

# The Aquarist

and Pondkeeper

APRIL 1963



MONTHLY  
Vol. XXVIII No. 1

**TWO SHILLINGS**

## WALTER R. SMITH

For Complete Tropical and Coldwater  
Aquaria also Tropical Marine

100 Varieties of fish usually in stock on view  
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Derham's Luck, an amusing book, but authentic 2/- post paid. Garden Pools, a very useful book, 2/- post paid. Foods, 'Elite' (Tropical) 2/- and 4/6 per tin—the 4/6 size contains four times the amount within 2/- tin. A good buy! Cold Water (Blue Label) 2/6 per large tin. Traders should get in touch with Barry M. Austin, 95 Crown Road, Twickenham, who is my only wholesaler, and very reliable too. No biscuit at all in 'Elite', all meats loved by fishes.

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Rear them on BIOL.

Dried pure Plankton culture made by a Dutch biochemical laboratory. A tremendous help to growing fish—contains 73% protein. Price 2/6 per vial of 7 grams.

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Moulded of strong, clear polystyrene.

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



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SUPPLIES COMPANY

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**TRAPS**  
**3-WAY CONVERTIBLE TANK TRAP!** The most versatile trap available. Can be used for breeding 1 or 2 livebearers, as a rod trap for breeding egg layers or as a self-cleaning display tank for 1 or 2 Bettas. Price 28s. 6d.

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To fit all aquaria frames up to 1" wide:  
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Sales promotion division of

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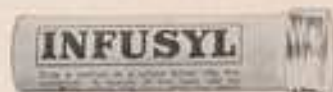


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PER VIAL  
of TEN TABLETS 2/6



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

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For 'Pond' or 'Tank' we've fishes galore,  
so pay a visit, to our 'Wonderful Store'.

BREEDING TRIO'S 8"-10" GOLDFISH OR SHUBUNKINS £2. YOU CAN SEE WHAT YOU ARE BUYING AT THE "CENTRAL"

**NEW ARRIVALS**

Funnels	46 to 76
Green Teuch	3- & 4-
Large Goldfish 7-4"	10-
Small Orly	26
7" Galico Coverts	15-
Medium Goldfish	3- to 76
Small Goldfish & Shans	1- to 26

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Procter	36-
General External	22-
General New External Type QK	22-
Wheat External	22-
Impe-Pet	22.6, 29.6
UNO	
Dut-Adl.	18-
Im-Adl.	15-
Im-Adl. "Poplar"	16-
"Poplar" with even indicator	12.6
Perist Matic	24.6
Wheat	10-, 12.6, 18-

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Quilko	22.6
Sina	42-
Hoko	36-
Zoobeko Total	35-
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Zoobeko Junior	36-
Maurose Major	24-
Maurose Minor	21-
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Dymax MA-1 A.C./D.C.	19 6 2
Dymax MA-2 A.C. only	19 1 8

**PISTON PUMPS**

Hy-do Junior New Super	427.6
Hy-do "A"	120-
Hy-do "B"	162-
Hy-do "C"	258-

<b>Thermometers</b>	<b>Filters</b>
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Blue Gem 4.6	Conny 4.6
Mazury Gem 6-	Windmill Hand 18.6
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T. Pices 94	Conroy 18.6
Clamps 1-	Premier Bio
Artisan	Isolink Sub-
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Fiber Carbon 2-	Star Jet 17.6
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Bassoras	3-	Fluocerosus	12-
Angels 2.6 & 3.6		Jack Dempsey's	3.6
White Cloud		Large Green Sailfin	
Mistakes	2.6	Mistakes from 8-	
Flames	2.6	Black Angels	10-
Beacons	2.6	Black Lacy	
Black Widows	2.6	Angels 3- to 16-	
Plays, various		Tiger barbs 2.6 & 3.6	
from 2.6		Glowlight	3-
Swordtails		Penguins (each) 3.6	
various, from 3-		Bumble Bees	
Schubert barbs 2-		(each) 3.6	
Schmiedels	2-	Mollies, Black	
Guppies (pair) 1.6, 3-		from 3.6 & 5-	
Hanloquas	2-	Lesser tetras	4-
Cherry barbs	3-	Goldfish Adults	4.6
Nigger barbs	2-	American Cichlids	6.6
Chequer barbs	2-	Oncelium Cox	9.6
Red Eyed Tetra	3-	Fighters	10-, 12.6
Whiplash Cox	9-	Syrinx	4-

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Freshwater Fishes of the World by Günther Series 65-7 F. & P. 2.6

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**BOW-FRONTED AQUARIUM**  
48" x 12" x 15" .. £28 0 0  
36" x 12" x 15" .. £18 10 0  
Standard Bow £11, £13 10, £11 5 0

**ADULT RARE FISHES**

Pelmatochromis Ardensis	7.6 & 18-	each	
Elephant Nose Fish	25-	each	
Black Veilfin Guppy	15-	pair	
Rose Aces	10-		
Kelly Fish Nigerian	9-		
Kelly Fish Brazilian	9-		
Crown Loach	12.6 & 15-		
Sunfish from	7.6 to 20-		
American Cichlids	7.6 to 15-		
Malayan Angels	6-		
Ramirez	6-		
Weather Loach	2-		
Silverstarks 4"	32.6		
Furcanch	4-		
Red Veilfin Guppy	10-	pair	
Red Tail Shrike	10-	to 15-	each
Ancistrus 4"-5"	20-		
Adult Diverston	12.6	pair	

Our minimum order for Aqua is £2.6  
Large of 12.6 pd. is made for container.  
Coverage charges, by fast passenger train  
and telegram within time of arrival.

**NYLON COATED AQUARIA, STOCK SIZES**

24" x 12" x 15"	£3 10 6
18" x 10" x 12"	£2 7 6
White or Black covers	18.6 & 25-

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12" x 6" x 6"	10-	24" x 12" x 12"	48-
10" x 6" x 6"	8.6	24" x 12" x 15"	52.6
14" x 8" x 8"	14-	30" x 12" x 15"	70-
16" x 8" x 8"	15.6	36" x 12" x 15"	82.6
18" x 10" x 10"	21-	48" x 12" x 15"	110-

**COVERS STANDS**

18" x 10"	14.6	14" x 10" x 36"	32-
24" x 12"	21-	24" x 12" x 36"	40-
30" x 12"	26-	30" x 12" x 36"	48-
36" x 12"	32-	36" x 12" x 36"	56-

Aquarium covers sent by post only at customers risk.

**PLANTS**

Agrostis	6d. each	5-	doz.
Valis. Tyra	6d.	5-	"
Valis. Spiralis	6d.	5-	"
Arundo	6d.	5-	"
Ludwigia	6d.	5-	"
Hydrophila	6d.	5-	"
Cryptocoryne	2- and 3-		
Wistaria	1.6	2-	
Great Hydrophila	1.6	2-	

By post, add 1.6d.

**HEATERS 25w to 150w**

Uco	6.6
F.S. Standard	7.6
Wheat	8.6

**FOODS**

Exotic Flakes	1.6
Exotic Flakes	1-
Branston	1.6 & 2.6
Barna	6d. & 1.6
Strimp	5d. & 1.6
Dry Diptera	6d. & 1.6
Ligality	2-
Influy	2-
Elbe	2- & 4.6
Hubbe	2- & 7-
McLaren's	1.6, 2.6, 6.6, 17.6
Reise Stamp	2- & 2.6
Herrman's	1.6 & 2.6
Wardley's	6-, 6.6, 2.6, 2.5, 1.2
Long Life	2.6 & 3.6
Tetra Min	1.10, 3-, 6.6, 22.6, 70-

Add 1- up to 10-; 1.6 up to 20-; 2- up to £1; 3- up to £1; over Free CARRIAGE AT COST ON AQUARIUMS, STANDS, AND TANKS

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AVAILABLE IN 2 lb POLYBAGS OR LOOSE AT YOUR STOCKIST NOW.

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- A guide to Aquarium Plants and their Cultivation
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  - Principles of Aquarium Management
- all in "Exotic Tropical Fishes" (Looseleaf Edition £7 10 0).

For the first time in aquarium history, hobbyists can add to their library an aquarium book that covers every area of interest so thoroughly that each major field has a whole book, not just a chapter, devoted to it. Think of it! A whole book about plants! A whole book about aquarium management! A whole book about breeding tropical fishes commercially! A whole book about specific recommendations for keeping hundreds of species and varieties of interest to hobbyists! All of these books combined into one fabulous, colourful (576 beautiful colour pictures) volume of almost 900 pages, each page loaded with the kind of information the hobbyist wants and must have to be able to be a real aquarist.



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BREEDING PAIRS OF GOLDFISH 10"-12" .. .. 35/- pair  
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 BREEDING PAIRS OF GOLDFISH 6" .. .. 20/- pair  
 BREEDING PAIRS OF SHUBUNKINS 10"-12" .. .. 35/- pair  
 BREEDING PAIRS OF SHUBUNKINS 8" .. .. 25/- pair  
 BREEDING PAIRS OF SHUBUNKINS 6" .. .. 20/- pair  
 BREEDING PAIRS OF NYMPHS 6" .. .. 30/- pair  
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 BREEDING PAIRS OF GOLDEN ORFE 6" .. .. 30/- pair

2"-3" BITTERLING, ORFE, BASS, GREEN TENCH, NYMPHS,  
 RUDD 4/6 each. 3"-4" GOLDFISH AND SHUBUNKINS 3/6 each

*All above fish are pond bred.*

FANCY COLDWATER—BLACK MOORS and ORANDAS 3" 8/6  
*Car and Currence 10/- extra*

SPECIAL FLAKE FOOD FOR YOUR FISH—ANIMIN  
 1/10 4/6 12/6

THE BOOK OF THE GARDEN POND by G. F. HERVEY  
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SPECIAL ALGAE-EATING POND SNAILS  
 6d. each. 5/- dozen

SPECIAL PLANT OFFER  
 30 Coldwater Plants for your aquarium 10/-  
 30 Coldwater Plants for your pond 10/-

WILLOW TREES	WATER LILIES	MARGINAL PLANTS	COLDWATER PLANTS
Strong young trees ideal for the pond surround. 4/8 each	Green .. 7/8 Pink .. 10/8 Red .. 12/6 Yellow .. 12/6 (3 year old plants)	Water lily .. 2/6 Bulrushes .. 2/6 Kingcapp .. 2/6 12 Assorted Marginal Plants 12/6 Good strong plants	Elodea Densa .. 6d. Elodea Crispa .. 6d. Willowmoss .. 1/- Moneywort .. 6d. Ludwigia .. 6d. Hairgrass .. 1/- Mystrophyllum .. 6d. Hornwort .. 6d. Vallisneria .. 6d. Hygrophila .. 6d. Cryptocoryne .. 1/- Beckettia .. 1/- Willow .. 2/6 Cordata .. 2/6 Hornwort .. 2/6 Anacharis .. 1/-

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4' 4" x 3' 4" 9-15" deep £3 19 6      6' 4" x 4' 4" 9-18" deep £5 18 0  
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 SHEPHERD'S BUSH, W.12  
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20- PLANTS FOR 10-

2 Cryptocoryne Beckhamii	4-
1 Cryptocoryne Haerulliana	7.8
6 Bucegia	4.8
2 Amazon Chain Swords	3-
2 Micro Sagittaria	1-
Four for 10-	20-

### OFFER No. 2

30 Assorted Tropical Plants 10/-

### OFFER No. 3

36 Assorted Tropical Plants 20/-  
(including Cryptocorynes, Wisteria)

## BOW-FRONTED AQUARIUMS

40in. x 18in. x 15in. bow-fronted aquarium with wrought iron bookcase stand £26.99 complete.  
36in. x 12in. x 15in. bow-fronted aquarium with wrought iron bookcase stand £18.99 complete.  
Available in prime frames, black & gold, and chrome.

### WITH PLAIN STAND

40in. x 18" x 15"	£21.00
36" x 12" x 15"	£15.99
24" x 12" x 15"	£11.99

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

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

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

### STANDS

18 x 10 x 36	28-
24 x 12 x 36	45-
30 x 12 x 36	50-
36 x 12 x 36	55-

### REMEDIES, etc.

Aquaristic	3.4	Clarity (Not by post)	1.4
Betamax White Spot	2-	Liquatone	1.9
Clare	2-	Oxalotone	1.4
Vivo Salt	2-	Brownish Fertilizing	2.4
Sea Salt	1.6	Tablets	1.8

Please add 1/- extra postage on appliance orders up to 10-, 1.5 up to 20-, 2- up to 30-.

