

# The Aquarist

and Pondkeeper

APRIL 1966

**THE GARDEN POOL (2)** *Special Coloured Supplement included in this issue dealing with Fishes, Light and Balance, Plants and Pests*



*Comet tail Goldfish. One of the few varieties of goldfish which was not developed by the Chinese or Japanese having originated in the U.S.A. towards the end of the nineteenth century. Good specimens should possess long, pointed caudal fins which endow their owner with rapid swimming ability. An active fish having good coloration, it is ideal for enlivening ornamental ponds.*

MONTHLY  
Vol. XXXI No. 1

**TWO SHILLINGS AND SIXPENCE**

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For Complete Tropical and Coldwater  
Aquaria also Tropical Marine

100 Varieties of fish usually in stock on view  
in 76 polished stainless steel aquariums

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24 x 15 x 12	£ 7 7 0	£ 9 9 0
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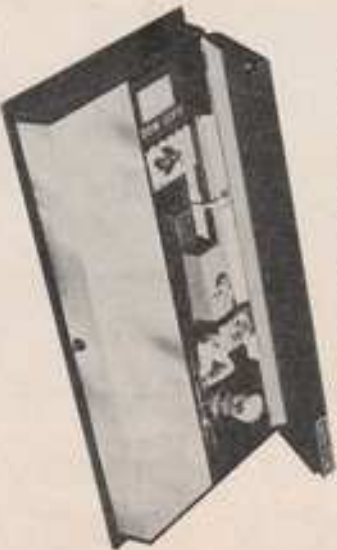
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GARDEN  
POOL



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AQUARIUM

VISIT THE MOST COMPREHENSIVE  
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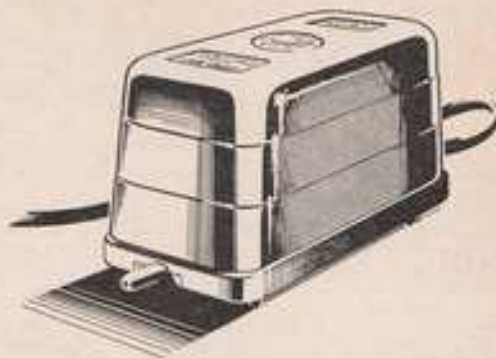
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Fibre-glass and Plastic Pool Linings, Pond Paint, Fountain and Waterfall pumps, Marginal and Bog Plants, Water Lilies, Goldfish, Golden Orfe, Tench, etc.

THE AQUARIST

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A PUMP  
SHOULD BE



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ROBUST CONSTRUCTION - ATTRACTIVE DESIGN  
FULLY RUSTPROOFED - SIMPLIFIED CONTROL  
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POSTAL SERVICE

# TROPICAL FISH

Fish of special interest this month



Yellow Fin Betta, 2 1/2" .. 7/6 each	Tetraodon, 2" .. 10/6 each	Fluorensis Latipinna, 1" .. 7/6 each	Aphyoseion .. 15/- pair
Claybar Ness, 5-7" .. 27/6 ..	Hemidactylus Argenteus, 1" .. 10/- ..	Danioideus Microlepis, 2" .. 19/6 ..	Aphyoseion Petersii .. 15/- ..
Leporinus, 3-3" .. 25/- ..	Apocheilichthys Dayii, 2" .. 5/6 ..	Cichla Ocellaris, 10" .. £10 ..	Protopoecilus Gracilis .. 15/- each
Marginal Platies, 2" .. 17/6 pair	Plecostomus Plecostomus, 5" .. 25/- ..	Red Delta Guppies .. 19/6 pair	Protopoecilus Neblinae .. 12/6 ..
Glare Deltas, 3" .. 6/- each	Shovel Nose Catfish, 4" .. 30/6 ..	Black Delta Guppies .. 15/- ..	Black Banded Sunfish .. 5/6 ..
Puntius Filamentosus, 3" .. 17/6 ..	Silver Hatchers, 2" .. 4/6 ..	Topgears Saxifragilis, 2" .. 5/6 each	Wu-fu Black Swords .. 19/6 pair
Kribia Mikiel, 1 1/2" .. 15/- ..	Abramites Headstander, 1-1 1/2" .. 35/- ..	Orange Chromides .. 8/6 ..	Swordtail Characters .. 18 each
Polycanopsis Albinovata .. 7/6 ..			Large Puffers, 3" .. 15/- ..
Red Fish, 10" .. 35/- ..			Zarco Planus .. 40/- ..
			Adult Pearl Gourami .. 27/6 pair
			Black Swordtails .. 5/- each

SEND S.A.E. FOR LIST OF POND FISH AND POND PLANTS

<b>LIVEBEARERS</b>	<b>HEMIRHAMPHS</b>	<b>THREE SPOT GOURAMI</b>	<b>FALMACHROMIS</b>
<b>Guppies</b>	Nannostomus Marginatus .. 5/- each	.. 2/6 each	Annoscus .. 12/6 each
Standard .. 3/- pair	Anostomus Anostomus .. 25/- ..	Male Siamese .. 10/- ..	Falmachromis .. 10/- ..
Black Veil Tail .. 12/6 ..	Abramites Headstander .. 35/- ..	Cloning Parrot .. 15/6 ..	
Red Delta Guppies .. 19/6 ..	Panosteus .. 3/6 ..		
Black Delta Guppies .. 15/- ..	Silver Hatchers .. 4/6 ..		
<b>Mollies</b>	X-Ray Fish .. 3/6 ..	<b>BARBS</b>	<b>CATFISH &amp; LOACHES</b>
Black .. 3/- each	Black Widow .. 2/6 ..	Tinfoil .. 5/- each	<b>Corydoras</b>
Speckled .. 2/6 ..	Pyrrhulina Racheviana .. 4/6 ..	Large Tinfoil 8" x 5" 7" 70/-	Albino Palatus .. 8/6 ..
Liberty .. 4/6 ..	Flagella (Prochilodus) .. 25/- ..	Nigger Ad. .. 7/6 each	Annos .. 4/6 & 5/6 each
Lynx Black .. 5/- ..	Marble Hatchers .. 4/6 ..	Barbus Torus .. 2/6 ..	Hassar .. 8/6 each
Saffin Black .. 21/- ..	Recessus, 1" .. 2/6 ..	Chesser .. 2/6 ..	Palatus .. 4/6 & 5/6 each
Albino .. 4/6 ..	<b>Denies</b>	Albino Tiger, 1 1/2" .. 4/- ..	Lybia .. 5/6 each
<b>Swordtails</b>	Glare .. 1/6 each	Ember .. 17/6 ..	Pontostatus .. 8/6 ..
Red .. 2/6 each	Glare Pearl .. 2/- ..	Half Banded .. 1/6 ..	Julii .. 10/6 ..
Green .. 2/6 ..	Glare large 3" .. 4/- ..	Golden .. 2/6 ..	Elegans .. 10/6 ..
Red Wagtail .. 3/6 ..	Zebra .. 2/- ..	Goldfish, 2 1/2" .. 15/- ..	Argenteus .. 8/6 ..
Red White .. 3/6 ..	<b>SHARKS</b>	Large Goldfish 8" x 10" 9" .. 50/- each	Melanostus .. 4/6 & 5/6 each
Albino .. 3/6 ..	Silver .. 21/- ..	Ophidion, 4" .. 50/- each	Upside Down Cats .. 10/- each
Red Tuxedo .. 3/6 ..	Red Fin .. 5/- ..	Barbus Virens .. 4/- ..	Cyprinops Loach .. 1/6 ..
Green Tuxedo .. 3/6 ..	Red Tail Black .. 5/- ..	Tiger .. 2/6 ..	Khuli .. 1/6 ..
Black .. 4/6 ..	<b>RASBORAS</b>	Comings Ad. .. 7/6 ..	Otocentrus .. 8/6 ..
<b>Platies</b>	Barbus Dorsalis .. 1/6 each	Barbus Hasselti .. 4/- ..	Socking Loach .. 4/6 ..
Red Wagtail .. 3/- each	Ista .. 1/6 each	Cherry .. 1/6 ..	Pimelodella .. 7/6 ..
Assorted .. 3/- ..	Rasbora Platine .. 3/- ..	<b>CICHLIDS</b>	Grassia .. 7/6 ..
Red .. 3/- ..	Scoortails .. 3/- ..	Angels	Oreochromis .. 35/- ..
Moon .. 3/- ..	Forsal Rasbora .. 1/6 ..	Adult pair .. £3 ..	Cyprinops, 5" .. 25/- ..
Marginal Varietas .. 17/6 pair	Harlequin .. 2/6 ..	Black .. 4/6 each	Poecilia Cate .. 10/6 ..
Varietas .. 7/6 ..	<b>KILLIFISH</b>	Lace Veil .. 5/- ..	Walkei Cate .. 8/6 ..
Yellow Wagtail .. 3/- each	Pachia Ceyl .. 5/- each	Veil .. 7/6 ..	Shovel Nose Cate .. 20/6 ..
Orange .. 3/- ..	Bivulva Mikiel .. 15/- pair	Adult wild .. 90/- pair	
Blue .. 3/- ..	Pantilia Seifastata .. 8/6 each	Falmachromis .. 8/6 each	<b>VARIOUS OTHERS</b>
Tuxedo .. 3/- ..	<b>LABYRINTHS</b>	Brown Dipsa 2" .. 50/- ..	Scoti .. 10/6-10/- each
Black .. 2/- ..	Dwarf Gourami .. 10/- pair	Blue Heckle Dipsa, 3" .. 48/6 ..	Elephant Nose Fish .. 25/- each
<b>EGGLAYERS</b>	Honey Gourami .. 5/- each	Blue Acaras .. 3/6 each	Budie Buds .. 3/- ..
<b>Characins</b>	Opaline Gourami .. 1/6 ..	Marble Cichlids .. 4/6 ..	American Flag Fish .. 3/6 ..
Neon 3/6 each (7/6 for six)	Combata .. 4/6 ..	Pike Cichlids .. 30/- ..	Leaf Fish .. 7/6 ..
Cardinal .. 4/6 each	Female Siamese .. 4/- ..	Orange Chromides .. 8/6 ..	Laybore Labeore .. 4/6 ..
Lemon .. 3/6 ..	Pearl Gourami .. 3/6 ..	<b>DWARF CICHLIDS</b>	Spiry Eels .. 8/6 ..
Flame .. 3/6 ..	Green Kissing Gourami .. 4/6 ..	Apoistogramma Sumatrense 5/6 each	Madagascar Rainbow .. 5/- ..
Red Nose .. 2/6 ..		Apoistogramma Agassiz 7/6 ..	Bombie Bess .. 3/- ..
Bleeding Heart .. 10/6 ..		Falmachromis .. 7/6 ..	Apple Snails .. 2/6 ..
Serges .. 4/6 ..		Kribia .. 5/6 ..	Chala Maccholi .. 7/6 ..
Glowlight .. 3/6 ..		Apoistogramma .. 5/6 ..	Siamese Tiger Fish .. 10/6 ..
Doris .. 7/6 ..		Butterfly .. 50/- ..	African Spiny Eel .. 25/- ..
Blind Cave .. 4/6 ..		Serranob .. 10/- ..	Knife Fish .. 10/- ..
Beacons .. 2/6 ..		.. 44 10/-, £3 20/-, and £7 10/-	Pygmy Sun Fish .. 12/6 pair
Rossetti, 1" .. 4/6 ..			White Cloud .. 3/- each
Leporinus Fasciatus .. 25/- ..			Butterfly .. 50/- ..

All fish guaranteed live delivery and in good disease free condition. 7/6 rail and packing charge to be included with every order. All consignments of fish to be collected from nearest main-line railway station. ALSO FULL SELECTION OF PLANTS, EQUIPMENT, ETC. Fully illustrated Equipment Catalogue Is 9d. post paid.

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 SPECIAL—FOR TROPICAL TANKS "GROLUX FLUORESCENT TUBE LIGHTING UNITS"  
 NEW FILTERS NOW IN STOCK. DYNOFLO MOTOR FILTER 25-17-6 EHEIM COMPACT FILTER 383  
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 Golden Orfe 6"-7" 8"-4" 13/- & 22/6  
 7"-5" High Carp .. 5/-  
 Green Tench .. 2/- & 4/-  
 Large Goldfish 7"-8", 8"-10" 10/- & 12/-  
 Small Orfe .. 2/-  
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 "Poplar" with neon indicator .. 12/6  
 Frost Mistle .. 24/6  
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 Hy-do "A" .. 120/-  
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 Assorted .. 10/6  
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 Neons, 8 for 1/-; 2/6 each

**Neons, 8 for 1/-; 2/6 each**  
 Rasbora .. 4/-  
 Angelfish 2/6 & 2/6  
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 Platys .. 2/6  
 Beacoms .. 2/6  
 Black Widow .. 2/6  
 Platys various, from 2/6  
 Swordtails .. 2/6  
 Schobert barb 2/-  
 Stenotomus .. 2/-  
 Guppies (pair) 1/6, 2/-  
 Harlequin .. 2/-  
 Cherry barb .. 2/-  
 Nigger barb .. 2/-  
 Chequer barb .. 2/-  
 Red Eared Tetra 2/-  
 Pterocoma 10/-, 15/-  
 Large Green Sailfin .. 2/6  
 Mollies .. from 5/-  
 Black Angels .. 2/6  
 Black Lace .. 2/6  
 Angels 4/- to 7/6  
 Tiger barb 2/6 & 2/6  
 Glowlight .. 2/-  
 Penguins (each) 2/6  
 Bumble Bee .. 2/6  
 Mollies, Black .. 2/6 & 5/-  
 Lemon tetra .. 4/-  
 Glassfish Adult .. 4/6  
 Assorted Cats .. 7/6  
 Oncelous Cats .. 7/6  
 Fighters 10/-, 12/6  
 Serpae .. 4/-

Think Up 3/-, dwarf or leaf 2/6, Kissing 4/-, Opaline 2/6, Guppies.  
**"SWIM-AWAY"**  
 Aquarium Vacuum Cleaner .. 60/6  
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 48 x 10 x 15 .. 20 10 0  
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 Sagittaria .. from 6d. each  
 Vallis Torta .. 6d. "  
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 Inter-Pet .. 10/6  
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 Pterocoma Erlbaum 7/6 & 10/- each  
 Discus .. 10 & 15 each  
 Large Sailfin Green Mollie .. 20/-, 25/-  
 Apistogramma .. 7/6, 12/6  
 Knife Flat Nigerian .. 4/6 each  
 Black Cardinal .. 7/6 to 20/-  
 Santa Irena .. 2/- & 7/6  
 Amazonian Cichlid .. 7/6 to 15/-  
 Black Veil Angelfish .. 6/- & 7/6  
 Tin Fish Barb 3" - 4" - 5" .. 6/-, 7/6, 15/-  
 Silverfish .. 17/6, 20/-  
 Firemouth .. 18/- & 15/- each  
 Red Veined Cuppy .. Large 15/- each  
 Red Tail Shark 2" - & 10" .. 8/6 & 10/-  
 Starry Fish ..

*Our minimum order for fishes is £1, a charge of 15/- is made for commission. Carriage charges, by fast passenger train and telegram stating time of arrival. Give phone number if possible.*

**NYLON COATED AQUARIA, STOCK SIZES**  
 24 x 12 x 15 .. 43 0 0  
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 White or black covers .. 18/6 & 25/-  
*Lower rates on quotation*

**STANDARD AQUARIUMS (Light Gauge) (Angle Iron)**  
 12 x 6 x 6 .. 10/6 24 x 12 x 12 .. 32/-  
 10 x 6 x 6 .. 10/6 24 x 12 x 15 .. 40/-  
 14 x 8 x 8 .. 12/- 30 x 12 x 15 .. 50/-  
 18 x 8 x 8 .. 17/6 36 x 12 x 15 .. 57/6  
 18 x 10 x 10 .. 22/6 48 x 12 x 15 .. 130/-

**COVERS STANDS**  
 18 x 10 .. 16/- 18 x 10 x 30 .. 35/-  
 24 x 12 .. 23/- 24 x 12 x 36 .. 50/-  
 30 x 12 .. 22/6 30 x 12 x 36 .. 55/-  
 36 x 12 .. 27/6 36 x 12 x 36 .. 60/-  
 Aquarium covers sent by post only at customer's risk.

