Hainland, Essex.

24th-27th August: The North-Eastern Federation of A.S. Annual Show at the Exhibition Park, Newcastle-upon-Tyne. Schedule available shortly from the Secretary, Mr. R. Wilson, 38, Douglas Terrace, Newcastle-upon-Tyne.

21st August and 1st September: Broad Tropical Fish Club Open Show of Tropical Fish, Plants and Furnished Aquaria will be held at the Temple Colston School, Victoria Street, Bristol, 1.

18th-22nd September: Leeds and District A.S. Open Show to be held at the Trinity Church Hall, Leeds.

29th September: Kingston and District A.S. Inter-Club Open Table Show.

20th-21st October: British Aquarist Festival, Belle Vue Zoological Gardens, Manchester. Schedule available from Hon. Show Secretary, Mr. Geo. W. Cooke, "Spring Grove", Fildath, Bury, Yorks.

Society secretaries are invited to send details of forthcoming exhibitions and shows for inclusion in the feature. Full details to help readers wishing to attend these events should be given.

### SHREDDERS SAGITTARIA (Giant) and SHUBUNKINS

Have you tried Shredded White Worm or Tubifex for your baby fish? You need not bother with Infusoria (it can be dangerous and pollute the water in your tank), but feed immediately with this Shredded live food.

Incidentally I was advised by an aquarist that he was perfectly satisfied and still using his Shredders he purchased 10 years ago.

Giant Sagittaria suitable for tropical, cold water or pond. Young plants 6/- and 8/6 dozen; larger plants 1/3 and 1/6 each; postage and packing, 1/3.

Shubunkins Bristol type from prize winners at Bristol, Birmingham and Manchester (all big open shows). My strain has been developed over a period of 20 years. Send your enquiries S.A.E. please.

P.S. Fish can be seen by appointment

The Shredders 10/-; Super Shredders 16/-; Coarse Tooth Shredders 12/-; All post free.

**AQUATIC DEVELOPMENTS,**  
143-145 Bure Lane, Christchurch, Hants.

### ARTHUR DERHAM Professional Aquarian and Fish Food Manufacturer

23 QUEEN'S AVENUE, WATFORD, HERTS.  
PHONE: WATFORD 21708

First man to start a Tropical Fish farm in England. First to import Tropicals to A.S. 66 Years in the Fancy.

Derhams Luck, 2/- post paid. Amusing but Authentic by A.D. Garden Pools, Construction, Stocking, and Maintenance, 2/- post paid. Always, and as ever the premier dried fish food in the world. 'ELITE' Tropical, (no biscuit whatever) 2/- and 4/6 per tin. The latter 4 times the quantity of 2/- size. Post paid from here. Our new Blue Label Coarse Fish Food for coldwater fishes, 2/6 per large tin, also post paid.

"Retailers ALWAYS apply to their  
wholesaler for this remarkable, and  
"so much demanded" food"

**GRO-WEL  
superior  
filters  
for best  
AQUARIUM  
CLARITY**



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

**OUTSIDE FILTERS**

To fit all aquarium frames up to 17" wide. **"SLIM JIM"**: The slimmest outside filter on the market. A quality filter for only 17s. 6d. **"CLEAR KING"**: 3-Compartment filter: Separate compartments for glass wool and charcoal. Removable partitions give a larger surface area for faster purification. Chip-proof return stem giving a steady, non-splash flow. Price 22s. 6d.

**INTERNAL FILTERS**

Decorative **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**

**3-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 28s. 6d.

Obtainable through your dealer or post free from

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

**What is an Aquarium?**

One definition has it as "a pond or container for keeping fish and aquatic plants," but surely, it is far more interesting to view these from the side rather than from above, and this would seem to be an essential feature of an aquarium. If this is so, then presumably the first aquarium became available with the manufacture of the first transparent bottle. It is unlikely that the manufacturers of jam realised the boon they were conferring on aquarists when they first began supplying their product in jars. Instant jam, if it ever comes, will not be welcomed by readers of this magazine.

However there is no fear that the angle iron aquarium will ever disappear, this, the basic, and most essential piece of equipment has been with us many years and without it our hobby could not have flourished. It is not perhaps as elegant as we would like for our homes and it does tend to become a little cluttered up with electrical wires. But to list the faults is like listing the faults of an old and faithful servant, let us just say that there is an alternative aquarium, the ARBE aquarium, constructed to eliminate all these faults and designed to be an elegant and worthy addition to your home.