## THERMOSTATS

Constant External	each	33-
Constant New External	each	33-
Type QK	each	22-
UNO	each	18-
Out/Adj.	each	18-
In/Adj.	each	15-
Bu/Adj.	each	10-
"Popular" with reset	each	12.8
Indicator	each	21-
Buss (with Nema)	each	26.8
"E-E" Switch	each	26.8

## THERMOMETERS

Mercury	each	4.4
Gum	each	4.4
Plastic Backed	each	5-
Stair Step Gum	each	5-
"E-E" Dummie	each	4.4

## FILTERS

"Wardley" Plastic	each	19.9
Quartz Filter	each	12.8, 15-
"Wardley" Biological	each	10-
Ammonium Filter	each	10-
"Wardley" Regener	each	6-
Inside Filter	each	2.8
Canister Filter	each	17.8
Air Lift	each	22.8
"Water King" Outside	each	8.3
Bottom Filter	each	17.4
Ornamental Bank	each	3.8
Yielder	each	3.8
Uno Polytube	each	3.8

## AERATORS & PISTON PUMPS

Monitors	each	21-
Fairy	each	27.8
Star	each	36-
Rena	each	42-
ZooTek's Total	each	187.8
Hydra Junior	each	136-
Hydra "A"	each	185-
Hydra "B"	each	250-
Hydra "C"	each	250-

## HEATERS

"QUEENSBOROUGH"	each	21-
75w, 40w, 60w	each	21-
100w, 100w, 120w	each	18-
150w	each	18-
Bona	each	18-
"E-E" Electric Heaters	each	19-
100w, and 150w	each	19-
"E-E" Thermostats	each	36-
Heaters, 100w, and 150w	each	24.8
Pre-set-matic	each	24.8
Low-Pot. Thermostatic Heater	each	22.8
Heater Holders	each	2-

## BACKING PAPERS

STRATA ROCKWORK	each	2.4
PEBBLE BEACH	each	2.4
SEA & SHORE	each	2.4
24in. long x 20in. high	each	2.4
per sheet, or 1.3 per foot	each	2.4

## LIVE FOODS

Brite Shiny Eggs	each	2.4 and 4.8
Cultures of	each	7.8
Neon Worm	each	13.8
White Worm	each	3-
Micro Worm	each	3-
Tablets worms	each	1.4 and 2.9

## BOOKS

Guide to Tropical Fishkeeping	each	36.8
(J. H. P. Reynier)	each	36.8
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## In the Spring— Beware!

by C. E. C. COLE

**G**OLDFISH breeders of many years standing will possibly remember my campaign of some 10 to 12 years ago to help them free their stocks from two very prevalent pests.

Since then there have been many newcomers to our hobby, and enormous numbers of fish have been imported—and the pests are again with us. It is indeed time for another war against these persistent creatures. Relaxation even for one season can undo many years' work. With a fresh breeding season upon us, now is the time to tackle our problem vigorously and with the best chance of success.

For the benefit of newcomers, and to refresh the memory of many old hands, I will give a description of the pests, details of their life histories as far as I know them, the most effective methods to drastically reduce their numbers, and methods of breeding fish which will minimise the chances of introducing the pests into fry tanks or ponds.

The pests are related. Both are minute flatworms or flukes (platyhelminths), so small that they are invisible to the unaided human eye, and here lies the first danger. Goldfish keepers may look at their fish, see nothing obviously wrong (sometimes), and assume the fish are free from trouble. Yet they may be smothered in trouble from snout to caudal, or hiding potential death beneath their opercula or folds of the throat.

Treatment for one pest will not eliminate the other, for although related the two are vastly different in characteristics and habits. One is livebearing, the other egg-laying, one is active all 12 months of the year, the other is seasonal, one is free-moving, the other staying put and, finally, one is easy to deal with, the other extremely difficult.

The one that is easiest to deal with is the livebearing *Gyrodactylus*.

This is the creature that roams freely in vast numbers over the body and fins of the fish, and appears to be active throughout the whole year. I have found them coating a fish removed from under ice—the fish torpid, but the worms as active as in midsummer. What they do to the fish—whether they destroy its mucous covering or pick at its flesh, or just tickle it to death—is problematical.

Particularly in early spring, just when the fish should

start feeding and coming into breeding condition, the reverse occurs. The fish wobble crazily about the surface of the water for a week or two and then die. If you have fish like this in your ponds, they merit immediate attention. At the same time there may be other pests assisting in their decline, but of this more later. My first reaction would be to treat for gyrodactylids.

To check your fish, remove them from the pond one at a time and place in a container in such a small quantity of water that only their fins will be submerged. They may kick for a moment or two but will then usually lie quietly on their sides, permitting inspection with a low-power lens. Look first at the caudal fin. At first you may see nothing, for the worms are quite tiny, almost transparent and practically without colour. It is usually their constant movement that focuses attention upon them. They stretch, contract, wave their bodies in the air (water), and loop themselves along in the manner of a leech or "looper" caterpillar.

When you spot one you will probably see dozens of others. Have handy a gallon of fresh tap water of the same temperature as that of the pond or aquarium from which the fish has been taken, and place it in this after inspection. If one of your fish shows signs of infestation then it is safe to assume that all others kept in the same pond or aquarium are carrying some of the pests.

Examine the water left in the inspection container after removal of the fish. It is probable that in its movements the fish has dislodged a number of gyrodactylids, and it should thus be possible to further examine the creatures under a microscope to see more of their structure.

They can then be seen to possess at one end a pair of elongated head organs and a mouth. There are no eyes. At the other end the most prominent feature is a pair of beautifully curved hooks, surrounded by a fleshy circle of smaller hooks. This is the organ of attachment, and is known as the haptor.

At first you may think it has a second pair of large hooks in the middle of its body, sometimes more apparent than others. These in fact belong to the developing embryo within the parent body. Indeed sometimes within the embryo a second pair of hooks can be discerned, and it is claimed that these belong to a third generation developing within the second. I sometimes wonder whether in fact this is really a second embryo at a less advanced stage of development than the first—a younger brother or sister, as

it were, instead of a son or daughter. Difficulty of dissection, however, has precluded me from investigating this idea further.

Having established the fact that your fish have unwelcome visitors, it remains for you to remedy the situation. Into the gallon of fresh water in which the infested fish is now moving about, drop about 8 or 9 drops of Dettol, and watch the effects. If fairly strong the fish will open its opercula and move swiftly about the aquarium—it is obvious that it doesn't like the Dettol. After a minute or so it will become inactive and turn partly on to its side. The reaction is always the same, and very alarming if you are seeing it for the first time. But do not worry. Take the fish out after several minutes—9 at the most, and transfer to another clean container, where it will recover in any time up to 3 hours.

A weak fish, like those I described above, cannot stand such a long immersion, and will need two baths of much less duration (from 1 minute to 3 minutes). These weaker fish must be isolated to avoid reinfesting those completely freed of the worms, and fed, if they are well enough to eat, with live food.

Those of you as anxious as I was to know precisely what happens to the worms can check my findings as follows. Place an infested fish in a small quantity of the Dettol solution so that again it just lies on its side with fins submerged. The reaction of the worms as the fluid touches them is instantaneous. They release the haptor and stand on their heads in an S shape. After a feeble movement or two they release hold with the head organs and fall dead or dying to the bottom of the dish. Even if they are not killed, the treatment remains effective, forcing the worms to leave the fish.

The Dettol possibly has an antiseptic effect upon any slight wounds or abrasions of the fish's body, but whether this accounts for the subsequent liveness of the fish is anybody's guess.

The treatment is easy and effective. Only the weakest fish, destined for an early death anyway, may succumb. My advice to anybody purchasing new stock, no matter from what source they come, is to give a precautionary Dettol bath, and an annual bath thereafter before the breeding season is far advanced.

In my next article I will deal with the second pest—a real killer, but a fascinating creature never the less.



## B O O K

### REVIEW

- Handbook of Lizards* by Hobart M. Smith. 1946. 50s.  
*Handbook of Snakes* by A. H. and A. A. Wright. 1957. 2 vol. 126s.  
*Handbook of Frogs and Toads* by A. H. and A. A. Wright. 1949. 55s.  
*Handbook of Turtles* by Archie Carr. 1952. 55s. Comstock Publishing Associates (a subsidiary of Cornell University Press, New York, U.S.A.).

THE four books listed above, together with *Handbook of Salamanders*, now unfortunately out of print, constitute a superb coverage of the herpetology of a

large country. Each species native to the United States and imported species that have been added to the U.S. fauna, together with Canadian species, are dealt with systematically. All the books are lavishly illustrated and several photographs of each species are provided. All reach a high standard and are invaluable to those interested in the branch of herpetology that they cover. They are most useful to collectors of American specimens, as not only do they provide useful identification both by the detailed descriptions of appearance and colour and by the photographs, but they give full details, as far as is known, of the habitat, habits and problems about each species.

*Handbook of Lizards* can be taken as typical of the high standard achieved. Part I is of an introductory nature and in 28 pages gives a well-balanced and most informative account of lizards in general. It provides a most reliable coverage of their Zoological Position, Characteristic, Distribution, Major Groups, Fossil History, Structure, Habitats, Life History, Habits, Folklore, Economic Importance, In Captivity, Collecting, Preserving, American Saurologists and Problems. This section of the book is a mine of information for anyone who wishes to acquire some background to the group. Part II, the rest of the book's

*Please turn to page 7*

## Don't Get Saddled with a Sea Horse!

by

Dr. JAMES W. ATZ,  
Curator, New York Aquarium

Photographs by the N.Y. Zoological Society

PEOPLE in need of information about wild animals or fishes naturally turn to a zoological park or aquarium for help. The number of telephone calls and letters such institutions receive about any particular subject is therefore a good barometer of current public interest in it. When, a few years ago, the New York Aquarium was suddenly bombarded with questions about the care of sea horses, we know that something new had happened to make people aware of the sea horse as a pet. We soon learned that an enterprising Florida concern was selling, for a few dollars, a kit containing two live sea horses and what was declared to be all the apparatus necessary to keep them in captivity. From long experience, we quickly realized that we were "in for it", for on us would fall the unpleasant duty of informing numerous well intentioned but misinformed people that in order to expect any success in maintaining sea horses in their homes, they would have to spend a good deal more money and effort than the vast majority would ever be prepared to do.

The duty was made doubly unpleasant because we realized that to almost everyone sea horses are diminutive, harmless and charming creatures that evoke mixed feelings of amusement, wonder and even affection. In fact, after 25 years of association with public aquariums and the public, I am more certain than ever that the sea horse is the most popular of all fishes, and I am sure other professional aquarists would agree with me. For years people have wanted to keep these captivating fish as pets—and for nearly as long as it has been in existence, the New York Aquarium has tried to discourage most would-be sea horse owners. Dr. Charles Haskins Townsend, who directed the institution from 1902 to 1937, did so in its first guidebook, and his successor, Dr. Charles M. Breder, Jr., lent his authority to the effort. The Aquarium's present director, Christopher W. Coates, has periodically attempted to educate the public on this score in his newspaper column on tropical fishes and home aquaria, which has appeared each week in the *New York Sun* and the *New York World-Telegram and Sun* for the past 32 years.

The real purpose of all these publications, and countless letters, interviews and telephone calls as well, has been not to prevent people from keeping sea horses at home, but to make them aware of the equipment and know-how necessary to give the fish a reasonable chance of surviving. Sea horses require sea water and living food, and it is these two deceptively simple requirements that make them so difficult to keep.

Sea water is a complex substance that begins to deteriorate, as far as its ability to support marine life is concerned, practically as soon as it is removed from the sea. In order to slow down this deterioration, it is necessary to aerate the water more or less constantly and, even better, to circulate it, filter it and regularly store it for extended periods in the dark. When hardy creatures like sea horses are to be



Two spotted sea horses (*Hippocampus erectus*, once known as *H. hudsonius*), the common species of the U.S.A. Atlantic coast

maintained, however, it is possible to get by with aeration alone. This calls for a small air-pump to force a continuous supply of air through a tube into a porous stone kept near the bottom of the tank and from which the air emerges as a rising stream of many small bubbles and thus aerates the water. It is even possible to use artificial sea water for sea horses, but this, too, requires aeration to prevent a dangerous build-up of poisonous carbon dioxide. Moreover, a marine aquarium must be kept scrupulously clean, for the least bit of decaying organic matter hastens the deterioration mentioned above. These are some of the reasons why the hobby of keeping marine fishes as pets has never rivalled its freshwater counterpart. Sea horses can never be as easy to maintain as goldfish or guppies, simply because they come from the sea. Experienced fish fanciers have long recognized this fact—and have dreamed of a freshwater sea horse. So far, despite recurring tales of sea horses inhabiting lakes and streams in the interior of Borneo and other remote places, a species of sea horse from fresh waters has remained a dream. The idea is not entirely fanciful, however, because more than one species of freshwater pipefish is known, and pipefishes and sea horses are fairly closely related, both belonging to the same family.

