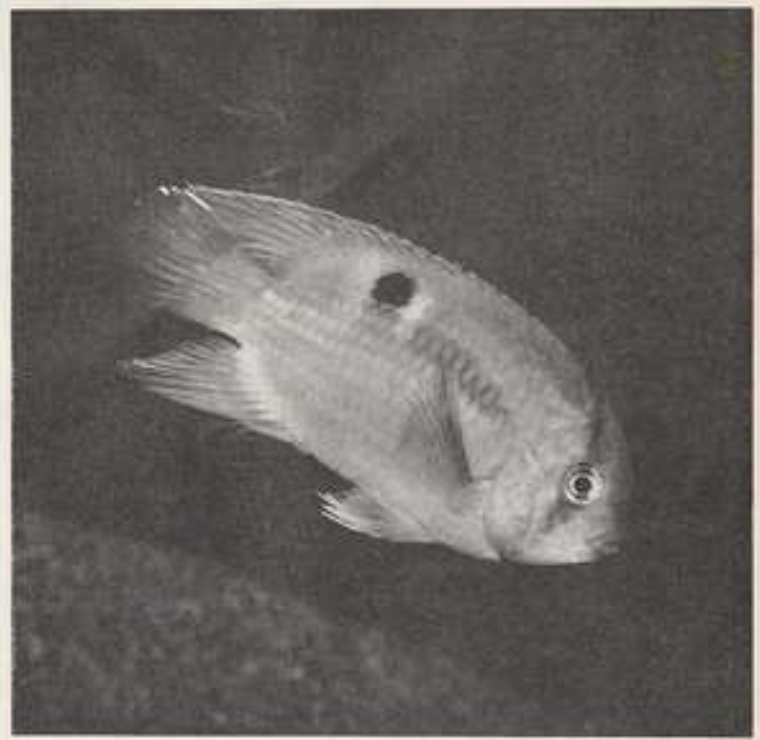


The Aquarist

and Pondkeeper

JUNE 1966



MONTHLY
Vol. XXXI No. 3

TWO SHILLINGS AND SIXPENCE

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Aquaria also Tropical Marine
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	Frames	Aquariums
24 x 15 x 12	£ 7 7 0	£ 9 9 0
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Angle Iron Aquariums, Frames and Seams a speciality.
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EVERYTHING
FOR THE
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POOL



EVERYTHING
FOR THE
TROPICAL
AQUARIUM

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COLLECTION OF TROPICAL AND
COLDWATER FISH IN THE MOST
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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.

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WITH THE
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THERMOSTATIC HEATER

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PRICE
40/10
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100w 130w
10" 12"



View of Control Head with Condensation Cover removed. Note the Neon Indicator and the Calibrated Control Dial affording immediate visual selection of temperature between 60°—90°F. To prevent accidental alteration the dial is recessed and its movement requires the insertion of a ball-pen point into the cavity provided. The required temperature numeral should be aligned with the raised arrow point against the cable inlet recess.

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POSTAL SERVICE

TROPICAL FISH



Interesting fish this month

Mesocyclops .. 15/- each	Adult Lyretail Mullies, 3" .. 18/- each	Solis Macrocantha, 3" .. 30/- each	Mollusca Spherop, 1 1/2" .. 1/- each
Stone Shark, 3" .. 12/6	Fascia Nigrofasciata, 2" .. 7/6	Colisa Lata, 1" .. 18/-	For the Coldwater enthusiast
Cetra Taurata, 2 1/2" .. 9/6	Tetraodon lineatus, 1 1/2" .. 12/6	Synodontis Nigritorica, 2-3" .. 18/- each	Oranda, 2" .. 22/6 each
Fundulus Macropodus 3 1/2" .. 12/6	Glozomus Pictus, 5" .. 25/-	Anthurus anthurus, 2" .. 27/6	Black Moor, 2" .. 21/-
Fundulus Duplei Dipar, 3 1/2" .. 12/6			Loach, 1 1/2" .. 21/-