Just send us a postcard with your name and address saying "please send leaflets" and we will be happy to forward these together with the address of your nearest stockist.

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

## BUYERS' GUIDE

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

### BERKSHIRE

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

### CHESHIRE

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

**Robert Jackson (Naturalists) Ltd.**  
Holly Bank Nurseries, Grove Lane, Hale  
Telephone: Ringway 3301  
WR. C.T.P.AA. R.&A.

### DURHAM

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

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

**The Fish Bowl**  
Laura Street, Sunderland  
Telephone: Sunderland 69192  
E.C.D. Monday. R. C.T.P.AA. R.&A.

### ESSEX

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

**Skilton, C. J.**  
"Ridgeway", 139, Gallywood Road,  
Chelmsford  
Telephone: Chelmsford 56878. WR. C.T.P.AA.

### HAMPSHIRE

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

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

### HERTFORDSHIRE

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

**Wat-Pet Organisation Ltd.**  
66-68, London Road, St. Albans  
Telephone: St. Albans 54469-55507  
E.C.D. Thursday. WR. C.T.P.AA.

### KENT

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

### LANCASHIRE

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

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

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

### LONDON (North)

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

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

### LONDON (South)

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

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

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

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

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

**LONDON (West)**

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

**NORTHAMPTONSHIRE**

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

**The Pet Shop**  
120, Kestering Road,  
Northampton  
Telephone: Northampton 841  
E.C.D. Thursday. R.C.T.P.A.A.

**OXFORDSHIRE**

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

**Headington Pets Supplies**  
150a, London Road,  
Headington, Oxford  
Telephone: Oxford 61706 and 58673  
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

**STAFFORDSHIRE**

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

**SURREY**

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

**SUSSEX**

**Preston Aquarium**  
44, Beaconsfield Road, Brighton  
Telephone: Brighton 29620  
(Open all week). E. C.T.P.A.A.  
**Regency Aquaria (Prop. R. A. Bassett)**  
49, Surrey Street (outside Brighton Station),  
Brighton. R. C.T.P.A.A.

**WARWICKSHIRE**

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

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

**WORCESTERSHIRE**

**The City Aquaria, Bird and Pet Supplies**  
(Proprietor: Mrs. M. Hemming)  
34, Friar Street (opposite Union Street), Worcester  
Telephone: Worcester 22905  
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

**YORKSHIRE**

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

**SCOTLAND**

**Aquarists' Rendezvous**  
164/168, Albert Drive, Pollokshields, Glasgow, S.1  
Telephone: South 4258  
E.C.D. Tuesday (1 p.m.) WR. C.T.P.A.A.  
**Forbes, James L. (Prop. P. R. Greening)**  
176, Blackness Road, Dundee, Co. Angus  
Telephone: Dundee 66409  
E.C.D. Wednesday. R. C.T.P.A.A.

**NORTHERN IRELAND**

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

**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

**I've Got Millions!****WORMS! FOODS! COMPOSTS! RESULTS!**

EUGLENA	2.4—With 8 page instructional booklet
MICRO WORMS	2.4—Complete with feeding powder
MICRO FOOD	2.4—Specially developed for Platy
GRINDALWORMS	2.4—Minoura W. Worms Easy to breed
GRINDALWORMS	2.4—Platone cultures in wooden boxes
GRINDAL FOOD	2.4—High protein content. Rapid results
GRINDAL COMPOST	2.4—Finely ground with organic base
WHITE WORMS	2.4—With complete instructions
WHITE WORMS	2.4—Platone cultures in wooden boxes
WHITE WORM FOOD	2.4—Exclusive formula. No milddew
WHITE WORM COMPOST	2.4—Compound for quicker breeding

Broader's packs: five times 2.4 quantity for 7.4

Ask your dealer, or free delivery from

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

WATERPROOF — DUSTPROOF — MOTHPROOF **INEXPENSIVE****POLYTHENE SHEETING**

Per Lincol YA. Stand. Super, Hvy.  
28" wide 28d 11d 2.4  
72" " 51 15 3.4  
144" " 215 31 7.1

101 uses for Aquarist & Pondkeepers  
Also ideal for Clothing and Bedding  
Storage, Machine Covers, Book Cov-  
ers. Easy-to-make Greenhouses—  
Garden Frames—Clothes, etc.  
FOR ALL-PURPOSE PROTECTION