As marine fishes go, sea horses are one of the hardier and more adaptable varieties, except when it comes to feeding. In Nature they feed on small crustaceans, those tiny relatives of the crab and lobster so aptly called the "insects of the sea", and very few sea horses ever learn to eat anything else. Unless an object is of the right size and is



Probably the favourite aquarium fish of most visitors to public displays, the sea horse tempts many people to try to keep an "aquatic stable" of them. They are, however, most difficult for the amateur to keep.



Male dwarf sea horse (*Hippocampus zosterae*)



Female dwarf sea horse (*Hippocampus zosterae*)

moving in the correct manner, they will ignore it. The problem of obtaining food for the sea horses used to be a serious one even for the largest public aquariums. At the old Aquarium in Battery Park, we had a collector who spent a good deal of his time searching along shores for *Gammarus* to feed our sea horses. Unfortunately, the supply of this small crustacean is seasonal, which made it almost impossible to exhibit sea horses the year round. In the early 1930s, however, it was discovered that the eggs of the common brine shrimp could be stored in a perfectly dry state for several years and then would hatch within 2 days after being put into salt water. This provided a practical way to culture sea horse food on the premises. Since brine shrimp eggs can be found by the millions around some brine ponds and salt lakes, they were soon being marketed at reasonable prices. In many ways, the brine shrimp has proved an ideal food for captive fishes that demand small, living prey; both amateur and professional aquarists, for example, have been able to breed and rear sea horses on it alone. But a lot of brine shrimp are needed to satisfy a single sea horse and in order to obtain viable hatches of good size, the water containing the eggs and larvae must be vigorously aerated.

The necessity for artificial aeration in the successful maintenance of captive sea horses, both for the sea horses themselves and to rear their food, brings us back to the sea horse kits which purport to provide the purchaser with everything necessary to keep the fish properly. Such kits do not include an air pump or any sort of aerator. What they generally contain is two live sea horses in a plastic bag with a small amount of sea water, a vial of brine shrimp eggs and a package of salts that will produce a rough approximation of sea water when dissolved in a certain amount of water from the tap. An aquarium to hold the sea horses may or may not be included, but no containers in which to hatch the brine shrimp are provided. On the contrary, the purchaser is usually instructed to dump some shrimp eggs into the aquarium with the fish periodically, a practice that soon leads to an unsightly and unhealthy accumulation of egg shells and unhatched eggs.

The kits have additional shortcomings. If they supply an aquarium, it is too small, especially with no artificial aeration; if they do not, the advertisements describing them imply that a goldfish bowl would be adequate, which it definitely would not. The artificial sea water is usually of an inferior quality, and not enough of it is provided, in any event. Finally, the instructions accompanying the kits are far from adequate.

With all these handicaps, in addition to the legitimate difficulties that experienced and well equipped amateur aquarists have in keeping any kind of marine fish, it would be expected that extremely few owners of sea horse kits would obtain satisfaction from them.

A further complication was added by the particular species of sea horse that the dealer decided to use, namely the dwarf sea horse (*Hippocampus zosterae*). This tiny fish, which may be a little less than an inch long when adult and which never exceeds 2 inches, adapts well to aquarium life and might seem to have been a good choice, but its natural life span is hardly more than a year and is usually less. Dr. Kirk Strawn made an extensive study of this species and found that the dwarf sea horse attains maturity when only 2 or 3 months old and that few individuals live to be 1 year old. No one will ever know how many unlucky purchasers of sea horse kits received specimens that were near the end of their normally short span of life.

Early last year a welcome opportunity to take action against this waste of sea horses and misleading of the public came to us through the National Better Business Bureau of New York City. As a result of our collaboration, the Bureau published, in May of 1962, a *Service Bulletin* (Periodical no. 1784) in which it recommended more realistic advertising by the firms—there were at least three of them then—selling

sea horses. The principal part of the *Bulletin* consisted of extracts from a long letter I had written covering the points I have made in the present article. The *Bulletin* also reproduced Director Coates' most recent tropical fish column dealing with the same subject, to which an inspired copy editor of *The New York World-Telegram and Sun* had given the succinct heading: Don't Get Saddled With a Sea Horse. We have, of course, no way of knowing how effective our various crusading efforts, including this one, may be. At any rate, I was reassured to learn from Dr. Strawn that in spite of all the depredations of collectors, there is no danger at present of exterminating the dwarf sea horse, even on the collectors' favourite grounds in Florida. Nevertheless, any waste of wild life ought to be discouraged and halted if possible. This minor crusade of ours is not yet finished.

One of the ways in which we try to help people with their sea horses is to give them a list of up-to-date, authoritative articles and pamphlets on the care of the sea horse in captivity. In the expectation that readers might be interested in keeping these fish (in spite of the present article!) I am appending this list.

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## DISEASES OF FISHES

### Gill Inflammation

**I**NFLAMMATION of the gills is a highly contagious disease and is more than probably due to a bacterial or virus infection. When a fish is attacked the gill becomes extremely red, because intense inflammation and swelling will occur. The breathing frequency will increase as the normal structure of the gill is destroyed. The infection can also present itself as a secondary contamination.

This is one of these unfortunate diseases where very little is known either about the disease or of a formulated cure. The aquarist can only isolate the fish in a well-balanced tank, feed with a good substantial diet including plenty of live foods and ensure thorough cleanliness.

R. E. Macdonald

# The Three-horned

by ROBERT BUSTARD, B.Sc.

*Photographs by the author*



This three-horned chameleon is about to retract its tongue, with which it has just trapped a bluebottle on the distended tip.

MOST reptile enthusiasts turn their attention at some time to chameleons and it is usually the most bizarre species that attract attention. The most readily obtainable of these is *Chamaeleo jacksoni*, sometimes called Jackson's chameleon to distinguish it from another species of three-horned chameleon (*Chamaeleo snousi*) from West Africa. As the accompanying illustrations show, Jackson's three-horned chameleon has the appearance of a miniature prehistoric monster.

*Chamaeleo jacksoni* is a native of British East Africa and most of the specimens that the author has kept have been captured in Kenya. Males possess three horns on the head: one on the snout (the rostral) and one in front of each eye (the preorbital). In female specimens these horns show variable reduction. Some females possess as well developed horns as male specimens, in others they are reduced and in some totally absent. Coloration, although variable, is usually most handsome. The specimen shown just protruding its tongue was mottled in shades of green with pale yellow-green interrupted longitudinal blotches on a green ground marked with extreme dark green and near black. The same specimen when photographed with a bluebottle trapped on its extended tongue was uniform bright grass green with a yellow-green longitudinal line, the edges of which were indistinct.

#### Housing

I frequently hear of people keeping chameleons in aquaria measuring 24 in. by 12 in. by 12 in. and, indeed, letters are received asking why these chameleons are not

feeding or are trying to escape. The truth is that chameleons are arboreal lizards spending their lives in trees and bushes, and unless the collector is willing to take the trouble to imitate this type of habitat in captivity then it is unfair to try to keep chameleons or other arboreal species.

A chameleon vivarium should be tall—they must be able to climb, but the floor area is less important. *Chamaeleo jacksoni* measures about 10 in. in total length and a suitable vivarium would be 36 in. long, 24 in. broad and 36 in. in height. Glass aquaria are not suitable for housing any secretive or nervous reptiles. They fail to provide a feeling of security unless all but one side is painted a dark colour or covered with cardboard. Chameleons are slow moving, defenceless lizards which rely on camouflage—colour change, shape and behaviour, to escape from their enemies. They will not be happy in a glass box where they can be observed from all sides. The vivarium should have opaque back, sides and top, and a glass front. It is particularly stressed that the top should be opaque.

I have successfully kept chameleons in wooden vivaria but for many years now (see *The Aquarist*, 1958, vol. 23, no. 8, p. 168) all my reptiles have been housed in metal vivaria, which possess innumerable advantages. There is no fire risk from warm bulbs nor does warping take place as a result of heat and humidity. My method of heating, outlined in the above-mentioned article, solely by means of pearl electric light bulbs of the ordinary domestic type, has proved most successful over the last 10 years. My *Chamaeleo jacksoni* were heated by this manner to a temperature of 77°F (25°C) during the day, when the light was on for



Head of a male three-horned chameleon



# Chameleon

10 hours. The night temperature varied between 50° and 59°F (10-15°C) depending on the time of year.

The floor of the vivarium was covered with sandy soil to a depth of 2 in. and dry moss was placed on top. Dead tree branches were then arranged so that the chameleons could reach food in any part of the vivarium with their long tongues. This may sound common sense but how often one sees a chameleon with introduced flies resting on the roof or a corner of the vivarium just out of reach of the chameleon's tongue.

Next, living foliage should be provided, and there is no hard and fast rule about this. Ideal are growing plants with woody stems, but in the absence of these dead tree branches provide good climbing facilities and can be augmented with pot plants or jars of cut foliage. Orange or grapefruit pips placed in John Innes no. 1 potting compost in small pots soon produce healthy seedlings which grow rapidly in warm vivaria. The particular collector will much prefer the appearance of these to jars of cut foliage, but either are suitable for the chameleons.

## Feeding

Chameleons feed on winged insects, and flies, bluebottles, butterflies, moths, beetles, cockroaches and grasshoppers are all suitable. It can be difficult to keep a steady supply of food available, other than bluebottles from purchased gentles, and it is advisable to experiment as chameleons do show individual feeding traits. Some specimens will accept gentles and others relish mealworms, which are an excellent standby. The really keen collector could culture locusts. An initial culture of locust hoppers (day-old hatchlings) can be obtained from the Anti-Locust Research Centre, Princes Gate, London, S.W.7, who will also supply a booklet on their care and breeding. They are easy to maintain with heat and grow rapidly on a diet of grass and bean. The hoppers provide excellent food for all insectivorous lizards and pass through about half a dozen moults before becoming adult, when they measure slightly in excess of 2 inches. Some adults must always be kept for breeding but once these have bred they too can be used as food.

Chameleons capture food on their tongue and the two photographs of one of my specimens shows the tongue at the commencement of projection and when it is being withdrawn. In the latter case note that the tongue has enveloped the bluebottle in the distended tip. Chameleons drink greedily and some specimens soon learn to drink from a saucer. Initially at least, the vivarium should be sprayed with water on alternate days.

*Chamaeleo jacksoni* is not one of the easiest species to keep and beginners would do better to try one of these recommended previously (*The Aquarist*, 1962, vol. 27, no. 4, p. 72). The three-horned chameleon thrives better, in my experience, in the outdoor repurary mentioned in the above article and in more detail in *The Aquarist*, 1962, vol. 26, no. 12, p. 249. Chameleons are likely to cost from about 15s. to 40s., depending on the species. *C. jacksoni* usually costs about 35s.

At the start of the article the superficial resemblance to certain prehistoric reptiles such as *Triceratops* was mentioned, but this resemblance does not end there. There has been much controversy as to the function, if any, of the three horns. It was therefore with great interest that, several years ago, I watched two males in my chameleon greenhouse fighting by interlocking their horns and pushing. On several occasions one male lifted the other right off the branch because of their interlocked horns, and then



The tongue of this three-horned chameleon is about to be projected at the bluebottle on the twig (right)

with a shake of the head threw him to the ground. Most fight behaviour is bluff when it occurs between animals of the same species. Reproductive fighting serves to space out males in the habitat and this can be achieved without injury to either combatant.

There is much to be discovered about the lives of many species of reptiles and amphibians and much useful information can come to light from the habit of writing down notes at the time. Such a record of events in one's collection should be kept by all serious collectors.

Those who would like to read my note, entitled "Use of horns by *Chamaeleo jacksoni*", will find it in the *British Journal of Herpetology*, vol. 2, no. 6, p. 105.

## Book Review

*continued from page 2*

357 pages, is a detailed family by family and species by species account. I have used this book continually now for nearly 10 years and have found it a most useful source of information. As well as a bibliography of the literature cited, there is a valuable list of general literature and, to me a most useful section of maps showing the distribution of many species followed by States lists of species and literature on them. *Handbook of Lizards* is an excellent volume because it does not try to paint a finished picture. On the contrary it highlights the tremendous ignorance about lizards and that this problem is still acute in the United States may come as a surprise to the average British reader. To give but one example, there are only three native species of geckos and four that have been introduced into Florida. Writing of one of the three native species (page 82), Professor Hobart Smith says "The life history of this species (*Gehyra brenni*) is unknown. Presumably eggs are laid." These two sentences serve to show the scope that still exists for collectors to make unique observations on their captive specimens. Of course, in some species, the life history is well known, but in most cases there is ample opportunity to make original observations.

All four volumes are highly commended and it is hoped that similar standard works may appear for other areas of the World.

Robert Bustard

# Lighting and Decorative Aquaria

by A. JENNO

WHERE an aquarium is used to display a collection of fishes and plants as a highly interesting and informative exhibit, much of the final effect can be made or marred by the way in which the lighting is applied.