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 Exotic Flakes .. 1/6  
 Hykes Flakes .. 1/6  
 Brexian .. 1/6 & 2/6  
 Bior .. 6d. & 1/6  
 Dry Daphnia .. 6d. to 2/6  
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 Infusil .. 2/6  
 Elite .. 2/6 C.W. 2/- & 2/-  
 Hobby .. 2/- & 7/-  
 McLyren's .. 1/6, 2/6, 6/6, 17/6  
 Home Swamp .. 2/- & 2/6  
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 Wardley's .. 8/-, 4/6, 2/6, 2/6, 1/3  
 Fantasy .. 2/-, 9/-  
 Tetra Min .. 1/11, 2/6, 7/6, 20/-, 34/-  
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 Vankor .. 1/6 & 6/6  
 Shad .. 2/- & 4/6

Add 1/- up to 10/- 1/6 up to 20/- 2/- up to 25/- up to 40/- over Free  
 CARRIAGE AT COST CHARGED ON AQUARIUMS, STANDS, AND TANKS. SENT AT OWNER'S RISK  
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**ADDITION TO THE "SUREGROW" RANGE  
OF FINE TROPICAL FISH FOODS**

**"Suregrow"  
BRINE  
SHRIMP  
EGGS**



NOT ONLY FOR YOUNG FRY,  
BUT ONE OF THE FINEST LIVE  
FOODS FOR ALL SPECIES FED  
AT LEAST ONCE A WEEK WILL  
SHOW MARKED IMPROVEMENT  
IN COLOUR CONDITION ETC.  
**"A NATURAL FOOD"**

AVAILABLE IN FOUR SIZES WITH INSTRUCTIONS 3/9  
6/6 12/6 25/- AT YOUR DEALERS NOW OR IN CASE  
OF DIFFICULTY DIRECT FROM THE ADDRESS BELOW

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SPECIALISTS AND BREEDERS  
OF TROPICAL AND COLD-  
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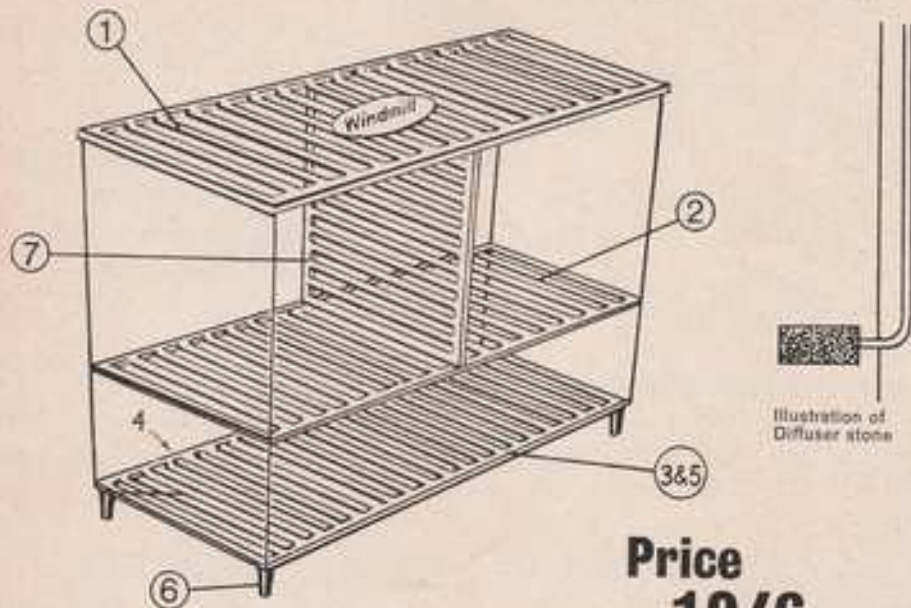
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**ALWAYS ARRIVING REGULARLY  
RARE SPECIES FROM ALL OVER THE WORLD**

WHOLESALE ORDERS EXECUTED IMMEDIATELY

# The Windmill Breeding Trap



**Price  
19/6**

1. Grilled top, base and interior partitions allow water flow and movement of fry.
2. Easy-fit interior fry separators can be positioned if required.
3. Removable secondary base allows passage of water and waste but not of fry.
4. Provision for internal aeration to encourage water flow through the trap.
5. Fixed base provides exit for fry but not of adult.
6. Legs on which trap can stand on the bottom of a tank, or rubber suckers by which trap can be adhered to the side of tank.
7. Upper compartment divider enables two adults to be accommodated or can be used to limit movement of a single female.

**WINDMILL PRODUCTS**  
**244 Vauxhall Bridge Road, London, S.W.1**



**STAPLE FLAKE FOOD  
BY GERMANY'S LEADING  
PRODUCERS**



Standard size	Double size	Breeders Jar	1 litre tin	Gallon tin
2/-	3/-	6/9d	22/6d	70/-

**COMPARE THE QUALITY—**VITAWIL compares with any other food available

**COMPARE THE PRICE—**We minimise advertising and other selling costs—thus you get **TOP VALUE**

**CHANGE TO VITAWIL** Join the ranks of other aquarists. You will be delighted

***INTER-PET - DORKING - SURREY***

# QUEENSBOROUGH FISHERIES

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THOUSANDS OF POND FISH IN STOCK

## SPECIAL PLANT COLLECTIONS (post only)

All post enquiries: 111 Goldhawk Road, W.12. 2s. post and packing on all collections

**TROPICALS**  
A 30 plants including  
Dwarf Lily Crystocoryna  
Wisteria etc. £1

B 12 Vallneria  
12 Myriophyllum  
2 Micro Sagittaria  
4 Ludwigia  
4 Elodea Dense £1

C 12 Vallneria  
6 Myriophyllum  
4 Ludwigia  
6 Elodea Dense  
4 Batavia  
1 Amazon Chain Sword  
1 Portulac Hair Grass £1

D 1 Nymphaea Sophia  
1 Giant Hydrophila  
1 Apogonium  
1 Wisteria  
1 Giant Sagittaria  
1 Crystocoryna  
1 Indian Fern  
1 Portulac Hair Grass £1

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See Page xi



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VOL. XXXI No. 1

1966

## House Plants for Fish Houses

by D.M.C. JONES, B.A.

### The Cyclamen

CYCLAMEN are among the most popular winter-flowering indoor plants and thousands of them are bought around Christmas when they are in full bloom. Their beautiful flame-like blooms come in shades of white, pink and red. The leaves are heart-shaped and often have attractive silver markings.

Cyclamen enjoy a fairly warm, humid atmosphere, and so the atmosphere of the fish house will suit them very well. The plants should be placed in a well-lighted, draught-free position. Watering has to be done with care, and soft water should be used. The fleshy corm is liable to rot and so the plants should be watered from below by standing them in a deep saucer of water for about half an hour. After this time they should be drained, and any water remaining in the saucer thrown away. They should be fed regularly with a liquid fertilizer while they are in bloom.

When a flower or a leaf dies it should be removed by giving the stem a slight twist and a sharp pull—this prevents any of the stem staying on the corm and setting up rot.

After the plants have finished flowering, water should be gradually withheld and the pots placed outside in a shady position during the summer months. They can be re-potted in July using John Innes Potting Compost No. 1, making sure that the corm is only partly buried. Bring the plants back into the fish house towards the end of September.

If a temperature of 60-65°F. can be maintained the cyclamen can be raised quite easily from seed. This is an economical and interesting way of acquiring plants. Sow the large seeds, either in the spring or the autumn, in a well-drained seed pan containing John Innes Seed Compost. Space the seeds about half an inch apart and cover them with  $\frac{1}{2}$  inch of compost. Germination will be slow and erratic but the little plants will start to appear after about four weeks.

# Farming for Fish

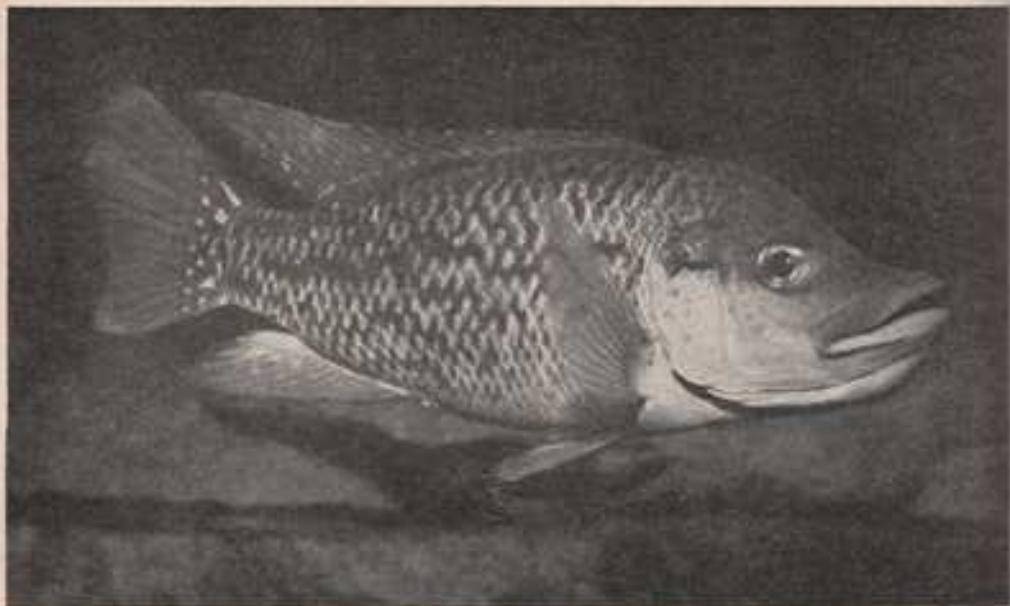
by PATRICK DOBBS, B.Sc.

IT is a trite and familiar saying among agriculturalists, that an acre of water can be farmed to yield more human food in a given time than an acre of land. The subject is, then, dropped, usually without any suggestions as to the nature of this food or how it may be produced and harvested. The fish ponds of Demerara provide one answer; not the only answer, for in Japan shrimps are grown, in the United States trout are raised artificially in running water and Lake carp have been cultivated for centuries in the monasteries of Europe.

The flat expanse of alluvial swamp that stretches from the mouth of the Orinoco through the coastlands of the Guianas to Brazil is a formidable impediment to development. The sea is shallow, merging into the land, so that the towns are all, perforce, built on an unstable foundation of mud, and subsidence of roads, buildings and wharves is a recurrent headache. Drainage and sea defence work constantly presents staggering yet unavoidable difficulties and expense. The soils of the coastal plain are made of heavy alluvial clay and acid peat from the decayed vegetation of the water-logged mangrove swamps and jungle beyond. They have a high concentration of toxic salts which is maintained by an upwards pressure of sea water

from the ocean floor. Under such conditions farming, though by no means impossible, is difficult. The main crops are traditionally plantation sugar-cane and smallholders' rice. Secondary in importance are bananas, plantains, citrus fruits, vegetable crops and fish; this last, the newest enterprise to be developed and possibly the easiest to carry out.

The main species of fish raised are *Tilapia mossambica*. A few others, principally carp, have been tried, but none can compare with the tilapia which enjoy world-wide popularity throughout the equatorial belt. They mature early and breed freely; good plump fish eight inches long may easily be grown within a year. They thrive under a wide variety of conditions, living happily in salt or fresh water and withstanding a big range of acidity—necessary in the Guianas where the soil water pH is often below four. They are not easily damaged when handled or left for short periods out of the water, and can survive transportation from pond to pond under inevitably rather rough and confined travelling conditions. The quick changes of water temperature, salinity and acidity, unavoidable on releasing fish in new ponds, upset *Tilapia* remarkably little.



*Tilapia mossambica*. One of the larger mouthbreeders





A Guineese casts his net over a well-stocked irrigation canal

Photo: Patrick Datta

Ponds vary in size from ten acres to ten square yards. The Congregational school at Stewartville has a small pond for teaching and demonstration. Uivlugs sugar estate has one for the benefit and amusement of their staff and the Adventure farming company has a commercial enterprise on a big scale. The sides of the pond should gradually slope down to give a depth of three to four feet. One corner is shaded to give refuge from the mid-day sun, a simple bamboo framework with a roof of palm leaves being sufficient. Vines of melon or squash often cover the shelter, providing an additional contribution to the stock.

It is a good idea to segregate the fish destined for the table into male and female ponds at an early age. In this way overcrowding is avoided and specimens can reach their full size, for *Misgurnis* breed early and fast and do not reach their full weight in a densely populated mixed-sex pond. A separate breeding pond can be maintained from which young fry can be collected as required. Grassy banks provide a good site for nesting and encourage egg-laying. When the fish have grown to a length of about one inch the sexes are easily differentiated and they do not suffer ill effects from handling and transfer. Alternatively, the department of agriculture in Georgetown will supply reasonable quantities of sexed fishes without

charge. Thin plastic containers are used for transport; before releasing the contents in a new pond the containers are held for a while below the surface of the water still sealed to avoid the shock of a quick change in temperature. The top is then opened quietly and the fish swim out in to their new home.

A small stock of rotted farmyard manure stacked in the water in a wire-netting enclosure gives the fish a food supply. A few water-weeds are also an asset, but a heavy growth will make fish catching difficult. Sometimes termite colonies in rotting wood are slung over the water so ants and their eggs keep dropping in for the fish below. Rice dust is the cheapest feed, and the fish grow most quickly where a little is thrown on to the water every day. As with other farm stock it is best to provide about as much food as they can clean up.

If water is taken from a creek or canal rather than a well or mains supply the inlet pipe must have a fine-meshed filter to keep out predatory species such as the *hourai* and piras. The outflow pipe must of course also be filtered, and it is very useful to be able to drain the pond for harvesting or inspection. The fish can be caught by running out the water or by netting. Any predators found are thrown out, for some generally get in the pond despite every precaution; the *hourai* for one can travel fair distances

over-land through long damp grass. Alligators are often a great nuisance and mesh fencing is necessary to keep them out.

Although letting the water out is the surest way of finding all the fish, nets are often used as they are easier and nearly as thorough. Young fry are scooped from the breeding pond in a net of cotton fabric stretched over a rectangular frame. They can be held out of the water on the damp cloth for some time without ill effects and thus sorted at leisure. Adult fish are caught in a net stretched between two posts which are drawn upright through the water along either edge of the pond, from one end to the other. Before netting, the pen, shelter and other obstructions are taken from the pond and it is easy to see that the job cannot be done satisfactorily if there is excessive weed growth. The top of the net floats on corks and the base is weighted with lead so that it drags along the bottom. When the whole pond has been traversed the base of the net is drawn up the bank so that the contents are held out of the water and may be caught and examined. The small specimens can pass through the mesh but the big fish are practically all trapped.

Right—Fish-pond for "farming" showing shelter. Stewartville Congregational School



Photo:

Patrick Dillon

## Flowering Shrubs at the Pondsides

by JAS STOTT

WHEN in bloom, flowering shrubs are wonderful subjects for providing areas of concentrated colour; that is, of course, if the right species are selected for some shrubs are grown more for the attractive foliage they carry than for the flowers they produce which are often insignificant compared with those grown for their floral beauty. There is another group of shrubs grown chiefly for the attractiveness of the berries or fruits they bear and yet others that are cultivated for the autumn tints produced.

All shrubs, however, fall into two main groups: deciduous and evergreen. The former lose all their leaves in winter while the latter remain permanently covered in foliage. This does not mean, of course, that evergreens never cast their leaves because, in fact, they do but only after new foliage is formed and at a much more gradual rate than the deciduous shrubs.

As far as size is concerned, there are shrubs to suit all positions, large or small, but for the average sized garden pond the pondkeeper should confine his choice to the dwarf species and varieties preferably, in the main, from the evergreen group for they not only help brighten the scene in mid-Winter with their foliage but there is less trouble from the sudden leaf-drop in Autumn as is experienced with the deciduous subjects.

Shrubs, when used mainly as part of the pond surround, should be planted as background subjects or to form a link between the pond and its surround and other parts of the garden. Where a peaty, acid soil is available (or perhaps it is better to say, in lime free areas), the Rhodo-

dendron species really deserve to be mentioned first for there are some beautiful varieties to be had these days. It is, of course, impossible to mention the many varieties to be obtained in an article of this sort but here are four dwarfs to be recommended for the pondkeeper's purpose. *R. anthopogon* bearing pale yellow, wavy edged flowers in April with a mature height of 2 to 3 feet. *R. idlyman* with deep red bloom in June and the bush has small, dainty leaves attractive in themselves. Height 2 feet. *R. campyligyan*, providing pink flowers in May and a height of 3 feet and a prostrate variety for the rock edging. *R. farrenii* var. *repens*, deep crimson flowers in April, and a most attractive form.