**POLYTHENE BAGS**

	10	100	500	Each	10	100	BLACK POLYTHENE SHEETING
3 x 3 6d.	41-	151-	18 x 24 6d.	41-	41-	32-	Standard Qual. 40"
4 x 6 7d.	51-	166-	17 x 27 41d	51-	51-	38-	width, 11d. per yard.
5 x 9 8d.	61-	218-	24 x 30 7d.	61-	61-	45-	Heavy Quality, 144"
6 x 12 11-	71-	276-	24 x 40 11-	71-	71-	52-	width, 7.6d. per yard.
8 x 15 14	118-	431-	36 x 40 21-	27-	180-		Postage: Up to 51-
12 x 18 19	141-	491-	48 x 60 31-	45-	410-		5d., 50c., 71d., over
12 x 18 19	141-	541-	36 x 84 41-	35-	310-		10c., 1.9d.
14 x 20 21 11	181-	611-	62 x 84 71-	45-	601-		

TRANSATLANTIC PLASTICS LTD.

(Dept. A.22) 43/45 Brighton Rd., Surbiton, Surrey

TRADE ENQUIRIES  
ELBRIDGE 5271

## OUR USUAL TOP QUALITY FISHES AT THE LOWEST POSSIBLE PRICES

Tiger Barbs ... .. 2-	<b>RARE FISHES</b>	White Cloud Minnows ... .. 2/6
Niger Barbs ... .. 2-	Flying Fishes ... .. 15-	Bumble Bee ... .. 2/6
Rose Barbs ... .. 2-	Barbus Schwanzeil ... .. 10-	Red Platys ... .. 2/6
Cherry Barbs ... .. 3-	Anostomus ... .. 10-	Red Swordtails ... .. 2/6
Siamese Barbs ... .. 3-	Black Lyretail Mollies ... .. 15-	Albino Swordtails ... .. 2/6
Angel Fish ... .. 4-	Leaf Fish ... .. 7/6	Dwarf Gourami ... .. 4-
Lace Angels ... .. 4-	Polyschanna Kribia ... .. 7/6	Socking Loaches ... .. 8-
Black Angels ... .. 8/6	African Knife Fish ... .. 7/6	Antennae Catfish ... .. 6/6
Black Wahoos ... .. 2/6	Elephant Fishes ... .. 25-	Large Male Fighters ... .. 6/6
Bassons ... .. 2/6	Clown Loach ... .. 15-	American Poecilia ... .. 4-
Flancons ... .. 2/6	Extra Large Scaphiopus ... .. 18/6	Khuli Fish ... .. 2/6
Red Scorpas ... .. 3/6	Medium Size Scaphiopus ... .. 12/6	Ambassis Lala ... .. 4-
Harlequins ... .. 2/6	Meteoriculus Argenteus ... .. 10/6	Opaline Gouramis ... .. 4-
Pompos ... .. 3/6	Adult Severans, 3 in. ... .. 2/6	X-Ray Fishes ... .. 2/6
Zebra Danio ... .. 2/6	Adult Jaws Catfish, 3-4 in. ... .. 7/6	Mystic Tetras ... .. 2-
Pearl Danio ... .. 2/6	Adult Niger Catfish ... .. 2/6	Loati Gourami ... .. 4-
Clown Danios ... .. 2/6	Adult Angels ... .. 2/6	Greenlights ... .. 3/6
Black Mollies ... .. 2/6	Adult Flancons ... .. 2/6	
Scorpaenids ... .. 3-	Male Flowering Gourami ... .. 15-	
	Betta Girls ... .. each 4/6	
	Hemichromis Marmoratus ... .. each 5/6	

WRITE FOR OUR COMPLETE  
FISH AND EQUIPMENT LISTS  
ENCLOSE S.A.E.

NEONS  
LARGE SOUTH AMERICAN  
IMPORTS  
1/- each—New for 20/-

*A charge of 12.5 is made for container-carriage and telegram.*

## PARAMOUNT AQUARIUM

**95 HAVERSTOCK HILL, HAMPSTEAD, LONDON, N.W.3.** Telephone: PRInrose 1842

## NEW FROM T.F.H.!

**ANNOUNCING A COMPLETELY NEW RANGE OF 3 - PET CARE BOOKLETS!**

Each 32 page booklet is packed with invaluable information and each one contains some of the finest full colour illustrations you have ever seen!