The primary functions of lighting over a decorative aquarium are to provide illumination of such an intensity as to show the inhabitants at their best and to provide a substitute for the natural light which all living things require in order to grow and reproduce. It therefore follows that if the owner of an aquarium wishes to fulfill these conditions he must find the correct value of light which the aquarium requires and he must apply this daily.

Many novice aquarists are informed at society meetings and other aquarists' gatherings that a certain size tank requires two bulbs of a stated wattage and that these should be switched on for a certain number of hours daily.

Often nothing is said about the amount or type of plant life in the tank, the direction from which the light should be applied or the method that should be used to direct the light into the tank. Like many other facets of the hobby, the amount of light required by an aquarium is not standard for a certain size tank, and never will be. It is dependent upon various factors, many of which are not related, and the correct value of light therefore is one that must be found by trial and error. The purpose of this article is to suggest a method whereby this trial and error may be reduced to a minimum and probably to attain a more satisfactory end result.

The lighting requirements of a decorative aquarium are then: (a) that the light should be of such a strength to display the fishes and plants and the overall aquascape in as pleasing and natural a manner as possible; (b) that the light should be applied in such a direction as to show up the aquarium inmates at their best; (c) that the total amount of light applied daily should be of the correct value to maintain the aquarium in a healthy and flourishing condition; (d) that from a point of view of economy the means of applying the light should be as efficient as possible.

The first point to be considered will be the type of reflector employed. This should cover the top of the aquarium completely and its inside surface should have as much reflecting power as possible. Plastic reflectors are most inefficient because a great part of the light output from the lamps passes straight through them and is lost. Metal reflectors, on the other hand, with suitably treated inside surfaces are very efficient and practically all the light will be reflected back into the aquarium. Reflectors for tanks above 2 feet in length should have positions for at least four lamps to be inserted, as a much better distribution of light can be obtained by using several small lamps rather than one large one. The shape of the reflector should be such that as much light as possible is applied from the front of the reflector to show up the colours of the fishes and to encourage the plants to grow towards the front of the aquarium.

Having obtained a suitable reflector, it should be placed on the aquarium and lamps of varying wattages inserted until a value of light is found which the aquarist considers pleasing from the decorative point of view and also gives the most natural effect. This is obviously a matter of personal preference and will therefore vary from one aquarist to another for a certain size tank.

The light should be switched on and off at the same times every day to keep the conditions constant. A period of about 8 hours' light per day is a good figure to start with. It is then a question of waiting to see how the aquarium develops under the amount of light applied, and after a few weeks one of the following conditions will probably exist:

- (1) Brown algae may have started to develop on the glass and rockwork and the plants will appear to be dying off.
- (2) Green algae may have started to develop but the plants will still be healthy, unless the green algae have reached the advanced state where blue-green forms are present and the mass contains small gas bubbles. In this case it will cover the plant leaves as well as everything else in the tank and eventually kills the plants.
- (3) There may be only a minimum of algal growth, the plants will be flourishing and the water will be crystal clear.

If condition (1) exists it is a sign of deficiency of light, and the best way to overcome this is to increase the time for which the lights are switched on daily. Do this in hourly stages, for if the increase is too much green algae will result. Remove as much of the brown algae from the aquarium as possible and then wait; if the adjustment has been correct, condition (3) should result.

If the light applied to the aquarium has been too much, then condition (2), with green algae, will appear. This subject receives much attention and discussion among aquarists and the usual cure suggested is to cut down on the wattage of the lamps or to shorten the time for which they are switched on. These suggestions are quite correct, but having taken the trouble to find a light value which displays the aquarium in the desired manner, the aquarist will surely consider that any decrease in the wattage of the lamps, and hence their light output, will only detract from the beauty of the aquarium.

It is therefore suggested that, instead of cutting down the light, more plant life should be introduced until a balance is reached where the plants absorb enough light to minimise the growth of the green algae. Of course, if the aquarium is already fully planted, then the answer is to shorten the time for which the light is switched on, but most decorative aquaria, especially those belonging to beginners in the hobby, are notoriously underplanted anyway, so there is usually plenty of scope for increasing the plant collection.

It should be stated, however, that a decorative aquarium will usually fare better if only two or three varieties of plants are kept, rather than one or two of each of perhaps a dozen different species. Some attempt should also be made to use plants whose light requirements are approximately the same or confusion will possibly result.

The third condition mentioned is, of course, the ideal one, a crystal-clear tank with hardly any algae present and good plant growth. If the aquarist is skilful enough or lucky enough to achieve this condition at the first attempt then he needs no advice from this article!

A sign of a healthy aquarium is always its smell. If a clean, sweet odour is present then all is well, but if anything at all unpleasant can be detected, steps should be immediately taken to find the cause and rectify it.

## COLOUR in and Around the Pond



*Firecrest (centre) is a lily that grows well in the shallow pond*

by LAURENCE E. PERKINS

*Photographs by the author*

**O**RNAMENTAL ponds are usually described as formal or informal. Very often, the only visible difference is in the shape, anything not conforming to a geometrical outline being described as informal. This is a great pity, for if a pond is really informal and pains are taken with its surrounds, very charming and colourful effects may be achieved, with twofold results. With informality goes the ability to amplify the pond's vicinity by creating a bog area as well as a rock garden, and by doing this the tedium of trimming and tidying the pond's edge (a must with formal designs) is avoided.

### **In the Pond**

The predominant colours of the majority of aquatic and marginal plants are yellow, blue and white, and if a surfeit of these colours is to be avoided a certain amount of thought is necessary when planning a colourful pond. Since a very wide variety of marginal plants can be obtained with blooms of the colours mentioned, their ultimate selection can be postponed until suitable water lilies possessing blooms of other hues have been decided upon.

Leaving aside white and yellow then, let us concentrate upon reds and pinks when considering the lilies. A wide range of shades is available in these two colours, the factors controlling individual choice being pond area and depth. Average sized garden ponds are of two main categories: those of uniform depth all over and those which possess a shallow and a deep end. In each of these types it is possible to accommodate at least two lilies, even in the smallest of ponds, as the following notes may serve to show.

Among the red varieties *Escharbouck* is, of course, a well-established favourite since it produces very richly coloured blooms in great numbers over long periods, but it requires a good deal of surface area if the fullest advantage is to be obtained from its prolific flowering. It requires from 1½ to 2 feet of water depth to do well. *Sirius*, which has large blossoms of deep red paling to pink at the petal tips, and golden stamens, is also suitable for this depth of water and makes more modest demands upon surface area. *James Brydon*, a close second to *Escharbouck* in popularity, has cup-shaped flowers of rose-carmine and thrives in conditions similar to those needed by the other two.



Trailing foliage and buttercup-yellow flowers of creeping jenny (*Lysimachia nummularia*) cover the rock surround to this pond

For the larger pond with depths of 2 to 3 feet, Attraction is an excellent choice and has very large crimson blooms with sharply tapered petals. Contrasting in size is Proebell, which is of similar coloration and which produces a large number of small blossoms but requires only 1 to 2 feet of water. Two other small red lilies suited to this depth or to small ponds are *Laydekeri fulgens*, with its small bright red flowers, and *L. purpurata*, which has wine-red blooms.

Of the pink varieties two of the most attractive and most readily available are *Marliacea carnea*, with large delicate-hued blooms, requiring 1½ to 2 feet of water, and Firecrest, which freely produces beautiful orange-pink blooms carried above the water surface and is happy in 1 to 1½ feet of water.

From the foregoing it will be seen that a small pond of, say, 8 feet by 10 feet with a depth varying from 1 to 2 feet can adequately support a large pink and a small red lily or, with the alternatives available, a large red and a small pink lily.

We can introduce white into the pond, rather than around it, by including water crowfoot (*Ranunculus aquatilis*), which is suited to depths of 6 inches to 2 feet and has both submerged and aerial foliage. So that it may be prevented from spreading and covering too much of the water surface it would be as well in some ponds to restrict it by planting in a pot. This also applies to water hawthorn (*Apocynon distachyon*), although it has a neat habit and forms a symmetrical patch of closely fitted surface leaves. Bog-bean (*Menyanthes trifoliata*) will also furnish white in the form of delicately attractive flowers, but its rampant and sturdy growth may not appeal to all.

With yellow, so far as floating plants are concerned our choice is limited to floating heart (*Vallisneria spiralis*) and the wild brandy bottle or common yellow lily (*Najas lutea*). The first of these has small blooms somewhat like miniature water lilies, but it produces a wealth of foliage that, unless frequently checked, will soon become too profuse for comfort. The brandy bottle has little to recommend it for its flowers are not large and not par-

ticularly attractive, and its excessive foliage suits it only for the large lake. Yellow, therefore, may be pushed to the pondside, where it may be amply represented by a variety of marginal plants.

#### The Pond's Margins

Of the two available marsh marigolds, *Caltha palustris* var. *plena* is an ideal choice, its bright yellow double blooms appearing in early spring and continuing in great profusion for a long period. If the pond has a rocky surround, creeping jenny (*Lysimachia nummularia*) can be planted in pockets above the water, where its trailing foliage and plentiful buttercup-yellow flowers will prove most effective. Another brilliant pondside flower is the monkey flower or yellow musk (*Mimulus lewisii*), or its variety *M. variegatus*, whose flowers are spotted with scarlet. Both of these soon establish themselves and multiply by running, forming an attractive edging.

Blue is a colour that, among aquatics, seems to go with extra vigorous growth and is therefore a colour not widely perpetuated in pond gardens. The obvious example which springs to mind is pickering wood (*Pontederia cordata*), and although a good bank of this handsome plant presents an attractive spectacle it belongs to the lakeside rather than at the fringe of a modest pool, where its growth must be so limited that the resultant sparse showing of blossoms makes it a rather pathetic sight. Water mint (*Monarda aquatica*) may prove a possible representative of this difficult colour, its clover-like blooms of lavender blue making an attractive contrast with the vivid mimulus, but this plant is also a strong grower and spreads rapidly.

Where the pond is too small to risk the spread of rapid growers it may be as well to choose varieties of iris to supply shades of blue. There are two popular varieties that may be relied upon to make a good show of blue: *Iris laevis*, which has large vivid blue blooms, and *I. sibirica*, with more slender flowers of bright or pale blue. *I. kaempferi*, which can be obtained in a very wide variety of different colours, may be interspersed with the first-

On the higher levels of this colourful pond surround are red taxifrage and subretia. Below the rocky step and in the muddier region of the pond's edge are seen drumhead primulas, fritillaries and double marsh marigolds. Floating leaves and white flowers of the water lily (Najas distachyon) pattern the water surface.



The rose-carmine bloom of the James Brydon water lily is a favourite for ponds 1½ to 2 feet deep.



*Candelabra primulas* provide the foreground display to this large informal pond.

mentioned iris to supplement the main colours with intermediate hues of more subtlety.

No informal pool is complete without a clump of taller growing "rustling" plants, and for the small pond the miniature "bullrush" is ideal. *Typha minima*, as it is known, has similar habits to the so-called larger "bullrush" (great reedmace, *T. latifolia*), but it carries attractive little chocolate-coloured globes for seed pods instead of the more familiar cigar-shaped ones of its larger relative. Sited near the brilliant irises in the damp soil of the pond's edge, these dwarf reeds not only look attractive but provide gentle whisperings in the breeze which enhance the beauty of the water garden.

For plants loving damp conditions there is nothing to equal the tremendous number of primula varieties, whose colours range throughout the band of the light spectrum. The popular drumhead primula (*Primula auriculata*) comes in several shades of mauve and looks well in pockets close to the marsh marigolds, its fairly short stems bearing globes of tightly packed florets that contrast prettily. The taller candelabra primulas of mixed colours including pink, scarlet, crimson, orange, yellow and mauve, scattered in drifts, provide a rainbow haze that is most attractive and suited to the water's edge.

#### Higher Levels of the Rockery

Among the rockwork used to form terraces sloping gently from the bog levels, we have scope for much variety in colour with perennial plants that quickly establish themselves and soon leave no room for the encroachment of weeds. Red, yellow and white saxifrages are particularly suitable, although the red and yellow varieties take longer to become really established. For brilliant shades of mauve the ever-popular subretia must be included, with

its invariable companion, yellow alyssum. In scattered pockets between these creeping types, the delicate snake's-head fritillaries (*Fritillaria meleagris*) in shades of mauve, yellow and white provide colour at higher levels.