LIVEBEAKERS

Guppies	Standard .. 3/- pair
Golden .. 4/-	
Black Delta .. 15/-	
Kingi .. 4/6	
Black Veiltail .. 12/6	
Red Delta .. 19/6	
Fancy .. 12/6	
Mollies	Black .. 3/- each
Adult Black Lyretail .. 19/-	
Sailfin Black .. 25/- pair	
Lyretail Black .. 5/- each	
Liberty .. 4/6	
Green Yelders .. 45/- pair	
Swordtails	Red .. 2/6 each
Red Wagtail .. 3/6	
Black .. 4/6 & 7/6	
Berlin .. 3/6	
Green Tuxedo .. 1/6	
Red Eye Red .. 4/6	
Red Tuxedo Sword .. 4/6	
Albino .. 3/6	
Hi-Fin Red .. 12/6 pair	
Green .. 2/6 each	
Red, S. American .. 17/6 pair	
Platies	Red Wagtail .. 3/- each
Marginal Varietas .. 17/6 pair	
Blue .. 3/- each	
Sunset Varietas .. 12/6 pair	
Comey .. 2/6 each	
Moan .. 2/-	
Orange Wagtail .. 3/-	
Blue Wagtail .. 3/-	
Red .. 3/-	
Yellow Wagtail .. 3/-	
Black .. 3/-	
Red Tail Black Tuxedo .. 17/6 pair	
Assorted .. 3/- each	
Varietas .. 3/6 pair	
Tuxedo .. 3/- each	
Hi-Fin Varietas .. 9/6 pair	

Danies	Giant .. 3/6 each
Tiger .. 2/-	
Spotted .. 2/6	
Zebra .. 2/-	
Peel .. 2/-	
Sharks	Red Tail Black .. 4/- each
Rasboras	Rasbora Dorsalata .. 3/6 each
Glowlight Rasbora .. 2/6	
Harlequin .. 2/6	
Finetail Rasbora .. 3/6	
Sunsettail .. 3/-	
Killifish	Fantax Dori .. 5/- each
Aphyosemon Australis .. 15/- pair	
Aphyosemon Culinatum .. 14/-	
Rivuloid Heterotis .. 18/-	
Fantax Sordidatus .. 5/6 each	
Fantax Pictus .. 12/6	

Lemon .. 3/6 each	Barbs
Flame .. 2/6	Large Tetra .. 8" 65 7" 70/-
Red Nova .. 8/6	Nigger Ad. .. 7/6 each
Bleeding Heart .. 10/6	Golden .. 3/6
Serpis .. 4/6	Sassy .. 3/6
Glowlight .. 3/6	Tulip .. 3/6
Scissors .. 3/6	Ember .. 18" & 17/6
Flouca, Nasserri, 6" .. 9/6	Cherry .. 2/6
Cardinal .. 4/6	Large Goldfish, 8" .. 11/-
Bloodfin .. 3/6	Albino Tiger .. 4/6
Nannostomus Tetra .. 4/6	Cummings Ad. .. 7/6
Nannostomus Marginalis .. 4/6	Nigger Im. .. 3/6
Nannostomus Marginatus .. 4/6	Headli .. 4/6
Swordtail Characin .. 4/6	Tiger .. 2/6
Akoniostomus Almond .. 28/-	Labyrinths
Pendul .. 3/6	Dwarf Gourami .. 10/- pair
Silver Hatchery .. 4/6	Black Lip Gourami .. 5/- each
X-Ray Fish .. 2/6	Kwong Gourami .. 4/6
Black Widow .. 2/6	Orange Gourami .. 3/6
Maple Hatchery .. 4/6	Climbing Perch .. 12/6
Bicolor .. 3/6	Female Siamese .. 4/-
Aurora, Fantax (in colour) .. 15/-	Fighters .. 4/-
	Pearl Gourami .. 3/6
	Moonlight Gourami .. 13/6
	Green Kissing Gourami, 2" .. 7/6
	Three Spot Gourami .. 3/6
	Paradise Fish .. 3/6
	Mute Siamese .. 18/-
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Tetra	Neon .. 3/6 each 12/6 for six
Red Fin .. 2/6 each	
Roberti Ad. .. 11/6	
Phosom .. 4/-	
Copine Arnoldi .. 5/-	