**LOOK FOR THESE NEW TITLES IN THE SHOPS NOW!**

- "TROPICAL FISH PRIMER FOR BEGINNERS" "COLOURFUL EGGLAYERS"
- "PLATIES AND MOONS" "COLOURFUL SWORDTAILS" "BEAUTIFUL GOLDFISH"
- "COLOURFUL LIVEBEARERS"

Also the following non aquatic titles—"Singing Canaries"  
"The Beautiful Budgie" "The Charming Puppy" "The Easy Way to Train your Dog"

U.K. DISTRIBUTORS  
**T.F.H. PUBLICATIONS (LONDON) LTD.** 59 STATION ROAD,  
REDHILL, SURREY.



## 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 ROYER

Spreideweg, 2

Putten (Gld.), Holland

## W. HAROLD COTTON

F.A.S.

### ICHTHYONOTOMIST

#### POST MORTEM EXAMINATION of Tropical and Coldwater fishes

Specimens should be wrapped loosely and very wet in greaseproof paper, surrounded by a damp cloth and then re-wrapped in dry greaseproof paper and sent in a strong container. A brief history and any relevant details should be given. No preservatives please.

Examination fee 2/-

39, BROOK LANE, KINGS HEATH,  
BIRMINGHAM 14

Phone: 4003bury 1483

## LETTY KREMNER

### LILIES AND MARGINALS AND ALL OXYGENATING PLANTS

#### Lilies

Marliacca Pink 10/6, Yellow 15/-; James Brydon  
Crimson 15/-; Odorata alba, small white 12/6;  
Gladstoniana, large white 12/6.

#### Oxygen

Willow Moss 1/-; Crowfoot 1/-; Starwort 1/-;  
Elodea Densa 3/- doz.

#### Marginal

Mint, Forget-me-not, Marigold 9d. each; Yellow  
Iris 1/-; Bullrush 1/6.

#### Floating

Frogbit 6d.; Water Soldier 2/6; Hyacinth 5/6.

Postage 1/6

AQUARIUM AND POND FISH LISTS  
NOW READY

#### NEW PREMISES

13 KING EDWARD BUILDINGS  
CHEETHAM HILL VILLAGE  
MANCHESTER 8 CHE 3246

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 on the Central Line thirty-five minutes from the West End, and we are three minutes from Buckhurst Hill Station. Or by bus routes 23, 24A, 107 to Bull Pasture Ring, five minutes walk from there. There is always someone in attendance at the Hatchery so you can inspect at any time including week ends. Over 120 different species of fish for sale. Fully stocked of plants available, collected from our hundreds of tanks for each order and sent direct to you. They cannot fail to grow.

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

E. Radicans	each	10/-
Cellophane Sweet plant	doz.	12/-
Broad Leaf Amazon	doz.	9/6
Cape Fear Sparrowdock	doz.	4/6
Wassara Plants	doz.	4/-
Fine Wisteria	doz.	2/-
Water Orchids	doz.	4/-
Calceola	doz.	4/-
Ambulia	doz.	4/-
Red Lactigala Yucca	doz.	4/-
Twisted Vals	doz.	5/-
Red Stern Myriophyllum	doz.	5/-
Sagittaria Nympha	doz.	4/6
Fine young Diver	30 - and 40 -	

No fish by rail during bad weather. 120 species for collect, 4 species of cichlid in stock.

We have a number of breeding pairs for sale. Large Angles, Cichlids, etc., and many other fish. All are large to risk on rail. Ring up for details.

#### PLANTS PLANTS PLANTS

We are now offering a wholesale supply of aquatic plants including the rarer species. Send for our wholesale list with S.A.E. please.

We are now booking dates for Club Visits.

Our 10/- parcel of 30 mixed plants 6 varieties is the finest on offer. Half parcel discontinued until May. Malacca snails 3/- doz, mixed snails 3/4 doz.

Our Fish food is the finest obtainable and contains a very high proportion of the best liver and young bullocks heart. Sent direct from here so that it is in perfect condition and ensures that it is not adulterated in any way. Your fish deserve the best food you can give them. N.O.F.F. (Natures Own Fish Food) is the best. Any of the Cichlids eat it greedily. A generous sample will be sent post free for 2/6. Try it and give your fish a real treat. Suitable quantity 4/6.