Azaleas are also included in the Rhododendron genus and there is no need for me to emphasize the fact these shrubs are capable of providing a wonderful display of colour during Spring and early Summer. Two varieties come to mind at once, both evergreen and suitable for a pondside position. Kur-an-yuki with a height of some 18 inches and bearing pink flowers in June and Kusun-tsu-bu with flame-coloured blooms in June and a height of 2 feet.

Next in order of merit on my list of suggestions I place the Spiraea (although deciduous), and that tried and trusted old favourite, Anthony Waterer, my first choice for its carmine bloom in August is always pleasant. It grows to a height of some 2 feet. A delightful companion for this variety is *S. caltora alba* growing to a height of around 18 inches and bearing creamy-white flowers during the same period. For planting along the bog-edge *S. alba-*

and some is a delightful subject some 12 inches high producing pink feathery blooms in July and August.

Late Winter bloom is always welcome around the pond and an ideal subject is the evergreen *Viburnum fragrans* which usually flowers around late January or early February offering white blossom tinged with pink and the shrub grows to a height of some 4 to 5 feet. When in full maturity they make good background pieces.

There is a charming *Berberis* suitable also for back-

ground planting growing to a height of around 3 to 4 feet. It has attractive, glossy evergreen foliage and produces bright yellow flowers in March; this is *B. aquifolium* while for the rock edge the *Berberis* family offers a useful subject some 12 to 18 inches high in *B. Thunbergii nana*.

A delightful dwarf Willow for roadside planting with a maximum height of some 3 to 4 feet is to be found in *Salix lanata*. It makes a sturdy bush bearing round, silvery leaves and, of course, appreciates a moist position.

## Breeding the Oranda

by J. PIXTON

THE Oranda is a very rare but handsome fish. There is some doubt as to its origin, but it is believed to have originated from a cross between a Veiltail and a Lionhead. It has some of the characteristics of the Veiltail except that the dorsal and the twin caudal fins do not have the same pointed tips. The wart-like growth around the head and gill plates is less pronounced than that of the Lionhead, and some people, including myself, regard this as a distinct advantage. It is a very delicate fish; indeed breeding should only be carried out by the experienced breeder who has all the equipment needed and a knowledge of fish-breeding techniques. It is not a beginner's fish, the inexperienced breeding often gives disastrous results. It needs a properly balanced diet with plenty of live food to prevent constipation, and a soft acid water about pH 6-8. A layer of peat in the filter is very satisfactory in getting and keeping these conditions.

The Oranda, like any other fish, must be brought into form-condition before successful breeding can be carried out, and if the following diet is observed throughout the whole of April, there is a reasonable chance that the fish will breed. Of course, the fish will have to be separated during this process and they must be sufficiently mature, say 3 to 4 years old.

Monday .. .. .	Gordons formula
Tuesday .. .. .	Mashed earthworms
Wednesday .. .. .	White worms
Thursday .. .. .	Tubifex
Friday .. .. .	Daphnia
Saturday .. .. .	Gordons formula
Sunday .. .. .	Tubifex

The Tubifex and earthworms should be well washed before use to ensure no foreign matter is allowed to enter the aquarium. The breeding tank must be set up at least two weeks prior to the spawning pair being introduced and it should not be smaller than 36 in. by 12 in. by 12 in. In many cases 1,000 fry can result from a good spawning so the importance of having a large tank can be appreciated.

The gravel must be washed in hot water and rinsed in boiling water. It is then introduced into the tank and the water added. Also a heater and thermostat should be included in the set up.

I find *Myriophyllum* the best spawning medium, 15 pieces floating and 10 pieces leaded down at one end of the tank are quite satisfactory, but you may have your own ideas on this. The ideal temperature is 75°F and the fish are put into the breeding tank at night after it has been left for two weeks. Spawning should take place, after a dawn, in mid-afternoon.

The parents must be well watched and fed with Tubifex.

A few *Daphnia* introduced after the fish have been fed might offer an alternative to the eggs, but the parents should be removed after the spawning anyway. The eggs hatch in about four days at 75°F and the newly-hatched fry are fed on powdered egg yolk squeezed through a piece of butter-muslin. When the fry are 14 days old, the ones with the single tails should be moved to another tank for they are only taking up valuable swimming space. At the same period the fry will be able to take finely powdered dry food, micro worms, and sifted *Daphnia*. Extra care must be taken with powdered food for it will foul the tank easily if misused. For three to four weeks the fry should be given Tubifex and chopped white worms. Another week or two and the fry will take whole white worms.

If the lighting (which should be about 350 watts in a 36 in. by 12 in. by 12 in. tank) and the food have been administered in the correct amounts, the fry should colour in eight to ten months. Fry born in the April/May period should reach about 1 to 1½ inches in the autumn. The fry should be wintered indoors and should also be regularly culled and, with luck, you will get about 10 to 15 good specimens. Only two to three of these will be show specimens.

If it is wished a few drops of methylene blue can be added to the breeding tank after the parents have been removed.



Oranda. Having the fleshy head of the Lionhead but retaining the dorsal fin of the veiltail.

# Around the Aquariums

by MIKE SHEEDY

RECENT arrivals in the reptile house at the London Zoo include a five foot alligator and two royal pythons. The alligator was presented to the zoo by the Horniman Museum in Forest Hill, where it aroused much interest amongst the younger visitors. As the animal was getting a little too big and temperamental to be handled safely, the Museum authorities felt the London Zoo would be an ideal home for him.

The two royal pythons are about four feet long and they are on view with other pythons in the reptile house. They had been brought back from Ghana by Masters J. C. and G. P. Winterbottom of Newcastle, about two years ago when the snakes were very much smaller.

A terrapin, or European pond tortoise, had been found wandering in the Holloway Road and was brought along to the Zoo offices. During the winter months terrapins should be placed in a box filled with leaf mould or light soil and allowed to hibernate in a cool outbuilding, or they may be kept awake in a warm indoor vivarium. As it is unlikely that this one would have survived the winter months out of doors, it is now living in the reptile house in a warm tank with several other terrapins.

The annual stocktaking at the London Zoo, shows that at the 31st December there were 850 mammals and 1,455 birds housed at the Gardens, together with some 4,000 reptiles, amphibians, fish and invertebrates—not counting the ants, bees and locusts, which would be an impossible task.

It may be of interest to our readers to know that the London Zoo maintains its lead in having the greatest variety of mammals of any zoo in the world, totalling 244 species, and is second only to San Diego Zoo in the number of species of birds which it contains, which totals 630.

Many improvements have now been carried out to the aquarium at Llanerch Deer Park, St. Asaph, N. Wales. Built in the 15th century wine cellars, the visitors will find much to interest them. A very wide variety of tropical, coldwater and marine tropical fish, as well as a fine variety of reptiles, such as snakes, pythons, terrapins and unusual manna-manna, the largest specimens of their kind in any British Zoo.

This aquarium is most interesting, for some of the bottles still containing wine, will be seen in their original state in the walls, and I might add, Mr. Petrie has made a very fine job of the cellars, for I saw them before they were converted into the present state and they were, indeed, in a very bad way, but hard work and patience has at last made it into a fine aquarium with a fine selection of fishes.

On a raw winter's day it is pleasant to slip inside the warm and colourful surroundings of an aquarium, and such a place will be found at the Bristol Zoo. Here brilliant jewel fish, red swordtails and striped penguin fish hover in tropical tanks. The pugnacious looking Jack Dempsey fish swim and the strange mouth breeder does its best to look after a huge family of more than 300 babies. The parent fish open their mouths at any sign of danger and the babies swim inside until the threat is over.

Here the big bass and pollack swim in a private salt-

water sea that is never tipped by storms, and pike and chubb patrol reaches never troubled by the angler's line. Yes, if its colour and warmth you want on a bleak day in an English winter, Bristol Zoo has its own snug havens.

There is nothing a sea-lion enjoys more than showing off its skill at catching things, and when it can show off its juggling skill by catching herrings or whiting it is even more delighted. That is why Bristol's Zoo sea-lions are being encouraged to flap up on their concrete platform and catch their afternoon meal. They show the dexterity of a brilliant fiddler in the slips as they catch the fusillade of fish flung by a keeper from a bucket.

It is hoped that Bristol Zoo's two existing sea-lions will be fully trained by the time two new sea-lions arrive to join them at the end of April. Eventually there will be a quartet of sea-lions on the receiving end of the flying fish.

With some reluctance the Bristol Zoo council have been compelled to increase the admission charge to 4s. for adults and 2s. for children under 14 years. This charge covers everything and there are no extra charges for the aquarium or any other exhibits. Old age pensioners can still go in on presentation of their National Insurance pension book on Mondays (except bank holidays), for sixpence.

The cost of food, wages and salaries, fuel, transport of animals, maintenance and new buildings have all risen and resulted in this inevitable increase.

Recently I had a letter from a reader of *The Aquarist*, wanting to know why snakes are not found in Ireland today, and also if at one time they were found there. I have already written to him and given him my views which I would like to give to other readers of *The Aquarist*. I think this is a very interesting question and I look forward to some of our reader's views.

First of all, I myself was born in Ireland and also went to school there. I was taught to believe that St. Patrick drove the snakes from Ireland. Later I learned that the snakes were gone from Ireland two thousand years before St. Patrick came. I wonder if any of our readers could throw a light on this because you can go from end to end and all over Ireland without finding a snake, no matter how small.

This season I will be presenting Sir Robert Fossler's group of African lions. While I am on tour readers and zoos can still write to me at my home address which is 19 Vine Street, Rotherham, Yorks. The mail will be forwarded to me, for I will still continue to send my news to *The Aquarist*.

## APOLOGY

The Ed. regrets the errors appearing in the sub heading of the article on The Sucking Loach (March issue) which should have read: *Gyrinocheilus Aymonieri* (Tirant 1883)

# AQUARIST'S Notebook

by P. M. FULLER

**M**ANY readers have expressed to me a desire to know something about the early days of this magazine, about how it came to be produced, its nature in the first years of publication, and the difficulties it had to become established. I hope the following item (the first of two) will begin to serve this demand. I must lay on record the debt I owe to Dr. J. R. Vincent of Peterhouse college, Cambridge, who made early editions of the magazine available to me, and has furnished valuable assistance throughout the compilation of this article.

In May 1924 the first edition of "The Amateur Aquarist" was published at sixpence. It was described as "A monthly journal devoted to the study of Aquatic life". A modest production, consisting of only 12 pages, it nevertheless contained articles by eminent persons within its own sphere. A contributor to the first edition, was E. G. Boulenger, F.Z.S., Director of the London zoo aquarium. The founder editor, A. E. Hodge, F.Z.S. (the extent of whose activities is indicated when it is realised that he also designed the magazine's first head-piece), wrote on this occasion:

"In modest fashion 'The Amateur Aquarist'—the first magazine of its kind to be published in this country—makes its plunge into the current of public opinion. The aims of the magazine are to encourage the novice as well as the student of aquatic life, without delving too deeply into technicalities, and it will be my endeavour, therefore, to give prominence to such topics as are of general concern while eliminating those which are abstruse."

One interesting feature of the first edition was a competition for young readers. Subsequent copies of the magazine indicate that Aquarists were facing much the same problems as we do today. Among the enquiries were such perennials as the simplest method of mending cracked tanks, and requests for opinions as to whether ants' eggs were any use as pufferfish food!

In July, 1924, the size of the magazine was increased to sixteen pages, and in August it enlarged its name to "The Amateur Aquarist and Reptilian Review". In September the following announcement appeared in the editorial:

"There are speed limits to progress, a fact which I have noticed in the conducting of 'The Amateur Aquarist'—the magazine is developing so fast that the work entailed is more than I can cope with 'single-handed' . . ."

In consequence the editor declared that the magazine would become a quarterly publication, and expressed a hope that by the spring it would be back to monthly production. Regrettably, this was not to be so for many years to come. The sixth edition of the magazine (Winter 1924-5) marked a significant point in its career because it then became the official organ of the British Aquarist's Association and also increased its price to 1s. The next edition, Spring of 1925, marked an increase in size to twenty pages.

The Autumn edition of 1925, the first copy to be published by the British Aquarist's Association, carried an announcement from the editor which indicates that it was then in some difficulties owing to the fact that initial subscriptions were expiring and there was some consternation as to whether they would be renewed. The following edition included an offer of the first two copies of the magazine to new subscribers as an inducement to increase circulation; these editions contained a great deal of material relevant to novices.

The Spring edition of 1926 also contains some interesting

material. Published therein is the result of an appeal launched in the previous issue, to provide retailers with free leaflets on goldfish-care for distribution to customers. Although the response was not as great as had been hoped, £7 8s. was raised, and 5,000 leaflets printed at a cost of £4 16s. 6d. Also the magazine contains the first proposition for a national show to be held in central London! The summer edition of 1926, despite the general strike which had affected (as the editor pointed out) the magazine as much as any other, showed a further increase in size, and this month it had doubled its number of pages since its publication not much over 2 years before.

Number 1 of Volume 3, produced in the Spring of 1928 was the next significant edition. Although still a quarterly despite frequent correspondence on the subject, the magazine was prospering. Its name changed to "The Aquarist and Pondkeeper", by which it is now known, and it carried a very pleasing new cover design.

This first article on the history of the magazine has traced, in some detail, the nature of its early editions and changes and its precarious beginnings; next time I hope to continue in outline, a description of its progress until the present day.

Among the most intriguing, but least often seen, aquarium fishes are the 'Puffers'. They belong to the order Plectognathi which includes such bizarre creatures as 'Coffin fishes', 'Trigger fishes' and 'Porcupine fishes', and the Puffers themselves are no less fascinating. In appearance they are quite different from the usual aquarium fish; in fact they appear somewhat awkward and over-balanced with large heads widely separated eyes, and teeth that are formed in the shape of a beak. Even their fin-structure is unusual; movement is obtained by propulsion of the pectoral fins, which have independent motion, the caudal fin being used for steering purposes only. This strange arrangement enables the fish to swim backwards, in itself a valuable defence mechanism, but in addition the fish's most striking feature is also primarily a means of self-protection for it can inflate itself at will with air or water and erect spines to frighten adversaries. In captivity it may be induced to perform this feat by lifting it out of the water. It is enabled to do so by the strong circular sphincter muscles which contract after each gulp thus acting as a form of valve. When inflated with air the fish will float, inverted, at the surface.

Those who keep Puffers invariably ascribe to them great powers of intelligence; however, they are somewhat difficult to care for. Those species coming from brackish water require gradual acclimatisation before they may be safely kept in fresh water. They are all notably aggressive, even towards their own species, and extremely destructive thus being entirely unsuitable for community tanks. Puffer fish will not accept dried food; snails or other fresh-water molluscs are preferred, with crustaceans, water-beetles, etc., as second best. On occasion, they can be induced to take Tubifex. A temperature of between 77 and 80 degrees F. is usually desirable.

Breeding, too, is difficult in private aquariums. Geiser, the eminent ichthyologist of the Zurich zoo, has successfully reared over 2,000 specimens of *Tetraodon lineatus brevisirostris*

Continued on page 13 ▶

# THE PEARL GOURAMI



by  
"JAYWARDENE"

**A** NATIVE of Borneo, the Malay Peninsula, Sumatra and Thailand, the Pearl Gourami (*Trichogaster Leeri*), is an ideal fish for the "community tank". Although it grows to a length of more than 4 in., it is the most gentle and well-mannered of fishes, even amongst companions one quarter its size. As if this were not enough it is also, when mature, a ready and prolific breeder, breeding in the standard Anabantid manner.

The basic body-colour of the species is an undertone of brownish-yellow overlaid by a network of a red-white mosaic-type pattern (which extends into the tail and fins), with a black wavy line running from the eye to just beyond half the body length, whereupon it fades away. An indistinct black spot is present at the base of the dorsal fin. Sexes are easily identified by noting the dorsal fin of the species which, in the male, is long and tapers to a point, and in the female is much shorter and rounded. Furthermore, the male, once he comes into breeding condition, cannot be mistaken as his whole throat area intensifies to a brilliant rosy-red coloration, considerably enhancing the fish's already natural beauty.

The Pearl Gourami demands little in the way of special treatment though it seems to have a distinct preference for a well-planted aquarium containing acid water. Live food is greatly preferred.