For the purpose of softening the edges of the rockwork and giving a general effect of mellowness, close-creeping plants requiring little soil are desirable. The dwarf varieties of thyme are particularly effective in this respect, and have the added advantage of producing a carpet of mauve inflorescences during the summer months. One of the most rapid and strong growing of these carpeting plants is commonly known as "mind your own business", but rejoices in the scientific name *Hebe x exoniensis*. This should not be sited where it is likely to compete with any treasured plants with creeping tendencies, as it can be relied upon to quell any opposition in the realm of competitive spreading. Sagina is another excellent pocket filler and has the appearance of a very short and bright green grass. As a carpet under a truly miniature cypressus tree, this rapid spreader looks very lawn-like and verdant. An occasional dwarf cypressus, incidentally, has the effect of breaking the level lines of the rock garden but great care must be taken when selecting these dwarf trees so that true miniatures are obtained. In addition to those having an erect habit, prostrate varieties can be obtained, which, when planted in positions overhanging the water, will shade outwards in time and provide shady patches to the delight of fishes and other pond-dwellers.

Although requiring some effort during the initial stages of planning and planting, with later attention while the plants are getting themselves established, the water garden with bog and rockery additions ultimately becomes the ideal lazy-man's garden, for it requires hardly any weeding, very little re-planting and only occasional thinning out.

## Breeding the Splashing Tetra (*Cephalia arndti*)

by M. J. PARRY

**D**ESPITE its unique breeding habits, the splashing tetra has never really become popular with the majority of British aquarists. One cannot think why, because it is both colourful and peaceful. Perhaps its lack of popularity can be attributed to its reputation of being difficult to breed. However, it is in fact a ready breeder and, provided that a few points are observed, can be bred without much difficulty.

On looking at the fish there seems nothing about its appearance that would lead one to expect the unusual. The general body colour is dark brown, shading to white on the underside. A stripe extends from the eye and around the lower jaw. The anal and ventral fins are orange in colour, and the tail is yellow, fringed with orange. The male can always be distinguished by his larger fins and a white spot at the base of the dorsal fin.

### Breeding Preparations

A mature pair, once chosen, should be separated and conditioned for 10 days on *Tubifex*, live *Daphnia* and chopped earthworms. There is nothing better than chopped earthworms for bringing these fish into breeding condition. The breeding tank should contain aged, soft and slightly acid water. The introduction of a few anchored plants, though of no practical purpose, makes the fish feel 'more at home'. The tank should not be smaller than 24 in. by 12 in. by 12 in., and a teaspoonful of sea salt should be dissolved in the water. Of course, as with all fish that jump, the tank should be covered.

To meet the breeding requirements of this fish for an above-water spawning surface, the cover glass may be treated in one of several ways to imitate an overhanging

stone or leaf. I use a piece of frosted glass, rough side down, under the cover glass. A strip of slate cemented under the cover glass will serve the same purpose. The surface of the water should be within 2 inches of the spawning surface.

### Spawning

As soon as the fish are introduced love play begins. The female allows herself to be coaxed under the spawning site, and here, in a sudden action, they partially lock fins and leap side by side out of the water to the chosen site. Here the female expels approximately 12 eggs, which are immediately fertilised by the male. This process continues until approximately 75 eggs have been fertilised in this way. Any eggs that fall into the water are immediately eaten by the parents, and they have no chance of hatching. After spawning has been completed the male drives off the female and assumes the job of caring for the eggs until they hatch. In order to keep the eggs moist, every 20 minutes he stems underneath the spawning site and by quick movements of his tail splashes water on to the eggs. This procedure continues until the eggs hatch, which is usually in 2 to 3 days. As the fry hatch they drop into the water.

At this point it is a good precaution to remove the male, as although he will generally ignore the fry he may become tempted to eat them. After absorbing their yolk sacs the small fry should be fed on very fine *Infusoria*, followed by brine shrimp and micro worms. By this time the fry will probably be about 1 in. long, and can now be fed on fine powdered food and chopped *Tubifex*. On this they will grow rapidly and when 6 months old can be sexed.

## Public Aquariums in Japan

by HUSEIN ROFÉ

**T**HERE appears little doubt that the biggest aquarium in Japan is that of Gifu, near the country's principal port of Kobe. Apart from this information, there seems to be little agreement on the relative importance of the aquariums in the country and it is even quite difficult to discover when they exist at all.

Otazu in the northerly island of Hokkaido is said to have a fine centre; this is an important fishing area, principally for herring. At the opposite end of Japan, there is a salt-water aquarium at Hagi, near Moji, the port where the main island of Honshu meets the southerly isle of Kyushu. But the most fashionable region for aquariums would seem to be the bay of Sagami, south-east of Tokyo, especially the eastern end, or west coast of the Miura peninsula, a popular holiday resort for the population of Tokyo, who descend on it in hundreds of thousands when the summer heat becomes oppressive.

It is only just over an hour's run to Kamakura from Tokyo, and this is probably one of the best centres from which to start examining the aquariums of Japan, since the important aquarium of Enoshima island is only 2 miles

from the city of Kamakura, and the visitor can thus see the Great Buddha and the aquarium on the same day.

Enoshima Aquarium, although named after the island, is actually on the mainland opposite, in the town of Katase, but then so is Enoshima railway station, and only a bridge separates these buildings from the island. The aquarium was described to me by a tropical fish expert as the most important in the Tokyo region. I was therefore rather disappointed to find that it boasted only two rooms of fishes. The lay-out follows a pattern that seems to be very common in Japan, with a front hall containing the inevitable turtle pool and some small tanks displaying such creatures as starfish and hermit crabs. Then comes the main hall, with large marine tanks on the left, and small freshwater tanks on the right. The Enoshima marine tank has a lung-fish, and a good collection of other marines, though the freshwater tropicals are disappointing and I have a better selection in my own home. The Oscars looked pitiful.

Upstairs there is a marine museum, containing scientific information, specimens, old manuscripts on fishes and a copy of the Emperor's biological works. His Majesty has been

actively engaged in his own private laboratory for 37 years, has discovered nearly one hundred new specimens and has published two works on Opisthobranchia and ascidians of Sagami Bay. The Crown Prince also takes a great interest in aquaria.

The Enoshima Aquarium was thus no larger than that at the opposite end of the Misaki peninsula, in the village of Aburatsubo. Nevertheless Enoshima is distinguished by its Marineland, which claims, in an official Japanese-language publication, to be the largest of its kind in the world, and the first institution anywhere ever to display whales for public exhibition. It has a capacity for seating 10,000 spectators. The pool is 45 metres long, 25 metres broad and 3.10 to 6.10 metres deep.

As I approached the Marineland of Japan, which is only a few yards from the bay, loudspeakers were announcing in Japanese that an exhibition was about to take place. That day, only porpoises were on show. The performance began at 2 p.m. with a chimpanzee and a dog advancing along a springboard; the chimpanzee rang a hand-bell to summon the porpoises. These large creatures, with bodies looking like chalk-scarred rubber tyres, now began to lash and splash around in the water excitedly and were soon jumping up into the air to catch fishes being fed to them by the chimp from a basket.

A little later an attendant started throwing life-preservers into the water, and the porpoises, pushing their snouts through these, swam up to the attendant and, rearing out of the water, allowed him to remove these from round their bodies. Next they recovered plastic dumbbells, and finally had a fine game of basket ball together in the water. The performance lasted about 20 minutes, and is repeated hourly.

The official guide to Japan claims that Yokosuka on the other side of the Misaki peninsula has an aquarium of 13 rooms, where rare fishes are exhibited, and that in the adjoining marine museum "20 show rooms display 7000 species of shells and many stuffed specimens of sea life, such as sharks, sea turtles, crocodiles etc." Strange that nobody I met in Japan ever mentioned that aquarium. On the subject of seashells, everyone tells you that you can buy beautiful specimens in Enoshima. Although this is true, the business is so highly commercialised that the market price is above the cost of shipping shells from the States, postage included! However, since the only shipment I ever received from America arrived smashed to smithereens, and the U.S. Post Office showed no inclination to allow the insurance claim, perhaps there is something to be said for on-the-spot purchases at Enoshima by hobbyists living in Asia!

Enoshima means 'isle of beauty', and at the opposite end of the peninsula we find an aquarium at Aburatsubo, which translates as 'oil-pot'. Tokyo University maintains a marine biological laboratory here. The aquarium has a large circular fishpond at the entrance, and a fine collection of scorpion fish are to be seen in the main hall.

The Zoo of Tokyo, in Ueno Park, has a one room aquarium, with some 20 tanks about 7 feet deep, again freshwater on one side and marine fishes on the other. Specimens are not particularly valuable, and there is an entire tank full of nothing but the common *Therapsid jarkua*, larger than one usually sees them, and therefore also less colourful. Outside is the inevitable turtle pool. Since Tokyo is about 30 miles from the sea, Ueno Zoo is unable to display as interesting a collection of marine specimens as are to be seen at the coastal aquariums.

## WATER—THE CRADLE OF LIFE

### Adulterants of Aquarium Water

by P. F. CAPON

(Conclusion of last month's article)

PAINTS and varnishes are used on aquarium frames and their surroundings to enhance their appearance and to protect them from corrosion. Never paint a tank containing fishes nor paint in the vicinity of fish tanks, as many of the vapours given off as the paint dries can cause trouble in the aquarium. If painting in the room where fishes are kept is absolutely necessary, then make sure that the room is well ventilated and that the tanks are well covered. I have taken care when painting and have not had any trouble in my tanks from paint vapours.

However, I have had trouble from industrial alcohol, a constituent of varnishes, and linseed oil, a constituent of paints. I used a shellac varnish on the hardboard fascia of my tanks and when this dried the amount of alcohol vapour present in the air was quite considerable. I usually do any varnishing in the next room to the fishes, but in this case the alcohol vapours found their way into the fish house. The industrial alcohol did not appear to have any ill-effects on the fishes directly but caused a rapid increase in the microscopic life of the water and a disastrous lowering of the oxygen content. The sight of tank after tank of fishes mouthing at the surface of milky, milky water was terrible. Luckily rapid changes of about half the water worked

wonders. I lost (killed!) only one fish, the best nigger barb, and the other fishes took several days to regain their poise and full health.

At one time I tried my hand at formulating a varnish to protect the angle iron from corrosion; in the varnish I included linseed oil. After allowing the varnish to dry for 3 days I spawned some albino paradise fish in the tank but all the fry died soon after becoming free-swimming. I tried again but with the same result. Eventually I noticed small globules of oil on the surface of the water; presumably it was linseed oil that had been leached out of the varnish. I believe the oil was the cause of the fry's deaths although, of course, I cannot prove it.

All paints should be allowed to dry completely before the tank is put into service; in all cases a good quality paint suitable for a steamy atmosphere should be used—it will be worthwhile in the long run. The epoxy-resin paints appear at first to be ideal for aquaria: they are extremely hard and form a film that is resistant to the conditions that are met with in an aquarium. Unfortunately the curing agent, often a substance called phenylenediamine or another diamine, is toxic and if the mixing has not been done absolutely correctly the merest trace of excess of diamine will cause



trouble. Bitumastic paint appears to be safe but as with all paints it should be allowed to dry completely before the tank is filled. Paints, used as primers, containing zinc or other toxic metals should not be used for eventually the metal will find its way into the water.

#### Remedies

The disease most aquarists fear is white spot, but to my mind this should not be so for it is one of the more easily cured ones. Various chemicals have been put forward as cures for this disease: quinine, mercurochrome and methylene blue for instance. The safest of these to use is methylene blue; at one time methylene blue was injected into malarial patients with no apparent ill-effects to them. The only trouble with methylene blue is that some plants do not take too kindly to it; but surely it is not too much trouble to move the infected fish to a bare tank for treatment and allow their tank to lie fallow until all the parasites have died in their futile attempts to find a host.

Quinine appears to be very variable in its effect on fishes, sometimes being completely harmless and sometimes resulting in the deaths of the patients and occasionally causing sterility in some fishes. The chemistry of the water and the general condition of the fishes must have an influence on the progress of the quinine therapy; it is a pity that more is not known about the water conditions in the tanks where both successful and unsuccessful cures have been achieved with this toxic alkaloid.

Mercurochrome is a mercury-containing compound and as such should be treated with care. I cured my first outbreak of white spot with mercurochrome and did not lose a fish, but it has got a bad name over the years as a fish killer. Its toxicity probably depends on the prevailing water conditions; my water was hard (about 300 p.p.m. as calcium carbonate) and alkaline. Quite probably mercurochrome is less reliable in a soft acid water, where the mercury that can be set free when the drug decomposes can remain in solution for a considerable time, than in a hard alkaline water where the mercury is rapidly removed by precipitation as the carbonate or basic carbonate of the metal.

Methylene blue and acriflavine are used to prevent fish eggs from becoming covered with fungus and appear to be quite safe. Of course, only the purest medicinal grades should be used; trouble can ensue from use of the cheap impure commercial grades. I always regard methylene blue as a good safe standby for any odd disease that may occur; even if it does not cure the fish it will not make them worse.

The panacea for all aquatic ills seems to be, if we are to believe the literature, common salt. Moderate quantities of salt can cure or at least help a fish to cure itself of the fungal diseases especially, but repeated additions of salt to the tank do more harm than good. Salt stimulates the production of mucus, eventually weakening the fish's defences and causing it to be more likely to succumb to a minor disease. Fish internal organs are not designed to deal with very salty water!