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Corydoras
Aeneas Ad. .. 8/6 each
Agassiz .. 8/6
Aeneas .. 4/6
Paleatus .. 4/6
Jull .. 10/6
Elgans .. 10/6
Melanostomus .. 8/6
Giant Khulia .. 8/6
Walkeri Cat .. 8/6
Upside Down Cat .. 10/-
Khuli Loach .. 2/6
Chocolet .. 8/6
Socking Loach .. 4/6
Pimelodella Gracilis .. 7/6
Fossil Cat .. 10/6
Flying Fox .. 5/-
Giant Cat .. 5/-
Various Others
Loach .. 8/6 & 10/- each
Bumble Bee .. 3/-
Butterfly .. 10/-
Moonlight .. 15/-
American Flag Fish .. 3/6
Chili Pleuro .. 7/6
Malawi Angoi .. 10/-
Knife fish, Africa .. 9/6
Leubus Lachota .. 4/6
Pigmy Junfish .. 20/-
Small Fish .. 20/-
Processus Gremmi .. 19/6 pair
Spiny Eels .. 8/6 each
White Cloud .. 3/-
Black Banded fan .. 5/-
Knife fish, S. American .. 27/6
Apple Snail .. 2/6 each

Cichlids
Angels
Standard .. 3/- each
Black .. 4/6
Lite Yell .. 7/6
Yell .. 4/6
Lite .. 4/6
Cichla Oxifera, 10" 4/6
Brown Acanth .. 3/6
Firemouth .. 3/6
Keyhole .. 15/-
Palmströmia .. 4/-
Gambusia .. 4/-
Marble cichlid .. 4/6
Orange Chromis .. 8/6
Jack Demassey .. 3/6
Dwarf Cichlids
Nannacara Anomala .. 7/6 each
Apatogomus .. 5/6
Ramirez .. 5/6
Palmochromis .. 5/6
Kribia .. 5/6
Haplochromis .. 12/6
Wingtail .. 12/6

Coldwater Fish
Golden Orfe .. 4/6 each
Green Tanch .. 4/-
Carp .. 2/-
Golden Tench .. 5/-
Breeding pairs
Goldfish .. 4-7" 35/- pair
.. 8-9" 45/-
Shubunkin .. 4-7" 40/-
.. 8-9" 45/-
Comet-tail .. 7" 50/-
.. 8-9" 55/-
Golden Orfe .. 4" 45/-

When ordering goldfish by post, 10/- must be added for carriage.
 All fish guaranteed live delivery and in good disease free condition. T/A rail and packing charge to be included with every order.
 All consignments of fish to be collected from nearest main-line railway station.

Catalogues and Lists sent by request, or come along and see the best display of fish in the North

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**Price
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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.

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SPECIAL—FOR TROPICAL TANKS "GROLUX FLUORESCENT TUBE LIGHTING UNITS".
NEW FILTERS NOW IN STOCK. DYNOFLO MOTOR FILTER LS-17-6 EHEIM COMPACT FILTER 383
LS-12-6 INCLUDING RACK. EHEIM STANDARD L12-15-0 INCLUDING RACK.
"GREEN SHIELD" STAMPS GIVEN (PERSONAL SALES ONLY)

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Golden Orfe 6"-1" 5"-9"	13/- & 22/6
3"-5" High Carp	5/-
Green Tench	5/- & 4/-
Large Goldfish 7"-8", 8"-12" 10/- & 15/-	
Small Orfe	5/- to 7/6
Medium Goldfish	5/- to 7/6
Small Goldfish & Shub	1/6 to 2/6

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Constat External	35/-
Constat New External Type OK	30/-
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UNO	
Out/Ad.	18/-
In/Ad.	15/-
In/Ad. "Popolar"	12/6
"Popolar" with green indicator	15/6
Fuset Matic	24/6
Wizard	10/-, 12/6, 18/-

AERATORS

Imo	20/6 & 28/6
Star	25/-
Ba. Summit	21/-
Quicks	24/-
Nema	23/-
Zeus Junior	23/-
Monroe Major	24/-
Monroe Minor	21/-
Procter	20/-

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Omer	£3 10 0
Stokes	£7 18 6

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Hy-do Junior New Super	107/6
Hy-do "A"	130/-
Hy-do "B"	145/-
Hy-do "C"	250/-