Everything on sale is the best on offer. We supply everything for the Aquarist in the way of equipment and post free. Our offer of a Thermostat, Heater and Thermometer at 50/- 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 5/- 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 typical 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 advice.

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

## PREPAID ADVERTISEMENTS

5/- per word (12 words minimum) Rate number 25/- entry

### FOR SALE

GLAZED aquaria in all sizes including 36 x 15 x 12, 70x, 64, 18 x 10 x 10, 15, 64, 24 x 12 x 12, 70x, 64, tanks dispatched to any part of Britain, carriage extra. Plants, Accessories, Fish. Wright's, 15, Lonsdale Road, London, N.4. Phone Ardway 8435.

FERRY'S for Plants. 1st and 2nd Awards British Aquarist's Festival. Assorted selections Tropical or Cold 5s. 6d.; 7s. 6d.; 10s. 6d. Vase Ferns, Sagittaria Nutans, 4s. per dozen. Cryptocoryna Cordata 1s. 6d. to 2s. 6d.; Willow 2s. 6d.; Beckwith 1s.; Haemodorum 2s. 6d.; Seven assorted 10s.; Water Wirtaria, Giant Hydrophila 2s. 6d. Post 1s. All Advertised Accessories. C. R. Perry, Professional Aquarist, 415, West Street, Crews.

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

PERFECT Specimens, Live Red Blue Sea-fall Guppies 15s. per pair; Live Red Blue Fighters 15s. per pair; Madagascar Rainbows 4s. 6d. each, carriage 3s. 6d. C. R. Perry, Professional Aquarist, 415, West Street, Crews.

INTERPET is coming!

CALLING ALL AQUARISTS. Call and see our large selection of Tropical and Coldwater fish, Plants in variety. We also stock all accessories at "The Aquarist," 192, Wellingborough Road, Northampton. Phone 3610.

EASY TERMS. Extend your hobby the easy way. Air Pumps, Heaters and Thermostats, Filters, Breeding Trays, Nets, Thermometers, Frames and Stand and all accessories. Send a stamp for list "A" Joseph Sandley Ltd., Church Hill, Northfield, Birmingham 11. Phone FRIARY 4535.

L.G.M. GRINDALWORMS, ever-ready source of live food. Comes, special food, compact and instructions 7s. 6d. complete.

AQUARIA Stands, Shades and Frames. Guaranteed square 1 x 1 x 4 in. steel angle stands to take 2 tanks 18 1/2 x 12 x 36 in. High 30s., 24 1/2 x 12 x 36 in. High 35s., 36 1/2 x 12 x 36 in. High 45s., Frames 24 x 12 x 12 in. 20s., 24 x 15 x 12 in. 21s., 30 x 15 x 12 in. 22s., 36 x 12 x 12 in. 24s., 36 x 15 x 12 in. 25s., 48 x 15 x 12 in. 11s. 15 x 4 in. steel angle 40s., Stand 48 1/2 x 12 x 36 in. High 45s. All over Shades 24 x 12 in. Aluminium 15s., 30 x 12 in. 21s., 36 x 12 in. 22s. Shades sent only with Frames or Stands. Any size frame or stand made to order. Money back if not satisfied. Hickox's Engineers, 79 and 81, Soames Street, Leeds, 1, Tel. 25061.

L.G.M. GRINDALWORMS, disease and pest free live food, give your fish the high glow of wellbeing.

AQUARIUM PLANTS at 5s. per dozen; *Elodea* (prayer chain sword), *Hydrophila*, *Ludwigia*, *Myriophyllum* (green or pepper-leaved), *Sagittaria*, dwarf *Dorata* or *satana*, *Valisneria* (straight or twisted). 50 species usually in stock from 2s. to 5s. each.

Try a generous 15s. order of tropical plants please. Mr. Sindler of Mossburgh writes me: "I have purchased several of these plants 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). Bathers by post only, at Frank Stone, 31, Northington Road, London, N.W.3.

WHO IS INTERPET?

AQUARIA FRAMES. For quality and accuracy buy direct from the manufacturer. 1 x 1 x 4 steel angle, 36 x 15 x 12, 24, 36 x 12 x 12, 24s., 30 x 15 x 12, 25s., 30 x 12 x 12, 22s., 6d., 24 x 12 x 12, 20s., 6d., also 18 x 15, 13s., 6d., 18 x 12, 15s., from 1 x 1 x 4 in. angle. All riveted and welded ground both. Any size to order. Immediate despatch carriage paid. C.W.O. Money refunded if not satisfactory. For complete list, stands, shades, etc., S.A.E. J. E. Hewitt, 32, Charter Street, Acworth.