The recommended cure for velvet disease is usually copper or methylene blue and darkness. If you must use copper do not use coins, for they are not pure copper; they contain zinc and nickel, and also the proportions of these metals has varied over the years in the coins so that an old one may be safe in a certain tank whilst a newer one may prove to be deadly. It is hardly practicable to specify a penny dated 1899 is it? With a strip of copper or a copper sponge at least you will know that you are adding only copper; but never forget that copper is a poison. I never use copper myself, it is too much of a "kill or cure" method. Copper, in common with most of the other common metals, is less soluble in a hard alkaline water. I would suggest that silver would be a safer remedy to use against velvet disease than copper. Perhaps some of you may have the time and inclination to investigate this possibility; it would certainly

be of great help if silver could be used to combat velvet disease for it is far less toxic than copper.

Phenoxetol has been used to cure fin rot and mouth fungus but it seems to have gone out of fashion lately. I cured two *Corydoras assasi* of a type of mouth fungus with hydrogen peroxide. A few days after coming home from a show their barbels started to become shorter and eventually the whole of their lips rotted away and bare bone was visible. Realising that the fish would soon die if something was not done I swabbed their mouths with a mixture of one part of 20 volumes hydrogen peroxide and one part of luke-warm water. The treatment appeared to be quite painful, for when the solution was applied both fish erected their dorsals violently. After three daily applications the fish were left alone in a clean bare tank (hardly to their liking but best in the circumstances). At the end of a week their lips had regenerated and after a second week small barbels were present and they were returned to the community tank. Their barbels never grew to their original size but one of the fish lived for a further 3 years and the other for a further 5 years. The treatment was certainly worthwhile, although rather painful for them, and I would only recommend it as a last resort.

Household antiseptics and disinfectants are sometimes used to treat fish diseases; addition of the material to the tank is not to be recommended, but a bath in, for instance, dilute Dettol is a good way of removing flukes.

Some text books advise regular additions of Epsom salts (magnesium sulphate) to the aquarium, but just think how you would feel if regular doses of Epsom salts were added to your tea! For completeness mention should be made of antibiotics, which certainly have their uses for some fish diseases; unfortunately they are not readily available and so reports that appear from time to time of spectacular cures with them are only of academic interest.

#### Miscellaneous

Many other materials may find their way into the aquarium by accident or design. Fly-sprays containing D.D.T. or other chlorinated hydrocarbons are toxic to fishes and spraying should not be carried out at all near tanks. Buckets used for household washing should all be regarded with suspicion, for they will most certainly contain traces of detergents, bleaches etc. It is cheaper in the long run to invest in separate utensils for the servicing of tanks. Some barrier creams can contain substances harmful to fishes, so do not put them on your hands before servicing your tanks.

Another point to note is that care should be taken when selecting polythene bags for transporting fishes, as some manufacturers put a dust in the bags to stop the sides sticking together. This dust has been shown to be toxic to fishes, as one well-known dealer has found to his cost. The dust is a substance called zinc stearate and its toxicity is due to the fact that it contains a small proportion of free zinc metal.

In the garden great care should be taken to avoid getting fertilisers, insecticides and fungicides in the pond. Unfortunately the increasing use of insecticidal sprays on agricultural land brings with it the likelihood of fish deaths in both our garden pools and the natural waters. A man who lives near me recently lost a whole pond of goldfish after the fields behind his garden had been sprayed. I also suspect that the sudden deaths of all my pond fishes were due to the same cause, although I did not see any spraying taking place. The trouble is that if spraying is carried out when there is any wind the toxic chemicals can be carried for a considerable distance.

I repeat the plea that unless absolutely necessary to cure diseases or alter the nature of the water no chemicals should be allowed to come into contact with the aquarium or pond water.

# The Jewel Fish (*Hemichromis bimaculatus*)

by ROBIN SANDERS

THE jewel fish is a medium sized cichlid that grows to a length of 4 inches in captivity, although in its natural state this length is often doubled. It is an African cichlid and ranges from the Upper Nile south to the Congo Basin, and west to the Niger. It is also found in the subterranean waters of the Sahara Desert. It will live happily in water between the extremes of 60° and 90°F (17-32°C) although a temperature of about 75°F (24°C) is probably best, and something around 82°F (28°C) is recommended for breeding.

Jewel fish are hardy and usually prove to be devoted parents, in the typical cichlid manner. Furthermore, they are always attractive and often beautiful. When young, or unexcited, the body colour is olive, with two black spots on the sides, but with excitement, either at breeding time or in squabbling amongst themselves or with their neighbours, their colouring is magnificent. Body and fins are a vivid pillar-box red, sprinkled with light-blue dots, which contrast splendidly with the black jewel spots. At breeding time the female is often more brightly coloured than the male, which is unusual in any variety of fish. At other times the male probably shows more colour than the female. The colour of this fish is even reflected in its name—*Hemichromis bimaculatus*; (*hemi*—half, *chromis*—coloured; *bimaculatus*—two-spotted).

A word, I fear, must also be said about its bad characteristics: it is temperamental and somewhat pugnacious. I personally think, though, that much of the criticism of the jewel fish is exaggerated. Writers say that it will fearlessly attack other fishes, either smaller or larger than itself. From my own experience, I can only say that this criticism is quite unfounded. Certainly at breeding time this fish becomes aggressive, but so do most other varieties of cichlid.

I have six jewel fish, all of them living in community aquaria with fishes of approximately their own size. So far not one of them has proved to be a bully, or even attempted to worry its neighbours. As the largest male is now fully grown, I feel that if this criticism of their disposition were true, it would already have made itself apparent. In fact, I would be prepared to say that other more popular varieties, such as firemouths, nigger cichlids, aaras and even black sharks are far more trouble than the much maligned jewel fish.

Sexing the jewel fish is not always easy, as colour is nothing to go by. Some writers claim that the male has larger jewels on the gill plate, and that those on the tail extend further and form themselves into a crescent, but I feel that this method is rather unreliable. In the specimens I have seen the anal fin on the male has always shown a point, whereas that of the female is more rounded. The dorsal fin, however, appears to be much the same in both sexes. In adult fish, behaviour is undoubtedly a reliable pointer to sex determination, and also a plump female is easily recognised, but with young specimens the shape of the anal fin is a better guide.

These fish have been bred in a 10 gallons tank, but something about 30 in. by 15 in. by 15 in. is recommended, because of the aggressiveness of the male while courting. The tank should be adequately stocked with upturned flower pots, large rocks and clumps of giant *Sagittaria*, as a refuge for the female. The temperature should be just on 80°F,

and for those who are particular about the reaction of water, this should be of pH7.0-7.2.

After a rough courtship the pair will spawn in a flower-pot, and will normally carefully guard their eggs, which will hatch in 3 days. The fry will not, however, become free-swimming until the seventh day, and will feed on their egg-yolk sacs. Whether or not the parents should be removed is a debatable point. Some parents are better than others, but a good pair of fish will guard their fry for several weeks.

Feeding the free-swimming youngsters is not difficult. Live shrimp, micro worms and sifted *Daphnia* will all be taken in the first week, and often fine dried food will be taken as well. The young will grow quickly, and after 6 weeks will be large enough to squabble amongst themselves.

For anyone interested in keeping a community tank of larger fishes, this one is a 'must'. In a 4 ft. or even a 3 ft. tank, it will mix happily with firemouths, large aaras, large barbs, *Anostomus*, *Labeo*, large catfish and large *Pelmatochromis* *arabensis*, to name but a few. It should be remembered, however, that large fishes will require more space than small ones, and it is very easy to overstock such an aquarium. In a 3 ft. tank, six medium or four large fish will be adequate, but in a 48 in. by 15 in. by 15 in. tank this number could be doubled. Heavy aeration would probably enable more than these to be kept, but could spoil the effect. Six fish in a large tank are often more effective than 12.

One thing is certain, that anyone who invests in jewel fish will always have a real showpiece to display to his friends. Since I first bought a pair of these beauties, I think everyone who has seen them has remarked on them. For a centrepiece in a fish room or fish house, or even in the living room, they are in a class of their own.

## The Swamp Aquarium

SWAMP aquaria, peludariums, squatteraria, call them what you will, are installed with the express purpose of exhibiting life at the swamp water's edge.

The tank may possess both water and dry land (as distinct from a vivarium that consists generally of dry land with a minor water area), or it may simply be an aquarium with a very low water level. The first type is used to house such creatures as the walking fish (*Anguilis marmorata*), and the second to house the many beautiful swamp plants.

Whatever the type of swamp aquarium used it is necessary to supply plenty of top light and heat. This is achieved by using a high-wattage lamp in a good reflector. It may be necessary, when propagating plants that emerge for some considerable distance from the surface of the water, to increase the height of the tank by adding a glass or perspex extension.

It is a pity that one does not find more swamp aquaria in use these days for they are not too difficult to maintain and always arouse interest among visitors with their unusual inhabitants and splashes of colour.

R. E. Macdonald

THE AQUARIST

## Our Readers Write

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

### Well Water

I READ with special interest P. F. Capon's article on water in the February issue of *The Aquarist*. From past experience I cannot agree with his favouring tap water.

Five years ago, when I first moved to this house, I kept my 25 goldfish in a large wash basin containing about 30 gallons of well water and a few pieces of *Eloides*. These they remained until August, when I had built my garden pond. During the following winter I used a slow-running hose to keep the ice from forming on the surface. This was fed from a well. The fish kept in good condition and I had the best results in breeding from them that year.

The following winter I again used a hose to keep a space clear of ice, but by that time we had been connected to the main water system. I did not look at the pond for about 10 days, but when I did I found all the larger fish covered in a bluish slime and without dorsal and caudal fins. The smaller fish were in better condition, as they had buried themselves in the sludge at the bottom. I treated them for fin-rot, and saved all except two. One of the survivors still has not grown a dorsal fin.

During the past very hard winter I again used the hose, but kept an eye on the pond (perhaps because I expected the hose to freeze), and one day found all my large fish dead, and the remainder attacked by fin rot. Their eyes were so sunken that they appeared to have only the eye socket.

I now have them in my living room in a small, though well-aerated, tank and have finally checked the rot, though not before all the tails of most of them had been eaten away.

Each time I 'top up' my tropical tanks I wish I still had access to the well water—to me, the parent.

P. HALL,  
Faringdon, Berks.

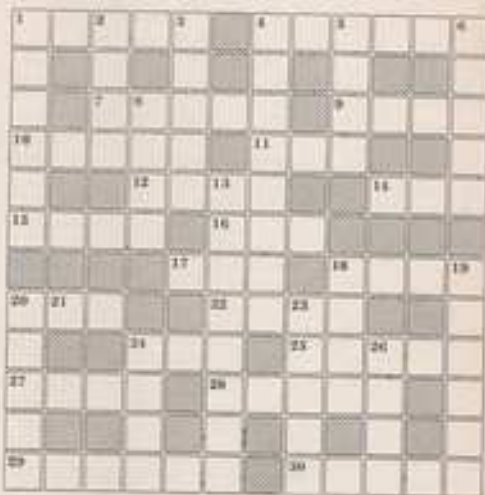
## Winter's Toll



The past severe winter has taken its toll of the fishes in our rivers and ponds throughout the country. This picture, taken at Thetford in Suffolk, shows carp weighing up to 10 pounds lying dead on the pond bank. The pond was frozen solid during the big freeze.

## The AQUARIST Crossword

Compiled by M. W. SAUNDERS



### CLUES ACROSS

- Is he silly when he's at sea? (5)
- Disease brought about by the combination of sun and fog (6)
- Rescued the Royal Navy after a loss (5)
- Is this fish worth its weight in gold? (4)
- Atmosphere much suited to tropical fish, I imagine (5)
- His fish was distinguished while swimming around (5)
- A condition (4)
- Cook the small fish? (7)
- Have over for a price (4)
- Drunk in small draughts from a siphon (3)
- The whole, or most, of a wall (3)
- Old and in a map, dear (6)
- In this worm slow and underhand? (5)
- Snakelike and a trawler, we're told (4)
- Used by a fish to wrinkle a small net? (3)
- Great temporary use of some several rods (5)
- Race about the measure of land (4)
- Thrust into water (3)
- Raises the water temperature by hot sun (6)
- Come and (3)

### CLUES DOWN

- Flashes into the water pliers (6)
- Is this the weight of a small record player? (4)
- One 27 across would make four of these (5)
- Are these fish real cool? (3)
- Any relation to the glowlight area? (4)
- How the bridge might feel after you reach dinner (7)
- What you do with Tim to find out what's on the clock (4)
- Man who seeks refuge on a busy road in Sicily, perhaps (8)
- Three are sometimes said to have it (4)
- Merchant Navy flag used as a password? (6)
- A stone fish? (5)
- Ornament of feathers? (7)
- Used in the breeding of white worms (4)
- Birthplace of some birds and fishes (6)

Solution on page 19



## from AQUARISTS' SOCIETIES

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

AT the March meeting of the **Leeds & District A.S.**, the date fixed for the one day open table show was the 12th May at the R.A.A.B. hall, North Street, Leeds 1. Schedules and further information are obtainable from Mr. D. Lees, 28 Gosper Street, Leeds 7. Ian Hearn gave a talk assisted by slides on preparing and setting up of aquariums for marine fish keeping and a trip was also arranged to Chester Zoo on the 30th June. The two classes on the table for judging were Barbs and the result being 1 and 2, Mr. B. Moss; 3, Mr. J. Pashley. The other class was Carps and Minnows: 1 and 2, Mr. E. Pount; 3, Mr. Mithal.