For breeding purposes mature fish only should be taken, separated and conditioned for a fortnight on such delicacies (to fish) as live Daphnia, white worm, Tubifex, shredded earthworm, and Bemax, for which they seem to have an insatiable appetite. The size of the breeding tank to be used should be given careful consideration beforehand, as young Anabantids are extremely susceptible to changes in water temperature and/or conditions, and in my humble opinion it is a wise policy to breed the fish in the aquarium in which they are later to be raised. For this reason I have always favoured a 48 in. by 15 in. by 12 in. aquarium, though I realise that lack of space in many instances prohibits the use of this size of aquarium amongst many aquarists. However, it should be stressed that in each and every instance the largest possible sized aquarium available should be used in the breeding of this species (and, indeed, with every other member of the Anabantid family) if satisfactory results are to be achieved.

The breeding tank should contain neutral, or preferably slightly acid water, pH 6.8-7.00. The tank bottom should be carpeted with clean compost and a few plants, suitably

placed at irregular intervals, will do much to make the fish feel "very much at home". A few stems of some bushy plant such as *Eliodea densa*, *cabomba*, etc., should be allowed to float in one of the corners to help in the ultimate building of the bubble-nest. Water level should be dropped to 8 in., and temperature maintained at 78°F. It is a generally accepted rule that both fish should be introduced into the breeding tank late at night in order (we hope) to spawn the following morning. In practice I have never found this to be essential having had spawnings occur on many different times of the day.

Love-play is preceded by the male building his bubble-nest assisted by the female. This action cannot be mistaken as the fish continually rise to the surface of the water to gulp in air and then move under the floating plants to release their saliva-coated bubbles, which stick to form a compact nest sometimes as much as 4 in. across.

Approximately two hours later upon its completion, the male commences his wooing of the female with the spreading of his fins and the constant circling of his partner. Eventually she takes up a semi-vertical position under the nest and in a quick action is embraced by the male who wraps himself around her, squeezing out her eggs which float into the nest. This action is repeated several times and upon completion as many as 500 eggs will have been safely deposited in the nest. The female should now be removed from the breeding tank to an isolated aquarium to prevent her from further damage and possible death from attacks by the male.

The latter may quite safely be left in charge of his offspring to add fresh bubbles to the nest in order to maintain its compactness.

Hatching occurs within 36-48 hours, when tiny spinnule-like objects will be seen adhering to the glass sides of the aquarium. It is now advisable to remove the male.

Within a further 48 hours the fry will have become free swimming, and they should now be given their first feed of infusoria. This diet will need to be maintained for a further two weeks or so, after which brine shrimp and micro worm can be fed.

The labyrinth, the auxiliary breathing organ situated above the gills with which all members of the Anabantid group utilise air from above the water, is formed at about the third week. Losses of fry at this time can be expected to be heavy but can be restricted to a minimum if efforts are made to shield the aquarium from draughts and a night-firing glass cover is put to use.

If well fed the Pearl Gourami fry are capable of reaching a length of 1 inch within eight weeks.

# FISH VARIETIES for the POND

by  
A. BOARDER

WHEN the water plants show signs of new growth the pond can be stocked with fishes. The numbers and types to be used will depend on the size of the pond and the whims of the owner. Some general directions will be offered and then it will be up to the pondkeeper to make his choice. It should be realised that there is no need to over-stock the pond as it is certain that if conditions are right not only will the fishes grow but they may also breed. Another point to consider when stocking is that a newly made pond is not likely to function as well over time as many fishes as an established one. If a few fishes can be maintained in good health then a few more can be added later if necessary.

There can be little doubt that the best fish to start with are goldfish (*Carassius auratus*). These are so colourful and easy to manage that they are the ideal fish for the garden pond. There are now many varieties of this species but some of them, although very handsome and suitable for the tank, are not so suitable for the outdoor pond. Those which should not be kept in the pond all the year



*Candelebra primula* provide the foreground display in this large informal pond

round are those fancy types with large and flowing finnage or very deep bodies.

The common goldfish is a sturdy fish with a stout body and short fins; it can be had in gold or red, silver or a mixture of these and sometimes blotched with black. The black on some young fish can soon disappear as this is a stage in the colour change from the first one of bronze to a brighter colour. The beginner is advised to start with small fishes, say not more than three inches in length overall. It is easier to get fish of such sizes established than it is larger ones, the latter having been used to different conditions over a longer period.

A fine variety of goldfish is the Comet. This has a streamlined body with a very long, pointed tail. It is a fast swimmer and a very active fish. Comets do not seem to be very common nowadays but if a few can be obtained they will be a constant attraction in the pond. The colours are often gold and silver, some almost all silver. They can grow to a fairly large size but should suit the ordinary pond admirably.

Another fine type for the pond is the Shubunkin. This is a variety of the goldfish with no hard scales but with a body appearing to represent a fish which has had all the scales scraped off. The outer skin is almost transparent and so allows colours to show through. A good shubunkin



Higo carp. A golden variety of the common carp (*Cyprinus carpio*)



Long tailed shubunkin, mottled colours and flowing tail

should have a blue base with red, yellow, brown and violet in well defined areas and a black speckling or blotching over the whole fish. As can be imagined, such coloured fishes are very attractive when swimming near the surface. There are two main types of shubunkin, the Bristol and the London. The former is more streamlined with larger finnage whilst the latter is the same shape as the common goldfish but with the shubunkin colour.

The fantail goldfish is a handsome variety which can winter out of doors in most parts of the country, but in areas where very severe and prolonged frosts occur it may be necessary to bring such fishes under cover for the winter. The fantail is a short-bodied fish, oval in shape with well proportioned fins, the main feature being a double tail or caudal fin with double anal fins. The desired colour for such fishes is a deep red but some have silver markings on them.

The following fancy goldfish are not suitable for the beginner to introduce into the open pond, but if they can be brought inside away from the frost they could be kept in the pond for the rest of the year. They are: the moor, a black fish in either the fantail shape or the veiltail; the fantail one is the better fish for the pond as it has shorter finnage but both are not very attractive in the pond as their colour blends too much with the base of the pool and so they may not be seen very often. The veiltail is a highly developed variety with an almost round body with a double large, flowing tail. As the body is so short, the internal organs are somewhat restricted which means that this fish is very liable to swim-bladder trouble when it receives a sudden change to very cold conditions. The extra long finnage is also very liable to attack by fin congestion and fungus.

The Lionhead is a type shaped like the fantail with a large protuberance on the head and gill-plates. It has no dorsal fin and can be obtained in the same colours as the fantail. It is as hardy as this fish and so could be kept in the outdoor pond in most southern parts of the country. The Oranda is another variety with the hood on the head and gill-plates, but this fish is otherwise shaped like the veiltail. The extra long fins indicate that this fish is not for the pond during very cold times. The celestial is a variety with its eyes looking upwards and as the eyes are rather protruding it is not advisable to include this type in the pond. The position of the eyes may prevent the fish from getting enough food when in the company of other types. The bubble-eye is another fish which is unsuitable as these bladder-like

Top—Lionhead goldfish

Centre—Fantail goldfish, hardy and colourful

Bottom—Goldfish spawning in the shallows







Top left—Tench. A bottom feeder and a useful scavenger. The golden variety may be preferred as its more brilliant coloration renders it more readily visible at the lower levels of the pond.

Bottom right—Rudd. Active fish given to shoaling at the surface where they are in constant quest of insects flying near the water-surface.

bones under the eyes could be damaged against rocks or when breeding. Another variety is called the peacock, but as this feature can appear in any of the scaled varieties it is not wise to use any unless they are types with stout fins and normal-shaped bodies.

Besides the varieties of goldfish there are other fishes which can be included in the stock. One of the very best is the Golden Orfe (*Idus idus v. orfio*). This is shaped almost like a herring, being streamlined with a pale golden colour. This fish is a very active one and spends long periods swimming about near the surface of the water. It is very hard in action and grows quickly in suitable conditions. It feeds on all types of food suitable for the goldfish but prefers live food and will even take live wasps from the surface. As this fish is so active and fast-growing it is not suitable for the very small pond. It requires a great amount of oxygen and in warm weather could soon be in danger from lack of it unless the pond was of a good size.

The Hi-gui carp (*Cyprinus carpio*), is another fine fish for the pond but again it can grow very large and easily reach over a foot in length in a few years. It is a slower-moving fish than the Golden Orfe but soon gets very tame and can take food from the fingers. Most of these fishes can be various colours of red, white and bluish-pink. They are not suitable for a small pond unless they are immature fishes.

There are several fresh water fishes which can be kept in the outdoor pond; some of these are the native pond and river fishes. The most important point to watch is that no carnivorous fishes are introduced into the pond or they could eat any of the fishes small enough for them to tackle. A very handsome one is the Golden Tench, which is a golden variety of the Common Green Tench (*Tinca tinca*). Although this fish grows to a large size it is in no way harmful to smaller inhabitants of the pond. Small specimens can be put in the pond and they should soon grow well. They make very good scavengers and as they are mainly bottom-feeders they may not be seen very often. However they will often lie near the surface of the water in warm weather and will also breed in the shallow parts of the pond

when their activities are similar to those of breeding goldfish.

The Rudd (*Scardinius erythrophthalmus*) is a fine fish when young. It can be obtained in its ordinary colour which is similar to that of a herring with red fins, or in a golden colour when the red is accentuated, giving it a very attractive look. It is a great attraction in a pond especially if there are several which swim in a shoal. It is more suitable for the pond than the rather similar type of fish, the Roach (*Rutilus rutilus*), as this fish appears to be very prone to the dreaded fungus disease. I feel

that much of the trouble with this fish when introduced to ponds is that it has a very thick covering of mucus and when handled much of this is removed, thus leaving the fish open to attack by the spores of fungus disease. If young Roach can be caught with a net and handled very carefully there is no reason why the pondkeeper should not succeed with this fish, although as it bears such a strong resemblance to the Rudd, there is not much sense in taking chances with it.

The Minnow (*Phoxinus phoxinus*) is a handsome, small, lively fish which prefers very well oxygenated water but can be kept in the garden pool as long as the water remains in good condition with a good oxygen content. A shoal can look very attractive when swimming near the surface.

The Gudgeon (*Gobio gobio*) is a very good scavenger but as it is a bottom-feeder it may not be seen very often on or near the surface. It is not one of the easiest fishes to keep as it prefers slow running water. The Bleak (*Abletus laevis*) is a bright little fish which does not grow very large. It is slimmer in the body than the Rudd and bears some resemblance to a streamlined Roach. It is quite at





Golden orfe



Gudgeon

bone in a well kept pond and is a fast swimmer, eating most foods taken by the goldfish.

The Club (*Squalus cephalus*) is a river fish which can grow very large. It is not very different to a very large Bleak, but it can be kept in large garden ponds. Small ones only should be added to the pond and care must be taken to remove them when they grow too large.

The Common Carp (*Cyprinus carpio*) is a fish which is so much like the ordinary goldfish in shape that I do not think it is very useful in the pond. As its colour is such a dark bronze it is possible that it will not show up very well in a well-planted pond. It is of course very hardy and if it cannot be kept in good health there must be something radically wrong with the water condition. It feeds on any food taken by the goldfish and can grow to a large size as witness the forty-odd pounder in the London Zoo.

The Stickleback (*Gasterosteus aculeatus*) is hardly worth putting in the pond as although interesting when in a suitable tank, it does not show up very well in a fair sized

pond. The Pike (*Esox lucius*) and the Perch (*Perca fluviatilis*), are carnivorous fishes and could eat any fish small enough to get into their mouths, and so if it is desired to keep these very handsome fishes it is necessary to see that they are not with any smaller fishes.

The European catfish (*Silurus glanis*), is often recommended and sold as a scavenger for ponds but can only be taken as this fish can grow to a large size, some over 30 lbs. in weight having been caught. They are also carnivorous and will eat any small fish they can get into their huge mouths.

A most interesting little fish from European waters is the Bitterling (*Rhodeus amarus*) which is unique in laying its eggs within the freshwater mussel (*Unio fluviatilis*). Although this breeding phenomenon is not likely to be observed if it takes place in the garden pond, a pair of these attractive, bright silver little fishes are worthy of inclusion. A member of the carp family, the Bitterling rarely exceeds a length of three inches so is ideally suited to the small pond.

Perch



Golden rudd



# LIGHT and BALANCE

by AQUARIUS

Natural rocks, ornamental shrubs and ferns provide an informal setting for this "bridged" garden pond.



A SUCCESSFUL garden pond is often described as being well-balanced. This term might be confusing to some beginners but it is very important and should be understood. Briefly, a well-balanced pond is one which can function quite adequately with the minimum attention from the pondkeeper. It is possible to instal a pond and stock it so that it can run along and remain in good condition for some years. The amount of light which reaches the pond can be an important factor, as without sufficient light many of the water plants will not flourish. It is only in a pond where the water plants are in good condition that they are able to keep a good balance. Such plants as water-lilies may not thrive without enough light although some of the underwater oxygenating ones do not appear to be so particular.

If the pond has been sited in a sunny part of the garden and is not over-shadowed by trees or shrubs, it is probable that the water-plants will thrive well. On the other hand if too much light reaches the water it can encourage the formation of green algae which makes the water thick and green so that fishes cannot be seen. This algae is a single celled plant which thrives in good light. Where light is excluded it will not grow. As most water plants need the light it should be provided for them and then when they make good growth they will choke out the algae, partly by providing shade and partly by using up the nutrient material also by algae.

When the pond is newly made there is a great danger of too much free-floating algae forming as the water plants will not have made enough vigorous growth to counteract its advance. It is always possible to provide some shade, however, in the early stages of the development of the pond. Before the water-lily leaves have had time to cover some of the surface, some cover from the sun may be provided by adding a quantity of floating aquatics, such as duck weed (*Lemna*). This soon spreads over the surface of the water and can help to keep the water clear. It also provides food for many fishes including goldfish. If this weed gets too rampant and covers almost the whole surface, some of it can be flushed off with a strong jet from a hose.

Another deciding factor in the maintenance of a good balance is between the fishes and the plants. If the correct number and types of fishes have been added and

the water plants were growing when they were introduced, it is probable that all will go well. If too many fishes were added before the plants had begun to grow, or were in too few numbers, then it is possible that the pond will not function at its best. It cannot be expected that a newly-constructed pond can be planted and stocked in a short space of time and function perfectly. Some patience must be exercised as it would be very unusual for such a pond to remain in a perfect condition. There are several factors which will operate to keep a proper balance and some of these are only likely to emerge when everything in the pond is in harmony.

One point which may soon upset the new pond is when the owner cannot refrain from feeding the fishes as soon as they are put in the pond and every day thereafter. Such a practice can soon lead to trouble. Until the water has settled down and the plants are active, it is unwise to start feeding the fishes. Apart from the fact that the fishes may have been disturbed when they were moved, it is probable that they can find plenty to eat around the water plants. Most fishes will eat any soft vegetation and there is likely to be plenty on the newly set plants.

To get a good balance in the early stages of development of the pond it may be necessary to over-plant for a time. Once the water plants are growing well it is possible to remove some or prune the others so that a better balance is effected. This refers mainly to the underwater plants which play a very important part in maintaining a good water condition. The condition of the water should be inspected soon after it has been stocked. Its smell should be noted. A clear water has no appreciable smell and does not look cloudy in any way. A slight green tinge should not be a cause for concern as this is very usual in the early stages, but if the water takes on a muddy hue, or bluish round the edges, there is cause for concern. It may be necessary to change a large amount of the water and refill with fresh. A sure sign of trouble is when the fishes mouth at the surface. There is little oxygen in the water when this happens and in the early mornings it is advisable to inspect the pond and to look for numbers of bubbles at the surface. The weather at the time may have something to do with this as if it has been thundery it is probable that the water will not be well oxygenated and a run from the hose with fresh water should soon improve matters.

WHEN the pondkeeper is ready to stock the pond it will be necessary to consider one or two problems before ordering. If the pond is expected to provide a home for several different types of fishes its stocking will be different from the case where breeding is anticipated. In the first place it can be stated fairly conclusively that if many fishes are left in the pond they will breed but if the stock contains many varieties of fancy goldfish the resultant youngsters will be runts or cross-breeds. In many ponds goldfish breed every year but so many get eaten by the parent fishes that few remain in the pond to grow on. If one requires to breed a special variety of fancy goldfish it is essential that either only one kind is put in the pond or that breeding is done in a controlled manner by removing the spawners to another pond or container so that any fry bred will be true to the parents. All goldfish of any variety can breed together and so it is most important that if good strains are to be bred from they must not be allowed to mix with other varieties.