L.G.M. GRINDALWORMS, from your dealer at just five if any difficulty, from E. L. Arnold, 99, Monaga Road, London, E.7.

GUARANTEED Quality Plants—*Hydrophila*, *Ludwigia*, *Hartweg* 6s. 5d. dozen. *Herpestes* 9d. 7s. 6d. dozen. Indian Fern, Dwarf Amaranth, Riccia, 1s. each. *Wittaria*, Giant *Hydrophila*, Dwarf Lily, 2s. Post 9d. all orders. 100 Varieties Tropical and Coldwater fish and other plants personal shoppers only. Kingsfisher, 138 Cranford Road, Beckenham, Kent. Sec 3716 Closed Wednesday.

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

WINNER TIME SWITCHES, Recycled, 14 Day Clock. 25/9. 1 Amp. Ideal for automatic switching Aquarium Lighting, Car lights, Radios, etc. 25s. Post Paid. A. R. Hutchins, Dept. A. 6, Park Road, Bromley, Kent.

L.G.M. GRINDALWORMS, ideal live food for tropicals. Full of both building proteins.

WHITE WORM by weight—1 oz., 4s.; 4 oz., 15s. Post Paid. Complete Orders welcomed. We produce the largest quantity of white worms in the Midlands. Culture Complete—containing worm and egg sacs, activated and ready for use. 5 lb., 7s. 6d., post paid. Society Pond Trading, V. J. and A. Dene and Son, "Dapford", Alcester Road, Parkway, via Atherstone, Warwickshire. Tel. No. Wythall 2582.

TROPICAL Fish in variety. By rail anywhere. S.A.E. for list. Native, 44, Dudley Lane Road, Selly Oak, Birmingham.

GOOD selection Tropical Fish. Popular breeds, mostly tank bred. Extra prices. Greenwood, Adams Nurseries, Newson, Nr. Kirkham, Lancs.

WHAT ARE INTERPET?

TROPICAL fish, fully quarantined, over 100 species offered at lowest prices. All aquatic requirements supplied. Personal shoppers and Sorting Fishermen, 62, Mayer Road, Wood Green, N.22.

GUARANTEED thermostat, heater and thermometer, 20s. post paid. Best heater settings. Sorting Fishermen, 62, Mayer Road, N.22.

WHY INTERPET?

USED AQUARIUMS (various sizes). Stands, Covers, Equipment—cheap. Gallery only, evenings, week-ends. Good selection Tropical and Plants. Eastway, 1, Balfour Road, South Westlands, S.W.13 (near Underground).

BRITISH and BEST, McJannet's fish food.

GREEN Polythene Sheeting. Aquarist's answer to green water and algae trouble in fish-tanks. Proven anti-stain in plant houses. 10 ft. by 8 ft. packs 5s. 6d., postage 1s. Leadley, 19, Newhill Lane, Stret, Staffs.

SPARKLING (clear tank), it's CLEAR by using McJannet's fish food.

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

ALL TRADERS send for our Wholesale Price List of Aquarium Equipment. We stock all best-selling items, including DATAM PRODUCTS. Immediate despatch service, generous C.W.O. discounts. Tom C. Saville, Ltd., 9, Station Road, Beeton, North.

If you sell Aquarium Equipment, you'll want our Trade Price List—sent to-day to Tom C. Saville, Ltd., 9, Station Road, Beeton, North.

WERE giving money away to all Traders! By generous discount for Cash with Order. You can't do better than send to the Province's Leading Wholesaler—Tom C. Saville, Ltd., 9, Station Road, Beeton, North.

THE PROVINCE'S Leading Wholesaler—Tom C. Saville, Ltd., of Beeton. Best variety of stocks, best quick service, best big C.W.O. discounts.

THERE was a young lady from Crews.

Who complained that her fish never grew.  
A friend in her Club,  
Said McJannet's is the grub  
And by jolly she's found that it's true.

BRISTOL SHRUBKINS — 2 pairs (2 years) not exhibition fish but will breed Red-Blue-Black Fry. £3 pair. Mansfield Nurseries, Sumerdown Road, Newcastle-on-Tyne.