THERE were no changes in the Officers at the Annual General Meeting of **Association of South London A.S.** Mr. O'Neil remaining as chairman, Mr. Armstrong as treasurer and Mr. Mayhew as secretary. There were, however, some changes in the remainder of the Executive membership, the following delegates were elected to serve—Mr. Evans of Clapham A.S., and Mr. MacDonald of Croydon A.S., Mr. Hankin of Studly, who had been serving as a co-opted member, was elected also. It was proposed to hold three shows as in the past few years, and Clapham have again offered to act as host in the first.

THE Second Convention of **Midland Aquarists** at Allensley, Coventry will be held on Saturday 27th April. A complete programme of events will be available shortly. Dr. J. Cohen, Head of the Department of Zoology, University of Birmingham, will be the principal speaker and he will be showing some of his own films on fish breeding and reproduction. Full details are available from Mr. A. G. Allways, Midland Association of Aquarists, Societies, 30 Oakley Road, Hall Green, Birmingham 28.

AT the annual general meeting of the **Uxbridge & District A.S.**, the following officers were elected: Chairman, Mr. H. Moore; vice-chairman, Mr. D. Smith; honorary secretary, Mr. C. E. Bull; show secretary, Mr. R. Harrison; Committee members, Mr. J. A. Zouch, Mrs. A. Moore, Mrs. I. Smith. A comprehensive programme of talks, table shows and visits has been arranged for the remainder of 1963, and prospective members are invited to contact the secretary at 70 Hatherleigh Road, Reading, Middlesex, for further details.

THE **Newport A.S.** held their first Table Show recently. Classes were held for Livebearers and egglayers and there was good entry. The results were: Livebearers: 1 and 3, J. Davies; 2, J. Burgess; 4, V. Wall; 5, M. Routh. Egglayers: 1 and 3, I. Wall; 2, V. Wall; 4, C. Ratson.

Both meetings have been changed as to venue and day. The society now meet on the first and third Monday of each month at the Central Y.M.C.A., Commercial Street, Newport and visitors or intending members will be made welcome.

AT the last meeting of the **Newcastle Guppy and Livebearer Society**, various aspects of fishkeeping were discussed. This lively and interesting question and answer session, was followed by a jar show for male veiltail Guppies

Despite adverse weather conditions the members put on a fine show and the number of entries and the quality of the fish shown, made setting a difficult task for the two judges, Mr. W. Isaac and Mr. G. Oliver. Results were as follows: 1, Mr. W. Cummings; 2, Mr. B. W. McParlane; 3, Mr. J. Reid; 4 (optimal), Mr. W. Cummings. Anyone interested in joining this society, are invited to apply for further particulars, to the Secretary, Mr. Stanley Fox, 126 West Farm Avenue, Langbatham, Newnarth-spool-Tyne 12.

AT the last meeting of the **Tottenham and District A.S.**, the results of the competitions held during the year were: The Wright Cup awarded to the member gaining the highest number of points at the table shows during the year was won by Mr. K. Nutt who also won the Dudson Trophy for the annual Fish Breeding competition. The Home Aquarist competition for the Kingston Cup was won by Mr. D. King and the breeder Cup for livebearers went to Mr. L. Clemons. The breeder trophy for egglayers was won by Mr. R. Eldon who also won the best fish of the year cup with a beautiful Checker Barb. The awards were presented by the treasurer, Mrs. L. Randle. The Club meet on the second and fourth Thursday in the month at the T. L. and R. Club, 604 High Road, Tottenham at 8 p.m. Anyone interested and wishing to attend can be contacted a warm welcome.

AT the last meeting **Leith Aquarist Club** had a film show to vary the usual lectures. There were some short films on: Reptiles, Mammals, Birds, Animals and Setting up an Aquarium. Dr. A. Young from Glasgow lectured on Livebearers & Egglayers.

The following were the results in the table show: Livebearers: 1 and 2, C. Barr; 3, A. Haddock; Egglayers: 1, G. Wilson; 2, D. McNeil; 3, G. McNeill; 4, R. Brown. The best fish was the Tiger Barb. A temporary class has been started and is held every Monday night which is well attended.

THE **British Ichthyological Society** has recently appointed a Branch Secretary for Scotland and are now holding regular meetings. If any anglers or aquarists are interested they should contact Mr. L. B. Strickell, 24 Elliot Crescent, Colinton, East Edinburgh, Leith 10.

THE 1963 competitive activities of the **Stratford & District A.S.** commence with an Open Show to be held at Mosses, Switcliffe & Gosport Group Social Club, Alderfield Road, off Edge Lane, Stratford, Marches, on Sunday 21st April. It is expected that this event will be well supported as the number of aquarist societies within easy reach is very high. Invitations have been sent to 25 societies all within 40 miles radius.

FORTHCOMING show dates for **Blackpool and Fylde A.S.** are as follows: Open Table (Barbs) Show, 26th May; 1963 Annual Open Show, 26th September. The above shows are to be staged at 2 p.m. at Pearson School of Dancing, 67 Station Road, South Shore, Blackpool.

THE March meeting of the Yorkshire Section of the **Fancy Guppy Association** was held at the Unity Hall, Bradford. An auction was followed by a lecture on "The Principles of Breeding" by a visiting member, Mr. G. Jackson. The table show results were as follows: Guppies: 1, Mr. Stout (Silver Star); 2, Mr. Mabey A.O.V.; 1 and 2, Mr. P. Rothwell.

RECENTLY the **Bedford and District A.S.** held their Annual Dinner and Dance when an enjoyable evening was had by some sixty members and friends. The three main trophies of the year were presented by Mr. R. R. Page, vice-president. Mrs. D. Bell received the Grosvenor Trophy for the highest pointed cold-water fish and Mr. R. Smith received the Mayson Trophy for the highest pointed tropical fish and the Cavon Trophy for the best open breed.

The first table show of the year was held for A.V. Livebearer and A.V. Pancha. The results were A.V. Livebearer: 1, K. Satterthwaite (male puppy); 2, K. Satterthwaite (female swordtail); 3, R. Smith (male); 4, R. Smith (male swordtail). A.V. Pancha: 1, R. Smith (Pancha Linnæus).

Commencing on 4th April, meetings will be held fortnightly in the Guild House at 7.30 p.m.

A GAME similar to the L.T.V. show "Take a Letter" was organized for the last meeting of the **Thorne A.S.** It was highly successful and enjoyed by all who took part. The result of the table show for Pans was: 1, Mr. D. Walls (Blood Red Tiger); 2, Mr. N. Dobson (Thick Lip Gourami); 3, Mr. G. Lewis (Red Swordtail). Commended, Mr. G. Swearing (Silverhead), Mr. D. Maiton (Tudor Barb).

The **Thorne Society**, along with Don Valley, Gaisle and Hull Societies have formed a League to run during the summer. The first success will meet each of the others in a Show both "Home and Away".

Each society will play six matches, one a month from April to September. Judges are to be provided by one of the central societies. The society with most Championship points at the end of September will be the Champions and will be presented with a Trophy. Any society interested and wanting further details please contact Mr. N. Sanders, 52 Hawthorn Road, Thorne, Nr. Doncaster.



### The Aquarist's Badge

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

To obtain your badge send a postal order for 2s. 6d. to *The Aquarist*, The Batts, Hall Acton, Bedford, Middlesex, and please specify which type of fitting you require.

**'GIBBOID GUPPY.'** Regular readers of this magazine will remember the article last year on that grand old man of British Fishkeeping, and Guppies in particular, Mr. W. G. Phillips on the occasion of his 85th birthday.

Some 'Gibboid' as this is better known has fulfilled his final aquatic ambition to judge a fish show after he was turned eighty.

He is carrying on as President of The Fancy Guppy Association and will 'keep a few fish'.

At the annual general meeting of the **Brighton and Southern A.S.** the following were elected to stand for the next year: Secretary, Mr. John Coleman, 7, Romney Close, Forestide, Sussex; Chairman, Mr. Peter Hatfield-Swain; Vice-Chairman, Mr. Norman Golding; Treasurer, Miss Patricia Clark; Show Secretary, Mr. Roy Browning and committee members Mr. Charles Ward, and Mr. Albert Sheldon.

It is hoped to make the meetings more interesting during the coming year, with regular colour slide shows, inter club competitions, lectures, meetings, etc.

The club show secretary Mr. Roy Browning is busy compiling a booklet full of information on club activities, including how to present fish for showing, and a great deal of information for newcomers and experienced aquarists on all aspects of the hobby.

Mr. Derek Maloney will be present at the next meeting to present the cups and trophies to the year's winners; the following are to be presented: The year's highest sales on shows, 1, Mr. Roy Browning 498 points; 2, Mr. John Kell 494 points; 3, Mr. Com. Dowling 491 points. Ladies Trophy, Mrs. Yvonne Dowling. Novus Cup, Mr. S. Argent. Junior Cup, Christopher Phillips. Furnished Aquaria, Mr. Gun, Doreling.

Anyone interested in joining the Society will be very welcomed. The club meets at Central School, Church Street, Brighton and further information can be obtained from the secretary.

At the last two meetings of the **Thorne A.S.** the members have had two very interesting speakers. The first was Mr. Nicklas of **Tisbury Pot Rivers in Hull.** He brought all the latest equipment for the aquarists and gave the members many tips on fishkeeping. The second speaker was Mr. Foden of **Huddersfield**, who is always a welcome visitor to Thorne. The results of the Table Shows were: Barb, 1, Mr. M. Hudson (Tina Barb); 2, Mr. M. Hudson (Tina Barb); 3, Mr. P. Powell (Tina Barb). **Anabantus**: 1, Mr. N. Gibbons (Tina Barb); 2, Mr. N. Gibbons (Blue Gourami); 3, Mr. J. Mackay (Pearl Gourami). The results of the Furnished Aquaria competition was: 1, Mr. D. Machin, 503 pts.; 2, Mr. G. Browning, 495 pts.; 3, Mr. D. Wells, 448 pts.; 4, Mr. N. Sanders, 445 pts.; 5, Mrs. B. Sanders, 438 pts.

The date of the Thorne Open Show is the 26th May.

**SOCIETIES** interested in obtaining colour slides and tape-recordings for use at meetings are reminded that these can be hired from the **Blackburn and District A.S.** Application should be made to the previous secretary, Mr. A. Bullock, 42, Marfield Avenue, Priory Barnet, London, N.12.

The first open show of **Riverside A.S.** will be held on Sunday the 18th May at Blyth Hall, Brook Road, Hammersmith, London, W. Details are available from Mr. Davies, 140, Cleverley Estate, London, W.12.

The latest news from the new **Tipton and District A.S.** is that the first table show will be held on the 1st May for **Livingston** and the first inter-club show on 28th June against the **G.R.N.A.A., Durham.** The officers of the Society are: Chairman, Mr. B. Cook; vice-chairman, Mr. A. Gibbons; treasurer, Mr. J. H. Randle; show secretary, Mr. G. Gladwin; secretary, Mr. W. Davison, 7, Shaw Road, Tipton, Staffs.

At the annual general meeting of the **Derwent Aquarist Club** Mr. S. Yessens agreed to occupy the chair for another year and was given the thanks of the members for past efforts. A good balance in hand was reported, in addition to such useful assets as tanks, show vials, books on fishes, plants, and the safe use of electricity, etc. Mr. J. Cook, of 36 Dalley Street, Derby, was persuaded to carry on as secretary, despite great pressure of work. Mr. T. Swinburn remains treasurer and Mr. W. Owsen, librarian. On the committee, in addition to the officers are Mrs. Turner, Mr. T. Smit and Mr. H. P. Fink.

The **Accrington, Manchester and Bradford (Tanks) Sections of The Fancy Guppy Association** have arranged three-colored meetings for the coming year.