Thermometers

Mercury	6/6	Gravel	
Blue Gem	5/-	Bubble-Up 25/-	
Dumpy	6/6	Hydro Outside	15/-
		Corner	4/6
		Outside	18/6
		Windmill Hand	15/-
		Raincoat	15/-
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		Constat	19/6
		Premier Bio-	
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TROPICALS

Nemo, 9 for £1 | 2/6 each

Roseatus	4/-	Plecostomus 10"-14"	
Angels	2/6 & 3/6	Large Green Sailfin	
White Cloud		Mollies	from 5/-
Mollies	2/6	Black Angels	7/6
Platy	2/6	Black Lace	
Platy various	from 2/6	Angels 4"- to 7/6	
Swordtails		Tiger barb 2/6 & 3/6	
various, from 3/-		Glowlight	3/-
Schubert barb 3/-		Penguins (each) 2/6	
Scissortail	3/-	Bumble Bee	
Cuppies (pair) 1/6, 5/-		Mollie, Black	(each) 2/6
Harlequin	3/-	from 2/6 & 5/-	
Cherry barb	3/-	Lemon tetra	4/-
Nigger barb	3/-	Glassfish Adult	4/6
Chequer barb	3/-	Annae Cats	7/6
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Thick lip 3/-, dwarf or leaf 3/6, Kissing 4/-,		Flowers 10/-, 12/6	
Opaline 3/6, Gourami.		Serpae	4/-

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Aquarium Vacuum Cleaner .. 48/6
Super Model .. 56/6

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BOOK CASE

BOW-FRONTED AQUARIUM

48" x 10" x 15"	£35 10 0
36" x 12" x 15"	£24 10 0
Standard Bow £20, £17, £13 0 0	

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Sagittaria	from 6d. each
Vallis Ternis	6d.
Vallis Spiralis	6d.
Anubias	6d.
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Hygrophila	6d.
Cryptocoryne	2/- & 3/-
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By post, add 1/6d. Minimum 7/6d.
HEATERS 25w to 200w
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Pelastodiscus Kröbentis	7/6 & 10/- each
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Small Discus	35/- each
Black Cardinal	7/6 to 20/-
Scars from	5/- & 7/6
Amaziliae Cats	7/6 to 15/-
Malayan Angles	6/- & 7/6
Black Veil Angles	6/-, 7/6, 15/-
Tin Pail Barb 3" - 4" - 5"	17/6, 25/-
Silverbarbs 2" - 5"	10/- & 13/- pair
Purpuratus	Large 15/- each
Red Veiled Guppy	8/6 & 10/-
Red Tail Shark 5" - & 10"	
Butterfly Fish	

Our minimum order for fishes is £2, a charge of 15/- is made for shipping. Carriage charges, by fast passenger train and signature, stating size of arrival. Give phone number if possible.

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24 x 12 x 15	£3 5 0
18 x 10 x 12	£3 0 0
White or black covers	18/6 & 25/-

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(Light Gauge)	(Angle Iron)
12" x 8" x 6"	24" x 12" x 12"
10" x 8" x 4"	24" x 12" x 15"
14" x 8" x 8"	30" x 12" x 15"
18" x 8" x 8"	36" x 12" x 15"
18" x 10" x 10"	48" x 12" x 15"

COVERS

18" x 10"	16/-	18" x 10" x 36"	25/-
24" x 12"	22/-	24" x 12" x 36"	35/-
30" x 12"	28/-	30" x 12" x 36"	45/-
36" x 12"	37/6	36" x 12" x 36"	60/-

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Banding Flakes	1/6
Hydro Flakes	1/6
Scottish	1/6 & 1/6
Storic	6d. & 1/6
Dry Daphnia	6d. to 2/6
Liquafly	2/6
Infant	2/6
Fluke	2/6 C.W. 2/- & 3/-
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McLynn's	1/6, 2/6, 6/6, 17/6
Brain Shrimp	2/- & 3/6
Tetra Min Growth Food Hatched	4/-
Wardley's	8/-, 4/6, 2/6, 2/6, 1/6
Fantasy	2/-
Tetra Min	1/11, 3/5, 7/6, 24/6, 54/6
Sargrow	1/3, 2/6
Vitakraft	1/10 & 5/6
Shoul	2/- & 4/6