### PLAQUES, SHIELDS, ETC.

H. HOLTOM & SON, 308, Oldbury Road, Sileswood, 40. Plaques, Shields, Medals, Cups and Medallions for Aquarist and Bird Societies. Tropical and Coldwater fish centres in full colour. Write for details to above.

### WANTED

FOND KEEPERS—any you cleaning out? Surplus coloured water lilies, marginal plants and large caudexes usually urgently required. Best possible prices paid. Offers gratefully received. Birmm, Commercial Pond Specialist, Coombe Avenue, Weymouth.

### REPAIRS

GUARANTEED heater repairs, 5s. 6d. each. Send old heater and own settings. New guaranteed heater which will give long, reliable service, 7s. 6d. each. J. Wier, 7, The Drive, Welwyn Hatfield.

# THE CONSTAT

# 22/-

ASK TO SEE IT AT YOUR LOCAL DEALER

Distributed by

**BARRY M. AUSTIN,**

95, Crown Road, Twickenham, Middx.

WHOLESALE TO THE AQUATIC TRADE

Thermostat Type Q.K.  
Outside Fitting

Also the Perkolator Sub-Gravel Filter  
Requires no pump. 15/- and 12/6 each



# Shirley Aquatics Ltd.

WATER PLANT NURSERIES AND FISH HATCHERIES—Phone: SHIRLEY 130

Stratford Road, Monkspath, Shirley, Solihull, Warwickshire

## A MANUAL OF AQUARIUM PLANTS

This book has proved the world's best source of information on aquarium plants, describing 220 species and illustrating 180

7/6 post paid

### BEAUTIFUL NEW INTRODUCTION CRYPTOCORYNE USTERIANA

For the first time, stock of this lovely tropical plant has come to Europe. Broad strap-like foliage attractively wrinkled reaches a length of 15" and a breadth of 2½".

**SPECIAL PRICE for JUNE and JULY ONLY**  
12/6 each — 3 for 30/-



### NEW COLOUR STRAINS OF HIGOI CARP FROM JAPAN

PURE GOLD 40/-	PURE WHITE 40/-
RED & WHITE 50/- & 60/-	BLUE & WHITE 80/-
GOLD & BRONZE Flecked 40/-	BRIGHT METALLIC 90/-

(A limited number of other colours for sale.)

4" - 7" GOLDEN ORFE 15/- each  
2" - 9" BLOOD-RED GOLDFISH 11/- - 20/- each

### INTERESTING AND NEW for TROPICAL AQUARIA

**SACOPA MYRIOPHYLLOIDES**  
(A Escapee with foliage similar to Myriophyllum)  
**SACOPA (Species undetermined)** (attractive long pointed leaves)  
**ECHINOOGORUS TENELLUS**  
(A newly discovered chain weed of small size)  
**ROSTAL SPECIES** (A new large Rostal from Indonesia)

One of each of above for 10/-

### SENSATIONAL OFFER

### BEAUTIFUL AND RARE TROPICAL PLANT

### BARCLAYA LONGIFOLIA

only 12/6 each or 3 for 30/-

(See illustration on 146)

**SPECIAL OFFER OF  
HANDSOME MARGINAL PLANTS**  
**LYSICHTUM AMERICANUM** 10/- each  
Yellow Arum-like flowers  
**LYSICHTUM CAMSCHATENSE** 10/- each  
Dark white species

**SPECIAL OFFER OF WATER LILY  
NYMPHAEA FROEBELI**  
Blood-red midsize lily with tulip-shaped flowers  
Small Plants 12/6 each

FOR MONTHS MAY—JULY OPEN SUNDAY AFTERNOONS

PLEASE NOTE—All enquiries requiring a reply MUST be accompanied by S.A.E. Our premises are situated on the main Stratford-Birmingham road, 8 miles from Birmingham. Midland "Red" Bus No. 130 from Bull Ring, Birmingham, passes the door, alight at "The Crown," Monkspath.

HOURS OF BUSINESS—Weekdays 10 a.m.—6 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 rail. Tropical suitcases order 45, insulated sunvisor and carriage 10/-. Cold water telegrams order £2 plus 10/- can and carriage. Plants by post (minimum order 10/-) please add 1/6 post and packing.

Printed and Published by BUCKLEY PRESS LIMITED, London and Brentford