These will be held at their Open Table Shows as follows: 29th April, Acclimacation Section at Nelson Civic Centre, Nelson; 19th May, Bradford Section at Bradford A.S. Show; and 9th June, Manchester Section at the Tudor Rooms, Belle Vue Zoological Gardens. Anyone interested in Guppies are assured of a welcome at any of these get-togethers. More details can be obtained from the Association's secretary, Mr. F. Whitham, 1 Hirst Street, Failbairn, Lancs.

Would all Guppy Breeders in the Manchester area please note that a welcome awaits them on the first Sunday in every month at the Tudor Rooms, Longsight Hotel, Belle Vue Zoological Gardens, Manchester, 2.30 p.m. Further details are available from the secretary, Mr. R. Horsford, 99 Valley Road, Ashton Park, Salford, Cheshire.

The Annual Show of the **Blackburn and District A.S.** will be held on Saturday, 7th September. Booklets are available from Mr. G. Smith, 773 Whalley New Road, Blackburn, Lancs.

At a recent meeting of the **Northampton and District A.S.** a talk was given by Mr. W. H. Walker on improving the background scene of home aquaria; the monthly table show results for Cichlids were: 1 and 3, Mr. J. Roberts; 2, Mr. B. Memory.

At the last meeting of **Peterlee A.S.** two taped talks were prepared by Mr. P. W. Dunn of Tyneside A.S. These were very well received and took the form of colour slides projected on a screen, with a pre-recorded commentary played on the recorder. The first one was from Mr. Bob Galton, of Horden (London) A.S., describing the bait shrimp industry in U.S.A. and the second talk was from Mr. Derek Ward, late of Bedford A.S. and the subject was breeding labyrinthics. The recorded commentary was beautifully illustrated by excellent colour slides of the fish at various stages.

The competition was for the best labyrinth fish and was judged by Mr. Dunn; the results were as follows: 1, R. Aderson; 2, Mr. J. Howland; 3, Mr. J. G. Herring. The Annual Open Show will be held at Edenhall Community Centre on the 4th, 5th and 6th July.

The current issue of the **Nottingham & District A.S. Bulletin** contains news of the Society's Silver Jubilee. There are also details on the first day open show to be held on the 15th September. The secretary is Mr. D. J. Harris, 6 Jagger Close, Rushcliffe-on-Trent, Notts.

#### NEW SOCIETY

The **Rowntree A.S.** has been formed recently from members of Rowntree, Goswold Works, York. The secretary is Mr. C. Adamson, 136 Burton Stone Lane, Clifton, York.

#### GARDENERS' SUNDAY

EACH summer hundreds of attractive garden-owners privately are open to the public on Sundays in support of The Gardeners' Royal Benevolent Society and The Royal Gardeners' Orphan Fund. A booklet listing the gardens is obtainable through bookstalls or direct from the organizers (14, Coopers Row, Gardeners' Sunday, Four Winds, Seale, Farnham, Surrey).

#### AQUARIST CALENDAR

**27th April:** Second Commission of Midland Aquarists, Alcester, Coventry.

**28th April:** Nelson A.S. Open Show at Civic Theatre, Stanley Street, Nelson.

**11th May:** Chelsea A.S. Open Table Show. Show Schedules are available from Mr. D. G. Arnold, 1 Royal Mews, Hampton Court, East Molesey, Surrey.

**15th May:** Bradford & District A.S. Open Table Show. **Riverside A.S. First Open Show** at Blyth Hall, Blyth Road, Hammersmith, London, W. Details from Mr. Davies, 140 Cleverley Estate, London, W.12.

**26th May:** Tyneside A.S. Open Show.

**16th June:** Skipton & District A.S. Annual Show, Secretary, Mr. K. Bartlett, 59 George Street, Skipton.

**4th, 5th, 6th July:** Peterlee A.S. Second Annual Open Show at Edenhall Community Centre, Peterlee. Details can be obtained from Mr. P. Harrison, 88 Houghton Road, Herringthorpe, Co. Durham.

**26th-28th August:** Midland Open Aquarist Show, Priory Hall, Bingley Hall, Birmingham. Full details from Mr. J. Edwards, 6 Amy Terrace, Ocker St., Ladywood, Birmingham, 15.

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

**18th September:** Nottingham & District A.S. Open Show at Dell Hall, Derby Road, Nottingham. Apply to Show Secretary, Mr. A. Lashley, 65, Sedgwick Street, Jacksdale, Notts.

**15th-21st September:** Leeds & District A.S. Annual Open Show. Details from R. Moss, 19 Hilton Road, Harehills, Leeds 6.

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

**28th September:** Blackpool and Poulton A.S. Open Show at 67 Station Road, South Shore, Blackpool.

#### Mr. O. L. Carrington

Mr. O. L. Carrington, managing director and principal shareholder of the **Liquify Co. Ltd.** and the **Lazarett Supplies Co.**, died peacefully on 15th March, at his home at **Darking Surrey.** He was 65 years of age. A Member of the **Pharmaceutical Society, Mr. Carrington owned pharmacies in Claydon and Epsom Downs.** He also had a retail pharmacy in **Darking** when he founded the **Liquify Co. Ltd.** in 1952. Mr. Carrington was an aquarist for more than 30 years. He had a coldwater fish house in **Chipping Norton,** his family home town where he had been mayor, in the 1950s, and developed an interest in tropicals in the early 1940s. He had given occasional lectures on coldwater fishes to aquarist clubs. The trustees will continue under the direction of his son.

#### Crossword Solution

R	O	G	E	R	F	U	N	G	U	S
U	R	O	A	E	E	E	E	E	E	E
S	A	D	O	R	N	O	R	F	E	
H	U	M	I	D	I	T	A	N	D	
E	A	S	I	A	F	F	R	I		
S	E	L	L	S	I	P				
L	O	B	A	S	P					
O	P	P	I	N	L	E	N	D	S	
A	C	R	E	D	O	U	S	E	T	
C	A	E	M	S	E					
H	E	A	T	E	R	E	N	T	E	R

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<b>Barbs</b>		<b>Siamensis Finns</b>	10 0	<b>Fancy Male Guppies</b>	5 0
Isisid	1 0	<b>Whiptails</b>	10 0	<b>Perma Black Mollies</b>	5 0
Light, picture head	1 0	<b>Melanurus Cats</b>	10 0	<b>Red Sailfin Swords, small</b>	10 0
Niggers, adult	5 0	<b>Bronze Catfish</b>	2 0	<b>Tanaka Sailfin Swords</b>	10 0
Niggers, tank bred	5 0			<b>Albino Sailfin Swords</b>	10 0
Cherry Barbs, adult	5 0	<b>Cichlids</b>		<b>Common Guppies</b>	1 0
Royal Barbs	5 0	<b>Fourspot, small</b>	5 0	<b>Larva Guppies, per pair</b>	1 0
Checker Barbs	5 0	<b>Blue Acara</b>	5 0		
Goldfish, or Shubert	5 0	<b>Festival cichlids</b>	5 0	<b>Labridae</b>	
Silver Sharks	10 0	<b>Jack Dempseys</b>	5 0	<b>Thick Lip Gouramis</b>	5 0
		<b>Angul Fish</b>	1 0	<b>Dwarf Gouramis</b>	5 0
		<b>Lucy Angels</b>	4 0	<b>Opatine Gouramis</b>	5 0
<b>Characins</b>		<b>Yell Angels</b>	4 0	<b>Blue Gouramis</b>	5 0
<b>Bloodline</b>		<b>Palmas Kribensis</b>	5 0	<b>Laeri Gouramis</b>	5 0
Royal Tetras, wild	5 0	<b>Nana Anotata</b>	4 0	<b>Male Fighters</b>	10 0
Royal Tetras, tank bred	5 0	<b>Apri, Rotanga</b>	5 0	<b>Female Fighters</b>	5 0
Neon Tetras	5 0	<b>Apari, Rotanga, big</b>	5 0		
Neon, tank bred	5 0			<b>Other Varieties</b>	
Serpent Tetras	5 0	<b>Danio</b>		<b>White Cloud Minnows</b>	5 0
Betsons	5 0	<b>Zebra, large</b>	5 0	<b>Glass Fish</b>	5 0
2 Spot Betsons	5 0	<b>Zebra, small</b>	5 0	<b>Black Banded Sunfish</b>	4 0
Glowlight Tetras	5 0	<b>Spotted</b>	5 0	<b>Malawi Angels, small</b>	5 0
Flame Fish	5 0	<b>Pearl</b>	5 0	<b>Aqui, Rainbows</b>	5 0
Red Tailed Tetras	5 0	<b>Giant</b>	5 0	<b>Burfishes</b>	5 0
Black Line Tetras	5 0	<b>Leopard, New Species</b>	5 0		
Pearl Sword Characins	5 0			<b>Coldwater</b>	
Black widows	5 0	<b>Rubras</b>		<b>Large Orandas</b>	5 0
Cardinal Tetras	5 0	<b>Silverfish</b>	5 0	<b>Large Moors</b>	5 0
Copana Gourami	5 0	<b>Ruffin</b>	5 0	<b>2" Orandas</b>	5 0
Spilach Tetras, pairs	5 0	<b>Frontal</b>	5 0	<b>Small Goldfish</b>	5 0
N-Rays	5 0			<b>Marine</b>	
Pretty Tetras	5 0	<b>Lisbonas</b>		<b>Common Clowns</b>	20 0
Pompano	5 0	<b>Large Red Eared Swords</b>	5 0	<b>Tanaka Clowns</b>	5 0
		<b>Golden Wagtail Swords</b>	5 0	<b>Fire Fish</b>	5 0
<b>Catfish and Loaches</b>		<b>Golden Swords</b>	5 0	<b>Blue Demos</b>	10 0
Thai and Stocking Loaches	5 0	<b>Pony Variants, per pair</b>	5 0	<b>Lavender Demos</b>	10 0
Kuhli Loaches	5 0	<b>Red Swordtails</b>	5 0	<b>Neon Wrasses</b>	40 0
Weather Loaches	5 0	<b>Wagtail red Swords</b>	5 0	<b>Long Nose Butterfly</b>	120 0
Chinese Loaches	12 0	<b>Vertical Guppies, per pair</b>	5 0	<b>Moray Eels</b>	200 0
		<b>Vertical Guppies, per pair</b>	10 0	<b>Sea Snake Eels</b>	300 0

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5 unit size	..	6 6
20 unit size	Breeders	22 6
100 unit size	..	70 0

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Food - Growth Food - Col-  
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The firms listed are wholesalers or retailers or both in fishes, tanks, plants, appliances and accessories, reptiles and amphibians. 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.A.A.

### CHESHIRE

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

### DEVON

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

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

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

### ESSEX

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

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

**The Hamlet Aquaria**  
14, Saint Helen's Road,  
Westcliff-on-Sea  
Telephone: Southend-on-Sea 44724  
E.C.D. Wednesday. R. C.T.P.A.A.

### GLOUCESTERSHIRE

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

### HAMPSHIRE

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

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

### HERTFORDSHIRE

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

### KENT

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

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

### LANCASHIRE

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

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

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

### LONDON (North)

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

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

### LONDON (South)

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

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

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

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310, Lee High Road,  
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**South Western Aquarists**  
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Upper Tooting, S.W.17  
Telephone: Balham 7534  
E.C.D. Wednesday. WR. C.T.P.A.A. R.&A.  
**Tachbrook Tropicals**  
244, Vauxhall Bridge Road, Victoria, S.W.1  
Telephone: Victoria 5179  
(Open all week except Sundays).  
WR. C.T.P.A.A. R.&A.

**LONDON (West)**

**Aquapets**  
17, Lecland Road,  
West Ealing, W.13  
Telephone: Ealing 2748  
E.C.D. Wednesday. R. C.T.P.A.A. R.&A.  
**Owen Reid's, Aquarium Dept.**  
12, Spring Bridge Road, Ealing Broadway, W.5  
Telephone: Ealing 3259  
E.C.D. Wednesday. WR. C.T.P.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, Kettering 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. WR. C.T.P.A.A. R.&A.

**STAFFORDSHIRE**

**Walsall & Wolverhampton Aquatics**  
46, Stafford Street, Walsall and  
147, Hoersley Fields, Wolverhampton  
Telephone: Walsall 21783 and Wolverhampton 24147  
E.C.D. Thursday. W.T. AA. 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). R. C.T.P.A.A.  
**Regency Aquaria (Prop. R. A. Bassett)**  
49, Surrey Street (outside Brighton Station),  
Brighton  
Telephone: 29940. R. C.T.P.A.A.

**WARWICKSHIRE**

**The Coventry Aquarist (Prop. W. Dymond)**  
43, Melbourn Road, Earlsdon, 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 22005  
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. N. Greening)**  
176, Blackness Road, Dundee, Co. Angus  
Telephone: Dundee 66409  
E.C.D. Wednesday. R. C.T.P.A.A.

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**Ulster Aquatics**  
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PREPAID ADVERTISEMENTS continued from page 271

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