A study of the list of fishes suitable for the pond can be made in the article on fishes for the pond. A choice can then be made and a few of each type required obtained. Remember that small fishes are likely to establish themselves more quickly than older ones. They are also cheaper to purchase. With a very new pond it will be a wise plan to try a few fishes first and then if there is no trouble with



Large water plants can be planted in pots containing earth and lowered into the pond. A layer of stones on top of the earth prevents it being stirred into the water. If flower pots are used they should be surrounded with concrete or bricks to avoid the risk of them tipping on their side in the water.

## STOCKING and MAINTENANCE

these, more can be added. The water can be tested with these few, or by adding some water fleas (*Daphnia*). These crustaceans will not live for long in impure water. Another good test is to introduce some water-snails, although this might not always be advisable in a large pond. For one thing they might not be easy to find after a day or two, and they might not be wanted in the pond. The addition of water snails is an individual taste for the pondkeeper. Some, such as the large pond snail (*Lymnaea stagnalis*), can eat a quantity of the fine soft leaves of the choice water plants as well as eating much of the food given to the fishes. Another point against introducing these snails is that if dried foods are placed on the surface the snails will get to it and what they don't eat they will feed up with slime. The ramshorn snail (*Planorbis cornutus*), is not as likely to attack growing water plants. Snails can also eat the eggs of fishes but against this the young snails can be eaten by fishes. On balance I do not advise keeping snails in the pond if any breeding is intended.

When new fishes are procured it is most important that they are thoroughly inspected before they are put in the pond. If any pests are present it may be very difficult to get rid of them later on. A wise plan is to quarantine the fishes for about a fortnight before they are allowed to go into the pond. This may not be easy as the pondkeeper may have no place in which to do this. Also most would be very impatient to see the fishes swimming about in the pond. One of the worst pests which could be on the fish is the fish-louse, (*Argulus*). This appears as a small jelly-like creature about a quarter of an inch across and sticks to the fish sucking its juices and causing red wounds.

It is fairly easy for an experienced aquarist to tell if a fish is healthy. Most fishes will keep their fins extended when

healthy and a lowered dorsal fin, the one on the back, usually indicates that all is not well. The fishes should be bright of eye and active. They should be swimming about in their tank at various levels and not mousing at the top of the water. This latter action may be only temporary as the water in the dealer's tank may be over-stocked with fishes and there may be insufficient oxygen for them all. Such fishes should soon become normal again in fresh water.

If the fishes appear to be active and healthy they can be added to the pond. The evening is the best time for this but any time will do as long as the introduction is done with care. The water in the carrying can may be different to that of the pond with regard to temperature. This is easily overcome. Just let the carrying can float in the pond for a time until the water becomes the same temperature as the pond water. Then allow the fishes to swim out quietly. Do not give any food for some days and let the fishes have settled down. When feeding does commence see that only a little food is given at first. If this is done up fairly quickly some more can be given but never so much at a time. The amount of food given will depend on the temperature of the water. During warmer months of the year the fishes will be more active than when the water gets colder and so their appetites will decrease with the coming of the winter.

For a fair sized pond the owner may like to have several different varieties of fish and the following kinds would make a good beginning:—A few common goldfish, shubunkins, fantails, comets, golden trench, golden rudd, golden orfe and hi-go. The number of each will depend on the size of the pond but always allow plenty of swimming space as this is most important. The fishes will grow much faster if they have plenty of room. A pond of about 100

water feet could start with two of each of the above named and they could be added to or decreased in numbers as time indicated whether this was necessary.

The introduction of scavengers will seem almost a must to most beginners but this is not as important as some people would have us believe. I consider that a goldfish can act as a scavenger as well as any of the usually recommended fishes. If a goldfish is healthy and hungry it can eat almost anything and I am certain that anything in the shape of food which fell into the pond would be taken. Sometimes the presence of a green teuch in the pond will ensure that no very large worms which fall in will remain to be and foul the water.

It has sometimes been recommended to add freshwater mussels to the pond as it is stated that they help to keep the water pure. This is a happy thought but it does not happen that way. No mussel could live long in a freshly constructed concrete pond. Mussels must have plenty of mud or muck in which to move around and feed. If this is not present they would soon die and a decaying mussel would foul the water as quickly as anything else I know.

It should be considered that when introducing British freshwater fishes to the pond that they are not all very attractive. Most of them have protective colouring on their backs so that they are not conspicuous from above the water and thereby are less prone to attack from predators. This also means that the fishes are not likely to show up in a half-stained pond. They may look very fine in a glassed tank where their silvery sides will be obvious but in the pond this is quite different.

Once your fishes are settled in the pond their feeding will be the most important task. Although it is probable that they will find plenty to eat there, it is advisable to add various foods from time to time. This is important if any breeding is needed. Fishes require plenty of food to help to build up a reserve of strength and development of eggs and milk if they are expected to spawn well. The food can be dried or live and it is a good plan to use a little of each, or at least to give live food on one or two days each week. Dried foods are numerous and it would be rather difficult to name many human foods which would not be eaten by goldfish. In addition they will eat garden worms (broken if too large), maggots, Tubifex, white worms and Daphnia. The art of maintaining a pond in good condition is knowing when or when not to feed. The pond can function well if left alone but if too much attention is given to it in the shape of over-feeding, trouble will surely ensue.

Using a stick among the marginal growth of blanket weed is the best and quickest method of removing the bulk of this pest.



## FRIENDS OR FOES



Larval form of dragonfly. A hungry predator and a danger to young fish.

WHEN the pond is initially stocked, fish may be the only intended occupants but other life-forms will very rapidly make their appearance. Some of these will develop from the eggs laid by winged insects, some from eggs deposited by amphibious creatures and others may be introduced along with aquatic plants. Some of these creatures will constitute a threat to the pond fish while others can be regarded more favourably as food for the fish. While it is essential to carefully examine all plants for foreign bodies before placing them in the pond it is also of great importance to keep a continual watch upon the pond for signs of visitors and to be able to tell friend from foe.

The greatest threat from the foes is directed towards fry and young fish so that intending breeders must be especially alert. Voracious predators such as dragonfly-larvae, great-diving beetles and their larvae and water-boaters are fairly easily detected because of their size and they can be netted and removed as and when observed, but smaller pests such as hydra are both difficult to see and to remove and it is such creatures as these which should be sought among plant foliage before planting.

The great-diving beetle, a handsome insect of some 1½ inches in length, usually arrives after dark and seeks the deeper regions of the pond where it can stalk and swiftly attack any soft-bodied creature of a size it can manage—a size often exceeding its own. Equipped with very sharp mandibles, it is able to tear and devour its prey quite quickly and be ready for further victims. However, needing to make contact with the upper atmosphere for its air supply, the water-beetle has to make periodic trips to the surface where it raises its abdomen above the water for this purpose and it is on such occasions when a swift dip of the net will secure it for removal. Its larval form is a greater menace for it has a greater appetite (being a larva and requiring to carry out its body-building while in this stage) and must spend its larval existence within the one body of water unlike the adult beetle which can take flight at any time for pastures new.

The water-boater, a rapid-swimming bug, has also to surface for its air supplies at periodic intervals and can be netted in the same way as the water-beetle. Care should be exercised when handling this insect as it will readily



Great-diving water beetle (*Dytiscus marginatus*)

use its "beak" (the sucking mouth-part) on one's flesh and the effect is quite painful although not lasting.

The larval forms of dragonflies present a somewhat different problem. Fully equipped for life under water they have a tracheal system enabling them to take their oxygen requirements from the water and their appearances at the surface are not frequent. While they are capable of rapid movement for short distances when disturbed, they resort to a different technique for catching their prey. There is a waiting game and they look among the submerged foliage making unerring grabs at passing prey by means of a device which shoots out from under the head and draws the victim back to the waiting jaws. Once in the pond their detection is difficult and usually occurs by chance.

Hydras, those tiny polyps related to sea-anemones, can be a scourge among shoals of tiny fry and their dual method of reproduction ensures a rapid multiplication of their numbers when the feeding is good. Since they usually arise from the introduction of plants their eradication must be ensured when the plants are obtained. To do this, and at the same time cleanse the plants of other possible small pests, the plants should be immersed in a container filled with a weak solution of potassium permanganate for some hours at the end of which the offending intruders will be found to have dropped to the bottom of the container when the plants can be lifted out carefully, rinsed thoroughly and placed in the pond.

Newts may make their appearance in the pond during early summer and while these engaging little batrachians



Hydra, actual size about 1 1/4 inches extended

are harmless so far as adult fish are concerned, a small number of them can decimate a shoal of fry in a short span of time. Their eggs, laid singly among the underwater-plant foliage, need not constitute a great threat since many of the tadpoles which emerge will be preyed upon by the fish. Better by far to concentrate on reducing the number of adults when they first appear in the pond in the breeding season.

Frogs, and more rarely, toads, may honor your pond with their presence and can, in the main, be regarded as more beneficial than harmful. Adult frogs prey almost entirely on terrestrial and aerial life-forms so can be regarded as quite harmless and their tadpoles are usually consumed by the fish. The same applies to toads except that their tadpoles are not relished by fish so would complete their metamorphosis and leave the pond while too small anyway to threaten anything!

Mosquito larvae, daphnia (water flea), anasias (water hog-lice) and freshwater shrimps (gammarus) can all be looked upon as friends inasmuch as they all represent potential fish-food providing a useful variety in the diet.

In the main, the foes far outnumber the friends when fish fry are concerned but a motto of "desire and ask questions afterwards" isn't recommended as a good one especially in these days of increasing rarity among so many of our erstwhile common life-forms. A better plan when a creature appears in the pond which defies identification is to place it in a lidded vessel of water until it can be identified when judgment can be pronounced. By this method a possible rarity may be preserved and knowledge accrued for future use.



*Dytiscus larva* feeding upon freshwater shrimp. Note the powerful, sickle-shaped mouth-parts



Water-bosman (*Notonecta*) taking air with its posterior end at the water surface

## OUR EXPERTS' ANSWERS TO TROPICAL FISH-KEEPING QUERIES

What can I do to rid my tropical aquarium of a blue-green algae which has spread from the rear glass on to the compost and is now smothering some of the plants? I do not wish to remove the fish from the tank or introduce any chemicals into the water.

We suggest that you scrape the growth from whatever it is adhering to and then siphon the pieces away. Next, introduce extra higher plants to compete with the algae for food (derived largely, of course, from the waste products of the fish) and light. Expendable and vigorous-growing plants such as *Elodea densa* and hornwort (*Ceratophyllum*) are ideal for this purpose. Finally, remove any manure and/or compost which is not calcium-free, keep the bottom clear of uneaten flesh or dried food, and endeavor to top up the aquarium every now and then with distilled water which has been strained through moist, acidifying and algae-inhibiting peat.

Yesterday I bought a handsomely marked fish called a flying fox. Please tell me where this species comes from, what its requirements are in the way of food and temperature, and whether it will make a suitable occupant for my community tank.

The flying fox, sometimes called the selimang or psi, is normally known as *Epiplatys spilargyreus*. It is a member of the family Cyprinidae, and is said to be fairly widespread over Sumatra and Borneo. It attains a length of about 5 in. in the wild state, but only about half this size in the aquarium. Like most of the cyprinids we keep in captivity, it will live with other fishes without molesting them and will thrive on a mixed diet which includes some soaked greenstuff or mossy algae. A temperature in the neighborhood of 75°F (24°C) suits it best.

I should be grateful for the names of some cichlids (not Oscars) that would live amicably with giant danios, blue parakeets and rosy barb in a large community tank.

You can hardly do better than make a choice from the following species: *Aequidens marmoratus*, *A. variegatus*, *Cichlasoma jentinkii* (rather shy and needs retiring places), *C. amatum* (not entirely reliable when large), and *Tilapia guineana*.

Is it possible to make a durable and non-toxic tropical aquarium frame from wood?

The short answer is yes if the proper joints are made and well-seasoned hard wood such as mahogany, teak or oak is used.

What small characins, barbs and catfish possessed of attractive colors, engaging ways and, when kept under good conditions, a reasonably long life, would you advise me to introduce into my newly set up 48 in. by 12 in. by 12 in. tropical aquarium?

As your tank will support about three dozen of the smaller tropicals, we suggest that, for a start, you introduce small schools of neon tetras, pretty tetras, flame fish and neon minis. For the rest, we recommend such hardy gems as the checker barb, Solizuka's barb, Schubert's

barb, Cumming's barb and one or two of the spotted or banded *Corydoras* catfish.

I wish to obtain healthy youngsters from a newly-purchased pair of speckled mollies. What sort of conditions and food suits this fish best?

Aim to keep the fish at a temperature range of about 72°F (22°C) to 75°F (24°C) in well-planted neutral to moderately alkaline water made slightly saline by the addition of a small quantity of Tidman's Sea Salt. Further, see that plenty of mossy green algae or blobs of cooked spinach or bruised lettuce leaves are included in the diet.

The only plants that grow well in my electrically illuminated tank are various *Cryptocorynes*. Other plants such as *Fallosoria* and *Cubomba* just dwindle away. May I have your comments, please?

Obviously your lighting arrangements are at fault. *Cryptocoryne* spp. will prosper in quite a poor light, but *Fallosoria* and *Cubomba* must have a bright light for at least eight hours every day.

The water that I draw from the mains is hard and alkaline. I would like to know a way to make it softer and less alkaline for my fish.

Boiling your hard water will render it softer. The alkalinity can be reduced by straining it through moist sphagnum moss or peat.

Can you tell me whether it is possible to grow tropical aquarium plants under fluorescent light?

Certain plants seem to grow quite satisfactorily under warm fluorescent light. Among these are the *Cryptocorynes*, *Lagenandras*, *Sagittarias*, and the aquatic mosses technically known (generically speaking) as *Vesicularia* and *Fossilsia*.

Please give me some information on the cultivation of the Grindal worm.

This tiny whiteworm needs warmth, and an ideal place to house a culture is in an airing cupboard where the temperature does not fall below about 65°F (18°C). A shallow box or plastic tray almost filled with yellow loam or leaf-mould mixed with a little clay is needed to house the worms. The soil should be kept moist, but not wet. It should also be covered with a piece of glass and a sheet of thick paper or card on top to exclude light. Feed the worms every other day on about a teaspoonful of milky fares or fine oatmeal mixed to a creamy paste with warm milk.

## COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I am making a garden pond and as there are a number of wild ducks around I wondered if it would be safe to use galvanized wire netting to make screens to cover the pond?

I made screens some years ago with wire netting on frames which have been in use with no ill effects to the fishes. Fresh galvanizing can be dangerous to fishes but a lot depends on the amount of water in the pond. However, there is a plastic square mesh netting on the market which would be quite safe.

I have a goldfish which has developed a white film over its eye. I have been treating it with potassium bichromate for six weeks but it has not been cured. What do you suggest?

Make a solution of a heaped tablespoon of sea salt to a gallon of water. Put the fish in this but try to use a container which is fairly large in surface area. Do not have the water deep. I find that the best results from a salt bath can be obtained when the water is just deep enough to cover the top of the dorsal fin of the fish when

the fin is extended. This shallow water ensures that there is usually plenty of oxygen in the water, and it is possible to keep a fish in such a solution for at least a fortnight whilst it is undergoing treatment. You can then lightly wipe the eyes every day with cotton wool dipped in equal parts glycerine and iodine. The fish should respond to this treatment.

Please could you recommend a book on feeding and the care of goldfish in a coldwater aquarium. We seem to be having trouble with our fish?

Get the book "Coldwater Fishkeeping," at 5s. 6d. post free from *The Aquarist*. This book gives you all the information you need to be able to succeed with your fishes.

I have recently set up a coldwater tank and notice that there are bubbles on the top of the water in the mornings. What is wrong?

The bubbles are a sign that the water is impure and the fishes have been gasping at the surface for more oxygen. You have either insufficient plants for the number of fishes or you have been over-feeding and the uneaten food has polluted the water. Change most of the water and go steady with the food.

I have been unsuccessful in keeping sticklebacks and gudgeon in a coldwater tank. I have fed them on many types of food but soon lose the fish. Where have I gone wrong?

It is difficult to say where you have failed with the information given. You may have over-fed and this could cause the water to become polluted. These types of fish like a well oxygenated water and as long as they have this and plenty of swimming space, there is no reason why they should not thrive.

I have had two goldfish in a bowl for nine years. One has grown to 21 inches but the other is only 5 inches. I know that these bowls are frowned upon by experts so do you think this is a record?

Goldfish can live to 20 years or more, but it is unusual to keep them as long as this in a bowl. The one fish has not grown as well as the other probably because there is not enough swimming space. It would be much better to give them both a proper set-up tank. You would not like to live in a small cell with no furnishings I am sure.

I have made a pond 18 feet by 9 feet and 21 feet deep. Can I put in six golden orfe, 12 in. long; four Migo 12 in. long and eight goldfish 8-10 in. long?

Your pond is of a good size and should be able to accommodate the fishes you mention with no trouble. The orfe and Migo can grow to a large size in time, but you can always reduce the numbers of fishes if it appears that they have grown too large for the pond. You may have to watch points in hot weather as the golden orfe are unhappy in a water which gets too warm and so loses much of its oxygen.

## *Macropodus opercularis concolor*

by L. B. KATTERNS

WHEN one has been keeping fish for many years and is handling many thousands annually, it is surprising how some possessing great merit from the aquarist's point of view will pass almost unnoticed, until one day something happens to focus attention on this fish and one's picture completely changes.

In my case, such a fish has been the *Macropodus opercularis concolor* or the so-called black paradise fish. These fish have been passing through my hands in quite fair quantities for some years and, frankly, I have often wondered why there has been such a steady demand for them and it is only recently that I have realised what I have been missing all this time.

A consignment arrived somewhat unexpectedly and not having a tank ready in which to quarantine them I was forced to place them in rather a dark and dirty tank; normally they would have been put into a clean light tank in order that any trouble developing would be easily seen, and under such conditions they remain rather colourless and are anything other than black, the fins remaining transparent and devoid of all colour. Where fish are concerned I am rarely surprised as I have come to the conclusion that the impossible does sometimes happen but on this occasion I confess that I was really amazed. Instead of finding a tank full of rather drab fish as expected, I was confronted with one of the most beautiful sights I have ever seen in an aquarium. The fish had taken on a dark, smoky black body-colour and the fins were almost indescribable. The caudal and dorsal were covered with a chequered pattern of tiny dark-blue squares and edged with greenish blue which could only be described as fluorescent, the pectoral fins being a vivid orange making a striking contrast against the dark body-colouring. The females which have a much shorter fin development show the same coloration but to a lesser degree.

The Black Paradise Fish is much smaller than the more

common *M. opercularis* but is identical in shape and formation and according to some American writers the two have been crossed but there does not appear to be a good deal of information on this.

The breeding habits vary only a small degree, the black variety making a much smaller nest and spawning fewer eggs. Several pairs in a large aquarium give better results than individual pairs in smaller tanks and I would suggest that a tank having 3 sq. feet of water surface with no more than 4 in. of water would be ideal for three pairs of fish. The whole surface should be thickly covered with some form of floating plant having roots long enough to touch the bottom; water lettuce (*Pistia*) is excellent for this purpose. If this method is adopted, each male will take over one corner as his own territory and make his nest and it is more than possible that there will be several pairs spawning at the same time. If a close watch is kept it will be noticed that the females do not spawn in one nest only. Once fry can be seen swimming freely remove all plants and the parent fish and cover tank with a piece of glass to maintain warm, moist air above the water. It is neglect to do this that causes the loss of so many labyrinth fish in the early stages of their development, for it needs one mouthful of dry or cold air when the labyrinth is forming to cause death.

Low temperatures can be tolerated for some considerable time but for breeding purposes 75°F. seems to give the best results. The water conditions are not so important as with many other fish.

Feeding presents no difficulties as these fish will take almost anything but a little live food is advisable during the conditioning period, and a few days in darkness is essential in giving the fry a start. This may be followed with brine shrimp and then on to some of the finer grades of prepared foods. Thus treated the fish grow very rapidly indeed.



## our readers



write

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

### Problem after Problem

YOU may care to print the following as a "follow up" to my article "Facing the Big Freeze Up" published by me in the January issue.

So far this winter has been kinder to us here in the south but a recent three week spell gave us temperatures down to  $-7.8^{\circ}\text{C}$ . Ice formed on the pond and the aerator was in continuous operation throughout the period. At first the oil-burner was not lit in the pump house. As the temperature fell and the area of open water decreased, I decided to light the heater and was pleased to see the clear areas expand again. A further hazard became apparent at this stage; the local cats and seagulls spotted the goldfish swimming about so a guard of wire netting had to be laid over the holes until the thaw came.

A. J. GILBERT,  
Bitterne, Southampton.

### Answer Please

WHERE can I purchase a glass fry tube? In the odd days it was possible for about half a crown to buy a splendid affair rather like a large glass tobacco pipe which could be used to fish out fry from a tank without hurting them. These days when I enquire of shopkeepers they never seem to have heard of such things or if they have they make suggestions like "cut out the end of a net and replace it with a plastic bag, it works just as well". Maybe it does but what satisfaction there was in scooping out fry with the glass fry tube!!! Please, do you know if any of your advertisers stock them—it is a very small item but very frustrating and I would far prefer one on the market at say 5s. to some of the gimmicky equipment selling for pounds.

REINOLD W. COLLETT,  
Dorking, Surrey.

### Film Shows for Aquarist Society

I USUALLY ask your indulgence once a year to allow me to inform your readers that I am still willing to travel almost anywhere to give my Film Show lecture to Aquarist Societies.

Clubs or Societies which do not hold membership of The Federation of British Aquatic Societies often find great difficulty in obtaining lecturers, this I know from letters I receive. Only your magazine can inform them of people available.

My programme of films is virtually the same as last year. The films which are all my own productions are as follows:

Tropical Aquarium Fishes, Blue Gouramis, Malindi Fishing, S. African Clawed Toad, Sick Insects and Praying Mantis for the Fish house, Fighting Fishes of Siam,

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

Hawaiian Mouthbrooders, Safari to Treetops, big game in E. Africa. The programme lasts 14 hours.

Yours faithfully,  
NORMAN MASON-SMITH,  
Lecturer F.B.A.S.

### Blue Carp

IN the December issue I read a letter about blue carp. I think that I have the answer. Now I am more a course water angler than a pondkeeper, but I have two small carp, one crucian of  $\frac{1}{2}$  lb. and one common of 1  $\frac{1}{2}$  lb. which I keep in my pond to study feeding habits and reactions to different baits, but I have noticed that in certain lights they have a blue back. I put this down to the reflection of the protective slime which covers the scales and hence the name blue carp. I have also noticed a faint tint of blue in some roach as well and I think this is a common thing in freshwater fishes—a sort of camouflage against a background of reeds and rushes.

R. CHOWN,  
Woking, Surrey.

### Mother's Day

I WOULD like to express my surprise when I divided part of my tank. In the "cut-off" corner I put a male Siamese fighter; in the other part of the tank was a female fighter. The partition stuck out of the water about  $\frac{1}{2}$  in. Everything was as described when I went to school on Wednesday morning but when I came home at dinner-time, the female had leapt in beside the male. There were no torn fins to suggest a fight. I was most amazed to find them swimming around quite happily together. Maybe the male sent a Valentine to the female, breaking any ferociousness between them!

MICHAEL HIES,  
Hellenburgh.

### Goldfish Classes

I READ in your December *Aquarist* the report of the Belle Vue show. I, like yourselves, was disappointed in the coldwater class and would like to see more fancy goldfish. But do we have judges who know their coldwater fish? I am in doubt. I attended the Blackpool annual show which has three classes: Common goldfish, Fancy goldfish and A.O.V. The entries were the best for a number of years, but when the judges came to judge they moved all single-tail fish into the common goldfish class, so giving 1st, 2nd and 3rd places to Bristol Shubunkins. I wrote and complained to the F.N.A.S., and got the old answer that the Judge's decision is final. So can we, through your magazine, see what other fish-showers

and judges have to say on this? As vice-chairman of the Blackpool & Fylde Aquarist Society I would like to know what class you would have put a Bristol Shubunkin in.

B. SIMMONS,  
Blackpool, Lancs.

#### Marine Classes Again

I WAS very perturbed to read in the March edition of *The Aquarist* that Mr. Parry, of Newport A/S, had been criticised for the letter of his which had appeared in an earlier edition.

I feel that Mr. Parry is fully justified in stating that his Society is progressive and go-ahead in its outlook towards the marine aspect of our hobby.

The Marine Study Aquatic Society of Great Britain was formed because it was felt that the one remaining aspect of our hobby not fully understood or studied, deserved attention. So far this field has not been touched except by the specialist Marine Biological Association (who do not cater for the average aquarist). Our Society has many advantages for the purely marine enthusiast, and also for those venturing into the marine "field".

We publish an extensive monthly news journal, do not hold regular meetings, have sources of supply of both coldwater and tropical marines for members, and are in the process of publishing small handbooks on setting up marine tanks, and certain other marine aspects. Our surveys cover tropical, coldwater marine fishes and plants, and the larger surveys undertaken by us will include a full scale coverage of certain areas of the British coastline. As we are most certainly at present one of the more specialised Societies and are a minority group, I will take up no further space in your magazine. I would also like to thank your magazine for the prompt reproduction of our Society

reports in your earlier editions.

New members welcome. Any offers?

G. H. JENNING, Hon. Secretary,  
Marine Study Aquatic Society of Great Britain

#### The Question of Exhibiting Marines

I HAVE followed the recent correspondence with regard to the provision of classes for the showing of marine fishes and am frankly puzzled by it all. Your correspondents give the impression that marines are barred from shows, but surely this is not so. The lack of provision of classes is surely due to the lack of entries—few aquarists keep them, fewer still exhibit.

The question of showing of marines was discussed at the last committee meeting of the Society of which I am secretary, and to our knowledge there is no ruling by any governing body prohibiting the showing of marines. It is therefore possible to show them—under "A.O.V. Displays (or Livebeasts)" for tropicals, or "Native and Foreign Coldwater" for the rest.

This Society holds its 1966 open show on Saturday, 14th May, and will, of course, be only too pleased to accept entries for marines—provision of a separate class will depend of course on the numbers. The show committee always reserves the right to amalgamate or sub-divide classes as necessary. Show schedules are obtainable from the show secretary, Mr. J. J. Gorman, 431 Honeypot Lane, Stanmore, Middx.

Therefore, marine enthusiasts should cease to bewail their lack of opportunity; instead, they should descend in force with their fancies at every show. Once they exhibit in sufficient numbers, provision of classes will be automatic.

Marine keepers, it is up to you!

G. W. BOSTOCK

## A Further Record of a Rare Freshwater Medusa in Britain

by EDMUND L. SEYD, M.A., B.Sc., F.L.S.

IN December 1965, Mr. Gerald Barbrook, the Aquarist of the Cannon Aquarium, Manchester Museum, noticed some small transparent objects floating about in one of the reserve tropical tanks of the Aquarium. Under the microscope these were seen to be specimens of the minute "jellyfish" *Craspedacusta sowerbyi* Lankester, the only species of freshwater medusa in Britain.

The first record of this species was made in 1880 by Mr. James Sowerby, secretary of the Botanical Society of London, who found some specimens in the tanks of the giant water-lily (*Peltandra regia*) in the Royal Botanical Society's Gardens in Regent's Park. Since that date it has appeared in tropical aquaria at Sheffield (1893), Birmingham (1928), Boscombe (1929) and Edinburgh (1933). More recently it was found in large numbers in a tank of tropical fish at Charterhouse School (Clegg, 1957).

The species has also been recorded in open waters. In 1928, 1929 and 1948 it was found in the Exeter Sluice Canal; in 1933 and 1935 in a colliery reservoir in Monmouthshire; in 1949 in Witcombe Reservoir, Gloucestershire; and in 1956 in the Rochdale Canal (Kidd, 1956). In aquaria *Craspedacusta sowerbyi* has only been found in tropical tanks in which the temperature ranges from 70°F. upwards. In the Cannon Aquarium the temperature of the tank in which the medusae were found is maintained at 78°F. It is therefore not surprising that the medusa has only been recorded in open waters during

the summer months and in most cases these waters appear to have been artificially warmed by hot water from industrial processes.

*Craspedacusta sowerbyi* has been recorded abroad in France, Holland, Germany, Austria, Czechoslovakia, U.S.S.R., China, Japan, Canada, U.S.A. and the Panama Canal zone.

There has been some confusion over the name of this medusa. It was named *Craspedacusta sowerbyi* (now *sowerbyi*) by Ray Lankester in a communication to *Nature* of 17th June, 1880, but a week later Allman also published an account of the species in *Nature* under the name of *Linnocodium victoria*, which he had proposed at a meeting of the Linnean Society on the day that Lankester's name had been published. Lankester withdrew his name and the species was known as *Linnocodium victoria* for the next 30 years. In 1910, however, the International Commission on Zoological Nomenclature ruled that the name *Craspedacusta sowerbyi* had priority over that of *Linnocodium victoria*.

Further confusion arose because the connection between the polyp stage, which was later discovered, and the medusa was not understood and the polyp was given a separate name of *Microhydra ryderi* Potts. This name still stands as the correct name for the polyp stage of *C. sowerbyi*.

The small polyp, 0.5-2.0 mm. high, has an apical mouth surrounded by nematocysts but unlike the freshwater form

medusa it is without tentacles. The polyp may remain solitary but, by means of budding, colonies of two to four and on rare occasions seven individuals may be formed. The polyp buds off medusae which at first are only 0.5 mm in diameter, with a bell-shaped umbrella and eight marginal tentacles. As the medusa grows the tentacles increase in number and a fully grown medusa has several hundred tentacles arranged round the margin of the bell.

The mature medusae have either ovaries or testes situated on the under surfaces of the radial canals and medusae of only one sex are produced by any one polyp. The fertilised egg gives rise to a larva which settles at the bottom of the water and develops into the polyp, thus completing the life-cycle. In the winter the polyp contracts into a solid mass of cells, with a horny covering

round it. This resting stage can survive adverse conditions and may help to distribute the species by being transported on water plants, etc.

An excellent account of the species, together with records of its occurrence and a full bibliography, is given by Russell (1953).

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continued from page 7

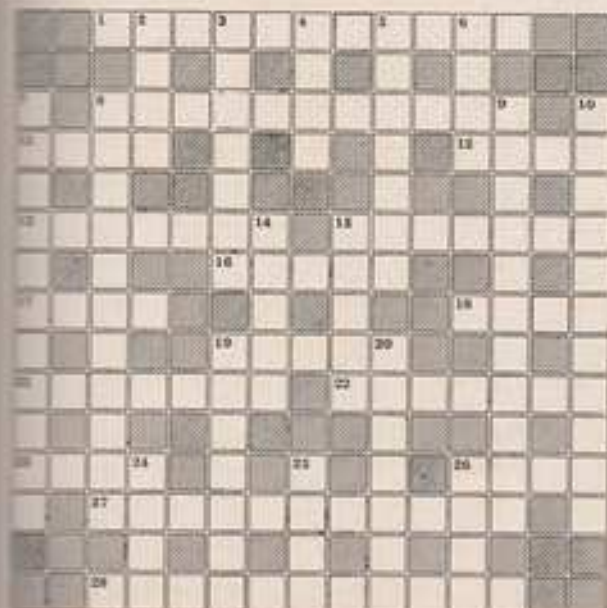
## Aquarist's Notebook

in a year, and sporadic reports of spawnings of other species such as *Tetraodon lineatus* are received. Nevertheless, despite all the difficulties involved, Puffers are worthwhile and fascinating creatures, and thoroughly to be recommended to any aquarist.

The diminishing numbers of Natterjack toads, *Bufo calamita*, have long been a matter of some concernation in Natural History circles. The toad is already confined to certain very limited areas outside of which it refuses to breed, and the obliteration of parts of these areas by building and other encroachments is a very real threat to the continued

existence of the species within the British Isles. Recently plans for the construction of a large multi-storey hotel were proposed near the town of Southport and in the centre of one of the species' most important areas; I am delighted to be able to report that, thanks to the intervention of a naturalists' organisation, the plans for the said hotel have had to be abandoned. Herpetologists acquainted with this animal will certainly be pleased with the decision because its extreme adaptability to captivity, quite apart from one's desire to prevent the extinction of rare animals, is a strong reason for desiring its continued existence in the wild.

## The AQUARIST Crossword Compiled by L. BRADLEY



#### CLUES ACROSS

1. *Trichogaster trichopterus* (4, 7).
2. Used to fight diseases in the aquarium (11).
11. Call to gentlemen (4).
12. Parasitic loach (4).
13. Group, e.g., eggs laid in cichlid fashion (7).
15. Red wine (anag.) (7).
16. Sounds like the modern terrapin's answer to "moving an one's finger" (3).
17. The water variety belongs to the family *Nymphalidae* (4).
18. Two of a kind (4).
19. Separates (3).
21. European freshwater fish (7).
22. Descriptive of an aquarium completely stocked with fish (7).
23. Fat coarse fish ♀ (4).
24. Opposite of *Hanks* (4).
27. *Hyporhamphus calidius serpes* (5, 5).
28. *Artemia salina* (5, 5).

#### CLUES DOWN

3. 50 to 1 that the guppy is this variety (4).
4. Eight six (anag.) (7).
4. Painted in by Picasso, perhaps (4).
5. Smaller version of 15 down (7).
6. Me in a muddle as to whom it belongs (4).
7. *Gasterosteus aculeatus* (11).
8. A genus of large freshwater snails (11).
9. *Ancistrus* (6, 5).
10. *Geopomus sleepi* (6, 5).
14. If one does this then one does not 19 down (5).
15. Where 23 across can be found (3).
19. Don't get out of bed (5, 2).
20. Carnes *slaphes*, found wild in the highlands of Scotland (3, 4).
24. Ale (4).
25. An example in pounds and shillings to keep one moving (4).
26. Find the vehicle in the quiet remshackle town (4).

Solution on page 16



## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarist societies for inclusion on this page should reach the Editor by the 12th of the month preceding the month of publication.

AT the monthly meeting of the **Garforth and District A.S.**, an exceptionally interesting lecture was given by Mr. Keith Barwell, the well-known northern dealer. His subject dealt with the relationship between aquarists and dealers and some very surprising facts emerged which should put the dealer in a much more favorable light. His difficulties and problems are numerous, many of which are not appreciated by the average aquarist. The result of the table show was as follows: The Moss Trophy for Berbs: 1, Mr. J. Lindley; 3, Mr. J. Driscoll; 3, Mrs. M. Waind. The Clarke Trophy for Livebearer Pairs: 1, Mr. P. Clarke; 2 and 3, Mr. D. Lindsay.

THE membership of the **Valley A.S.** has now increased to over fifty, and as applications have been received from many under the age of 15, it has been decided to form a junior section holding meetings fortnightly. Mr. R. Hurrell has judged the table show, and afterwards gave a talk on breeding and rearing *Siamese* fish, which the members found very interesting. The result of the table show was as follows: Male fishers: 1, Mr. & Mrs. F. Taylor; 2, Mr. W. Armstrong; 3, Mr. J. O'Neill. A.O.V. male: 1, Mr. & Mrs. F. Taylor (green sword); 2, Mr. G. Dabwood (dwarf guppies); 3, Mr. C. Gregory (Anthurus anthurus). The meetings are held at the Mason's Arms, Runcorn, at 8 p.m. Further information can be obtained by writing to the secretary, Mrs. J. M. Isherwood, 6 Birley Street, Sealand, Barry, Lancs.

THE first table show of the **Uxbridge and District A.S.** for this year was held recently. The show consisted of five classes: A, *Catfish* and *Loaches*; B, *Danios*, *Bastards* and *B.G.M.M.*; C, A.V. *Mollies*; D, A.V. *Guppies*, and E, *Novitas A.V.* The prizewinners were: class A—1, Mr. Hickman, *C. palustris* (85 pts.); 2, Mr. Branson, *C. palustris* (83 pts.); 3, Mr. Perry, *C. fidi* (83 pts.). Class B—1, Mrs. Peters, *Scorpaenid* (81 pts.); 2, Mr. Ball, *Zebra* (79 pts.). Class C—Mr. D. Twell, *Black Mollie* (81 pts.). Class D—Mr. Branson, *Guppies* (81 pts.). A.V. *Novitas*: 1, Mr. B. Carter, *Labo bicolor* (84 pts.); 2, Mr. Scaplan, *Pulsatillanona* (*Leucostoma*) (84 pts.); 3, Mr. K. Perry, *C. Araso* (83 pts.); 4, Mrs. Ball, *Pulsatillanona* (*Leucostoma*) (83 pts.).

The judge, who was Mr. "Jock" Stewart, complimented the exhibitors on the standard of the fish, and the questions from members to Mr. Stewart were many and varied. The next table show will be held on 10th April, and an even larger number of entries is hoped for.

THE **Cambridge and District A.S.** held their annual general meeting on the 1st February. The officers elected were as follows: President, Mr. Elkerton; chairman, Mr. R. Burt; vice-chairman, Mr. Taylor; secretary, Mr. P. Sanderson; 1, Cey. Warren, Farm, Newmarket Road, Taverham, Cambridge; treasurer, Mr. N. Radford; assistant and show secretary, Mr. Egrove; librarian, Mr. Thomas; publicity, Mr. Rivett; supporting committee, Mr. Hulsey, Mr. and Mrs. Hulsey, Mr. Able, Mr. Cooper and Mr. Haines.

The *Volantia* Trophy was presented to Mr. M. Hibbert, for most points scored throughout year 1965. Two shows are to be held

during the year, the first of these being on the 7th May, and new members will be warmly welcomed to meetings held in the Great Northern Hall, Station Road, Cambridge, on the first Tuesday of the month.

AT the meeting of **Thurrock Aquarists** recently the evening was taken up with an informative talk on the setting up of a furnished tank for the forthcoming home aquaria competition. This talk was given by the chairman, Mr. R. Nicholls, and he was assisted by Mr. D. Durrant, the show secretary, who set up a tank in that everyone was able to appreciate the money hints and tips which were given.

The later assembly in March was devoted to a business meeting and a table show for fighters. The results were as follows: 1, Mr. S. Wellman (*Tetraodon*) 70 pts.; 2, Mr. S. Henkle (*Multispinosa*) 69 pts.; 3, Mr. G. Rowe (*Radi*) 68 pts. The shield of the month competition was won by Mr. S. Wellman.

MEMBERS of the **Independent A.S.** took a strong contingent of fish and apparatus to Harrogate for the last leg of the Six Club Competition, and with some fine staple fighters, A.O.V. livebearers and danios. At the following club meeting members were treated to one of Frank Tomkins enlightening talks on E.L.T. Carps, from which a few interesting facts came to light.

The final *Desborough Trophy* show (an inter-club trophy) for 1965/6 was held with odd-water classes on the bench. Winners were as follows: *Common goldfish*—1 and 3, Mr. J. Clarke; 2, Mr. J. Kettle; 4, Mr. J. Rook; *Fancy Goldfish*—1, Mr. J. Clarke (*Black Moor*); 2, Mr. J. Kettle (*Comet*); 3, Mr. D. Chapman (*Fossil*); *British native and foreign goldfish*—1, Mr. J. Kettle (*guppy*); 2, Mr. J. Kettle (*3-spined stickleback*); 3, Mr. J. Clarke (*3-spined stickleback*); 4, Mr. J. Kettle (*rainfish*). During this meeting Mr. J. Clarke announced his resignation from the post of P.R.O. and editor of the club's magazine, as he is moving to Hitchfield, Essex in the near future. The following week the second miniature furnished aquaria competition was held in which members have to work with a tank 8 by 6 by 6 in. There were half-a-dozen entries, and the winner was Mr. Jim Chapman; the runner-up was Mr. J. Kettle.

THE annual general meeting of the **Warrington A.S.** was held early in March, and following the reading of the minutes and the president's address the members present (about 40) elected their new committee. Office holders are now as follows: President, Mr. A. Higham; chairman, Mr. P. Nye; secretary and publicity officer, Mr. E. Trench, 289 Manchester Road, Warrington; assistant secretary, Mr. J. Higham; treasurer, Mrs. J. Cameron.

Meetings will continue to be held at 8.15 p.m. at the Ring O'Belts Inn, Church Street, Warrington, every fourth Tuesday commencing 20th April. Social events planned for the forthcoming year include a visit to Chester Zoo and a hot pot supper. A lively programme is envisaged and with the aid of increased publicity it is hoped that membership will continue to increase.

THE subject of the talk given by Mr. Hall at the last meeting of the **Hull A.S.** was "Prison

and Poy," and quite an interesting discussion followed. Food visitors were welcomed to the meeting, and it is hoped to extend these to members in the near future. The committee met to draw up plans for the setting up of tanks and stands for the open show to take place at the end of July in the East Park. More details will be available later.

AT the March meeting of the **Wakefield and District A.S.** the winners of the table show were as follows: *Carp* and minnow—Mr. D. English, A.O.V.; Mr. A. Conna. The chairman then conducted a light-hearted quiz on many aspects of fishkeeping.

THE first annual general meeting of the **Gorton and Openshaw Aquarium Society** was held at the beginning of March and the following officers were elected: Chairman, Mr. E. Pifer; treasurer and minutes secretary, Mr. K. Waind; secretary, Mr. L. McCosker; show secretary, Mr. J. Dale. An advisory committee was appointed and consists of: Mr. A. Newton, Mr. J. Logan, Mr. H. Allen, Mr. J. O'Hanlon.

In the chairman's address, Mr. E. Pifer congratulated all members on their efforts and support given in making the Society's first year a success in every way. He asked that the Society would welcome all aquarists in the area to become members. Anyone interested should contact the Secretary at M. Railway House, Gorton, Manchester, 18, or attend the meetings which are held on the first and third Mondays of each month. A large and varied programme has been published of the Society's forthcoming activities in the coming months. The Society's second annual open show is to be held on Sunday, 14th August at the Society's headquarters at The Conservative Club, Gorton Lane, Gorton, Manchester, 18, the same venue as last year and includes all open classes, a marine section. The *Freshwater Association* (Manchester Group) will also be taking part.

A league table is to be established in Lancashire for clubs in Lancashire, affiliated to the Federation of Northern Aquarists Societies, and Secretaries are asked to forward their proposals on the following: There are Five, One for Second, One for Third, from any open show, anywhere that they attend, to the organizing secretary, Mr. L. McCosker, M. Railway House, Gorton, Manchester, 18, and these will be published monthly. The league is to start with the results of this year's first show in the month which was that of **Stourford A.S.** A fee, necessary for it to be changed to cover the cost of a stamp and post, etc. Only Lancashire clubs will be eligible.

AT their monthly meeting, members of the **Southampton and District A.S.** were shown how to test the water of their aquaria for hardness and afterwards spent an amusing evening seeing samples. The differential of hardness was surprising, the events showing that while Southampton water supply is suitable for human consumption it is not the best for many species of tropical fish. The meeting then a table show for livebearers including guppies, was judged by Mr. Spry. The awards were: Guppies: 1, Miss Parker; 2 and 3, Mr. Yarnon; Livebearers: 1 and 2, Mr. James; 3, Mr. Fish.

During the business session, it was decided that a one-day bottle show be held this year, and that the date would be 25th June, opening to the public in the afternoon.

THE programme for **Southend, Leigh, and District A.S.** meetings for the remainder of the year is as follows: 19th April, lecture on breeding and rearing berbs, both tank show; 3rd May, child slide show; 17th May, water and lunch lecture, laboratory and a.c.t. show show; 7th June, guest speaker, inter-club tank show; 21st June, talk on fry rearing, lunch-out at fry for rearing competition, odd-water tank show; 5th July, lecture on pond fish and one loads; 19th July, auction, literature table show; 2nd August, lecture on building a fish-house; 16th August, judging competition, plant show

show; 9th September, toothpick slide show; 13th September, lecture on livebearers, table show (mostly and mostly); 26th October, Bird and Bee; 17th October, 10th October, visiting show, toothpick table show; 24th November, marine slide show; 15th November, A.O.M. members and best fish of year table show; 16th December, holiday slide show; 20th December, table showing, hard-look table show.

All interested members or interested persons will be informed at meetings which take place at the Liberal Hall, Clarence Road, Southend-on-Sea, and all enquiries should be made to the secretary, Mr. J. Willis, 17 Arsenal Gardens, Southend-on-Sea.

**THE North of Scotland A.S.** was reformed at a meeting of all persons interested in January last. As an annual general meeting a committee was elected and part of the constitution was amended. At the first club meeting Capt. Cameron gave an illustrated talk on wild life in relation to rivers, and on the 1st March, Mr. G. Stewart, the superintendent of Aberdeen's new zoo, talked on his experiences of catching and keeping tropical fish in Britain. Mr. C. Stephens and Mr. S. Cox of Aberdeen Naturalists Tropicals will give a practical demonstration of setting up a tank on the 5th April. This is primarily for the beginners in the club but with the increase of new apparatus on the market the discussion should appeal to some of the older members.

To future the new address for the **Oldham A.S.** is Bradford St. School, Oldham. The new members' particulars are as follows: Mr. Harold Woodcock, 48 Crumpton Street, Goldsmith, Oldham, Lancs.

**THE Mansfield and District A.S.** held their annual dinner and dance recently, and was attended by 80 members and friends. The guests of honour were the Society's president and his wife, Mr. and Mrs. G. L. Wilson. In his closing speech, the Chairman said that the membership of the Society had increased markedly in the past two or three months. After an speech the President gave a short address, pointing out the results of the annual competition which has made the presentations of the trophies. Winners were as follows: Fish of the Year, Torrey, Mr. J. W. Bower; Home Furnishings, Aquaria, Mr. R. V. Dyson; Challenge Trophy, Mr. C. A. Hill. During an interval of the evening, the presentation of a bouquet of spring flowers was made to Mrs. Wilson in appreciation of the very good work she has done to assist the Society funds over the past year.

**MEMBERS** of the past month, members of the **Perthshire A.S.** were entertained with two sessions. The first was given by Mr. V. B. Hunt, on the fly and diseases they are responsible for spreading, and their contribution to a hot bed. The second was by Mr. H. J. Vigney, F.R.S., Director of the South London Field Station, professional zoologist, who spoke on water, their formation, and their suitability for swimming in aquaria. This was illustrated with coloured slides and specimens from many parts of the country.

The services of Mr. Harrison from Manchester Corporation Waterworks have been obtained by the **Salford A.S.** to give a lecture and film show on the 26th April. A warm welcome is assured to visitors. Meetings start 8.30 p.m. and are held at Green Social Club, Toy House, Bolton Road, Pendleton, Salford, 6.

**THE newsletter** from the **Mereside A.S.** contains reports of recent meetings. At the first the main topic was on judging, which caused much interest among the members. The speaker of the second meeting was Mr. Alan Bond who gave an extremely interesting talk on "Breeding".

**NEWS** from the **Bradford and District A.S.** includes a report on the February main meeting. The speaker was Mr. Reynolds, and his talk

was full of interest, and covered a very wide range of things connected with the hobby. His ten vital recommendations for fish-keepers were well worth noting and remembering by all present. The table show, which was judged by Messrs. C. R. Wilson and D. Carr, gave a very good start in the competition to Mr. D. Parry who took both first and second prizes. Third place went to Mr. M. Firth. In the a.c.v. class Master S. Butterfield was first and second, Master D. Butterfield being third.

**THE Bulletin of the Aireborough and District A.S.** contains quite an interesting account of aquatic news and information. The latest table show results are as follows: Chairmen: 1, Mr. Hampson (flagged chairmen); 2, Mr. Helen (mermaid); 3, Mr. Emma (cathedral); A.O.V.: 1, Mrs. Dickinson (cave); 2, Mrs. Holly (leaf); 3, Mr. Emma (last gentleman); Novices: 1, Miss Hampson (wonderland); 2, Mr. Whitley (R.T. shark); 3, Mr. Whitley (dark widow); Junior: 1, Miss Hampson (giraffe); 2, Master Parry (R.T. shark); 3, Master Kober (sagebrush); Best at Show Cup: Mr. Hampson (flagged chairmen).

**AT** the first February meeting of the **Cresswell and District A.S.**, Messrs. Ashley, Standforth, and Healey demonstrated the setting up of a tank for Home Aquaria Competitions and that effort was well received by the members. The question-time after was a lively affair. A table show consisting of two classes was held and the results were as follows: A.V. egg-layers: Seniors: 1, Mrs. J. Healey; 2 and 3, A. & P. Standforth; Juniors: 1 and 3, A. & P. Standforth; 2, P. & D. Gibson; Livebearers (pairs): Seniors: 1 and 2, A. & P. Standforth; 3, Mrs. J. Healey; Juniors: 1, 2 and 3, D. Plumb.

Members at the second meeting were given a tape recorded lecture of one of Dr. Ghadiali's previous lectures. This was to further the minds of the members with a view to the Doctor lecturing the Society once again. The table show was for two classes and the results were: Toothpick: Seniors: 1, Mrs. J. Healey; 2 and 3, A. & P. Standforth; Juniors: 1, P. & D. Gibson; 2, I. Healey; 3, R. Broadfield; Bottle aquaria class: 1, Mr. G. Gibson; 2, Miss J. Harper; 3, Mrs. J. Healey.

Among other items discussed were, if any other Societies would be interested in forming a longer competition and also someone in the future holding a convention run on similar lines to the Harlow Convention. Both these items would automatically concern Societies within approximately 75 miles radius of Cresswell. Any Societies that are interested in either of these items would they please contact the secretary, Mr. J. Healey, 18 Duke Street, Cresswell, N. Worksop.

**AT** the March meeting the main item at the first was a table show of two classes for livebearers and egg-layers pairs. The results were as follows: Seniors livebearers: 1, Mr. & Mrs. J. Healey; 2 and 3, A. & P. Standforth; Senior egg-layers (pairs): 1, A. & P. Standforth; 2, T. Broadfield; 3, A. Ashby; Junior livebearers: 1 and 3, S. Deakin; 2, P. & D. Gibson; Junior egg-layers (pairs): 1, K. Broadfield; 2, K. Rodgers; 3, J. Harper.

The second March meeting will be remembered for the lecture and film show given by the vice-president, Dr. Ghadiali. This was the type of interest all aquarists desire about, concerning itself with the feeding of live foods and the rearing of them. The Mansfield A.S. were entertained as guests for the evening. A table show for a.c.v. original was judged by Mr. A. Deakin, F.N.A.S., and the results were: Seniors: 1, Mr. & Mrs. J. Healey; 2, Mr. G. Gibson; 3, A. & P. Standforth; Juniors: 1, 2 and 3, P. & D. Gibson.

**AT** a February meeting of the **Cardiff A.S.**, Mr. M. J. Parry judged a table show for livebearers and catfish. The results were as follows: Catfish: 1, P. Harris; 2 and 4, N. Counsell; 3, E. W. Gorwill; Livebearers: 1 and 2, P. Harris. At the following meeting members saw a set of slides on "Kribbians" loaned from the well-known aquarist Mr. A. Robson.

The table show at the March meeting was judged by one of the club members, P. Harris. The results were as follows: Livebearers: 1, C. W. Gorwill; 2, J. Barnes; 3, G. Douglas; Catfish: 1 and 3, C. W. Gorwill; 2, J. Barnes.

Recently, the first annual dinner of the Club was held at The Bristol Hotel, Cardiff, where guests and visitors from Newport and Barry were present.

Meetings are held on the second and fourth Thursdays of each month at The Old Arcade Inn, Queen's Street, Cardiff, at 8 o'clock. Visitors and any prospective new members can be assured a warm welcome. More details can be obtained from Mr. N. A. Counsell, 79 Llanmorris Road, Gelligo, Cardiff.

**AT** the meeting of the **Swinton and District New Aquarist Society**, the evening's activities included a raffle, auction and a slide show and lecture on fishes, given by Mr. Martin, the club librarian. The evening was completed by the chairman, awarding the winners of the first club competition with their prize cards. Results were as follows: Livebearers (groups): 1, Mr. J. Gilbert; 2 and 3, Mr. E. Parry; Egg-layers (single): 1, 2 and 3, K. & M. Martin; Aquarists: 1, Miss Broadthwaite; 2, A. Brewer; 3, R. Gardner; Catfish (corydoras): 1, J. Gilbert; 2, R. Gardner; 3, A. Pearce.

**THE news** from the **Dunstable A.S.** is that the latest positions in the Scott Trophy competition are as follows: 1, Miss E. Davidson, 28 pts.; 2, A. L. Harris, 21 pts.; 3, P. N. Greening, 21 pts.; 4, Bruce Hill, 14 pts.; 5, Stewart Gault, 13 pts.; 6, W. S. Russell, 11 pts.; 7, J. McGeoghan, 10 pts. In the Member of the Year Trophy competition the leading positions are: Miss E. Davidson, 190 pts.; Ian Reid, 140 pts.; Brian Hill, 141 pts.; Stewart Gault, 140 pts. Recently the Society enjoyed a most interesting illustrated talk on "Whaling" by John Alexander, a member of the Dunstable Photographic Society.

**AT** the last meeting of the **Nottingham Tropical Fishkeepers**, a discussion was held regarding the open show to be held on the 12th August, and a show committee was formed. The table show results were as follows: Guppies: 1 and 2, Mrs. Scrimshaw; Tetras: 1, Mr. Parry; 2, Mr. Parry; 3, Mrs. Scrimshaw; Barbies: 1 and 3, Mr. Parry; 2, Mr. Parry; Mollys: 1, Mr. Watson; 2, Mrs. Scrimshaw; Catfish: 1 and 3, Mr. Watson; 2, Mr. Parry; Danios: 1, Mr. Parry; 2, Mrs. Scrimshaw; 3, Mr. Parry; Toothpicks: 1 and 3, Mrs. Scrimshaw; 2, Mr. Parry.

A new and varied programme has been arranged for future meetings. For any information required regarding the Club, please contact the secretary, Mrs. H. Parry, 37 Hockwood Road, Hockwood Park, Nottingham.

**A RECENT** meeting of the South London Section of the **Fancy Guppy Association** was well attended and the show bench was also supported. A talk on genetics was given by Dr. Atkins, which was both interesting and enlightening, and the general discussion period was interesting with a variety of questions discussed. The membership for 1966 is the most on record at 48, increasing every month, but more new members would be warmly welcomed. The class winners were as follows: Veiltails: A. E. Tarrant; Jettas: A. E. Tarrant; Fantails: Goodall & Mottilla; a.c.v. novitiates: A. Jamieson; original novitiates: Goodall & Mottilla; Big and small: R. Simpson; a.o.v. male: A. E. Tarrant; superfish: A. E. Tarrant; wendytail: G. Best; wallpaper: R. Biggs; original: A. Jamieson; a.c.v. female: E. Stevens; breeders' females: Goodall & Mottilla; breeders' pairs: Goodall & Mottilla.

The spring open show is to be held on the 24th April at Lady Gorman House, Hockwheat Road, Rotherhithe, London, S.E.16.

**THE second annual general meeting** of the **Heywood and District A.S.** was held in February when the following officers were elected: Chairman, Mr. J. McBride; secretary, Mr. A. Beasley; treasurer, Mr. J. Wood; vice-

chairman, Mr. B. Walden; show secretary, Mr. T. Davies; minute secretary, Mrs. M. Spencer; publicity, Mr. R. Spencer; social secretary, Mr. D. Kibson.

The Society runs an annual competition based on the prizes gained at shows and the awards this year were: Ladies—Inter-Club and Open Shows, Mrs. B. Walden; Men's—Inter-Club, Mr. K. Hill; Open Shows, Mr. T. Davies. A special award shield is presented each year to the person who has done most for the Club during the previous 12 months and this year it was presented to the secretary of the last year, Mr. John Wood.

The annual open show will be held on the 15th May, again at the Archbishops' Hall, Bamford Road, Heywood. For anyone interested in either joining the Society or who wishes to pay a visit will be quite welcome to come along to the King's Hotel, Heywood, on the first of third Thursday in each month.

**THIS** show season for **Tropical Aquarium Breeders** opened with pairs of cichlids. This is a closed show with a difference. Each member must show a pair of cichlids in the first leg and in the second leg in six months time, there is a resident team of six fish from the pair exhibited, total number of points depending on the winner. Result of first leg, judge, Mr. C. Walker, F.N.A.S.: 1, Mr. J. H. Turner (pump tetras); 2, Mr. S. A. Collins (Apistogramma striaticeps); 3, Mr. J. Collier (Pelmatochromis kribia).

At the meeting of the **Leicester and District A.S.**, members enjoyed an illustrated lecture on the American tissue shrimp industry. Slides showing the netting of the shrimps, the cleaning, deep freezing, packing, and desalting, were very interesting. Other slides showed the gathering of brine shrimp eggs and the drying, sorting and packaging of them. This type of lecture, given by tape recorder and colour transparencies, has proved to be popular, and is most useful when it is not possible to book a lecturer. The library, which is another popular feature with club members, has had three new books added to its shelves, and doubtless further additions will be made in the future.

Recently about twenty members of the club attended a social given by the High Wycombe club, and a very enjoyable evening was spent.

A **SMALL** party of members and friends of the **Newport A.S.**, invited by mail, recently to Bristol Zoo to receive, by kind permission of the Director, a "behind the scenes tour of the aquarium" from the senior keeper, Mr. A. Elliott, and his assistant. Particularly impressive were the large ichthids on display. Mr. Elliott also undertook an explanation of filtering and feeding arrangements used in the aquarium and answered many questions from his visitors on all subjects appertaining to the practical aspects of the hobby. The reptile house was also visited by the party. It was also noted that within the confines of the reptile house much of the Zoo's breeding of fish was carried out. The party was shown several breeding pairs, and also several sea horse fry (three days old), which, informed Mr. Elliott, had not, as yet, been successfully reared to maturity in Britain before.

At the Society's monthly meeting held a fortnight after the above visit the guest speaker was Mr. Barry E. James of Chesham, the well-known writer on aquatic subjects. His subject was "Aquarium Plants for the Hobbyist". The same evening the first of the 1966 table shows were held, for two classes, A.S. beginner and A.S. exhibitor. The results were as follows: A.S. (beginner): 1, Mr. Leo Baumgarten; 2, Mrs. A. James; 3, Master Clive Pemberton. A.V. exhibitor: 1, Master Clive Pemberton; 2, Mr. J. H. Wall; 3, Mrs. M. Burgess; 4, Mr. R. Blum.

Local enthusiasts are reminded that meetings of the Society are held on the third Monday of each month in the Whitland Mansard Room of the Central Y.M.C.A., Commercial Street, Newport. Visitors and prospective members will be made welcome at any meeting. Further information may be obtained from the secretary, Mrs. E. A. Selman, S.R.N., "Herrings", 33 Glamorgan Park Avenue, Newport, Mon.

#### NEW SOCIETY

**THE Mid-Sussex Aquarists Society** was formed on the 17th February with a membership of 21 from which the following officers were elected: Chairman, L. Watson; treasurer, J. Bishop; secretary, D. Jolly. Future meetings will be held on the third Thursday of each month in The Ugly Duckling, Woodfield Road, Haywards Heath, at 8 p.m. Anyone interested in this Society is cordially invited to attend any meeting or contact the secretary, Mr. D. Jolly, 53 Rumbold Lane, Haywards Heath, Tel 50008.

At the annual general meeting of the **Rediffert Section of the Fancy Guppy Association**, officers elected were: Chairman, Mr. H. Gerrill; vice-chairman, Mr. P. King; treasurer, Mr. C. Powell; show secretary, Mr. H. Hurrell; secretary, Mr. G. H. Goodall; 3, Tutor Avenue, Tottenham, London, N.15. The agenda for the first six months was laid out. This is to include a lecture by Dr. J. Atkins on genetics and a lecture by the F.G.A. chairman, Jim Kelly, on hormones. Any person who lives in Herefordshire who would like to join the association please contact the secretary for further information.

Table show results: Plagial: 1, H. Harris; 2, R. Gange; 3, B. Simpson. Pinnati: 1, Goodall & Montilla; 2, D. Ford; 3, A. Jaxxon. Wedge: 1, A. Johnson; 2, B. Hawkins. Original: 1, D. Ford; 2, J. A. Jameson. Distant: 1, R. Biggs; 2, Dr. Atkins; 3, Jose Thorne. Vichai: 1, R. George; 2, H. Harris; 3, Dr. Atkins. Superbital: 1, R. George; 2, H. Harris; 3, A. Jameson. Breeder pairs: 1, Goodall & Montilla; 2, A. Johnson; 3, Dr. Atkins. Scotland: 1, Jose Thorne; 2, B. Simpson; 3, B. Hawkins. Sessoids: 1, Jose Thorne; 2 and 3, A. Jameson. Siphoni: 1, R. Biggs; 2, Goodall & Montilla; 3, R. Simpson. A.O.V. breeders: 1, R. Biggs; 2, R. George; 3, Goodall & Montilla. Silver award pairs were won by R. Biggs (1) and D. Ford (1).

A **MEETING** was held by the **Taunton and District A.S.** recently at the Adult School, Hancock Street, Taunton. Members were given an illustrated talk on killifish by Mr. P. I. Flinwood. There was also a table show for table: 1, Dr. Gerrill; 2, Mr. B. Hancock; 3, Mr. W. Lortick.

At the February meeting of the **Nottingham and District A.S.**, the speakers were three of the Society members. Mr. Norman Goodfellow gave a very interesting talk on the use of a microscope in the battle against many of the diseases encountered in the fish world. Mr. Goodfellow brought along several drawings of various pests, i.e. white spot, velvet, etc., as seen under the microscope. Mr. George Ballymore told of his experiences in trying to breed the Ramfish. The importance of setting up a breeding tank in readiness was stressed. Success can be achieved even without any elaborate plant although of course the results are not as great. Mr. Edgar Smith gave a very enjoyable talk on his experiences with various fish in obtaining, breeding and selling.

Nominations were received for the election of officers and committee members for 1966-7 and the voting took place at the annual general meeting held on the 29th March.

#### NATIONAL NATURE WEEK

IN connection with the National Nature Week which is being held from the 22nd-30th April, the **Blackpool and Fylde A.S.**, approached the Education department recently with an offer of assistance in the setting up of some tanks. It has been arranged to set up twenty to thirty tanks covering British fishes, snails, frogs, and insects which should help in populating the "hobby". The Exhibition will be held in the Art Gallery and at the Central Library from 25th April-6th May.

#### BRITISH AQUARISTS' FESTIVAL

Will be held this year on the 26th-30th October at Belle Vue Gardens, Manchester. Full details will be available later.

#### AQUARISTS' CALENDAR

BELOW we publish the details of forthcoming shows so far available, but as this is not complete we should appreciate additional particulars from societies as soon as possible.

**17th April:** Middleborough and District A.S. Annual Open Show, Burwick 10th Community Centre, Middleborough.

**1st May:** Derby Regent A.S. Annual Open Show at the Railway Institute, Salford Road, Derby. Schedule may be obtained from Mr. A. Widdowson, 78, Finsley Avenue, Derby.

**7th May:** Chichester A.S. (provisional date).

**8th May:** Midland Association of Aquarists Societies Annual Convention in Birmingham.

**15th May:** Heywood and District A.S. Annual Open Show at the Ambulance Hall, Burnside Road, Heywood.

**21st May:** Cardiff A.S. Annual Open Show (venue to be fixed). Here, show secretary: Mr. N. J. Coombs, 26, Chancery Road, Cardiff.

**4th June:** Carlisle A.S. Open Show. Full details are available from Show Secretary, Mr. R. G. Owen, 47, Eborac Road, Carlisle, Cumbria, S.E.6.

**11th June:** Brighton and Southern A.S. Full Hall, Hove (opp. Hove Station).

**26th June:** Mansfield and District A.S. Open Show (venue to be fixed). Full particulars may be obtained from Show Secretary, Mr. C. Hill, 47, Dallas Street, Mansfield.

**2nd July:** Bracknell and District A.S. Annual Open Show at Victoria Hall, Bracknell. Deputies: Show Secretary, Mrs. Natalie Jordan, 6, Parkbank Place, Ascot, Berks.

**8-10th July:** Dagenham Town Show. Details are obtainable from Mr. J. Price, 3, Ashby Drive, Crutchen, Essex.

**8-12th August:** Portsmouth A.S. Open Show.

**17th September:** Newport A.S. (provisional date).

**28-30th October:** British Aquarists' Festival, Belle Vue Gardens, Manchester. Full details available later.

#### Crossword Solution

■	■	B	L	U	E	G	O	U	R	A	M	■
■	■	A	X	I	I	■	■	■	■	■	■	■
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■	■	E	■	O	■	C	E	■	■	■	■	■
■	■	B	R	I	N	E	S	H	R	I	M	■



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continued on page 2011

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