Add 1/- up to 18/-; 1/6 up to 25/-; 2/- up to £2; 3/- up to £3; over Free CARRIAGE AT COST CHARGED ON AQUARIUMS, STANDS, AND TANKS. SENT AT OWNER'S RISK (Enquiries stamped envelope please) Terms, Cash with Order

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**ALWAYS ARRIVING REGULARLY
RARE SPECIES FROM ALL OVER THE WORLD**

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WHOLESALE ORDERS EXECUTED IMMEDIATELY

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COLDWATER FISH
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**THE FINEST
PELLETISED
FISH FOOD
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POND PACK 4/-
SMALL PACK 1/6

**LIVE FOOD FOR
TROPICALS**

**THE NEW
"SUREGROW"
BRINE SHRIMP EGGS**



Create a **Boiling** action with aeration, not allowing the eggs to settle in the solution as per the instruction. Will give you satisfaction every time. In four sizes:

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OLD BATH ROAD · COLNBROOK · SLOUGH · BUCKS

COLDWATER FISH

NOW IN STOCK

Red Fantails	6/6
Calico Fantails	7/6
Comets	3/6 8/6
Nymphs	3/6 7/6
Golden Orfe	3/6
Goldfish and Shubunkins	1/6 7/6

POND FISH

Goldfish and Shubunkins	5-6" 15/- pr.
"	7-8" 25/- pr.
"	9-10" 50/- pr.
Golden Orfe	6" 30/- pr.
Nymphs	5" 30/- pr.
Calico Comets	5-6" 25/- pr.
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Minimum Order for Fish £2
Plus 15/- Carriage, Packing etc.



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Aquariums	Half Reflectors
16 x 8 x 10	16 x 8
20 x 10 x 12	20 x 10
24 x 12 x 12	24 x 12
24 x 12 x 16	30 x 12
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16 x 8	16 x 8
20 x 10	20 x 10
24 x 12	24 x 12
30 x 12	30 x 12
75/6	43/3
91/3	54/6
	60/6
	72/-

KNOCK DOWN STANDS FOR ALL SIZES

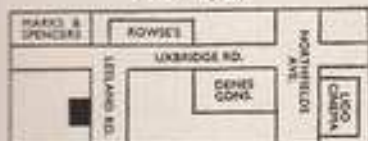
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White	5/-
Red	15/-
Yellow	15/-
Pink	12/6
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Spatterdocks	4/6
Minimum order for Plants	5/-

LIVE FOODS

Wingless Fruit Fly Culture	7/6
Grindal Worm Culture	3/-
Micro Worm Culture	2/-
White Worm Culture	3/-
White Worm, 1 oz.	6/-

Post Paid



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3/-



FOR VERY MUCH IMPROVED FILTRATION, THE "EHEIM SU-R" RECHARGEABLE RESIN, THIS CAN BE USED IN ANY FILTER AND IS PARTICULARLY SUITABLE FOR BREEDING PURPOSES. THIS DOES NOT AFFECT THE pH LEVEL IN FRESHWATER.

40/- p.p.



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WUNDERBAR
display stand
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See Page xi



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Contents

	Page
<i>Cryptocoryne blausii</i>	39
Interesting Pond-dwellers	40
Around the aquarium	42
<i>Pseudisylla gracilis</i>	43
Junior Aquarist	44
Collecting Specimens	44
The Guppy	45
Frog-Spawners	45
The freshwater crayfish	46
The Glowlight Tetra	47
Our readers write	48
Comments at the pondside	51
Readers' Queries Answered	52
Tubifex	54
Insect individualities— <i>Gyrinus</i> and its alarm system	54
Fish diseases (25) Fin and tail rot	55
Autumn in your aquarium	55
The black-lined tetra	56
Osmosis in the aquarium	57
Gas embolism	58
The <i>Aquarist</i> Crossword	59
News from Aquarists' Societies	59

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1966

Cryptocoryne blausii

by B. FRY

AMONG the very best of the larger *Cryptocorynes* to my mind is *C. blausii*. This species was first introduced into Europe from its native Thailand about six years ago, and in its mature form is one of the loveliest plants imaginable for adding foliage beauty to the tropical aquarium.

The glossy-surfaced leaves are roughly ovate in shape and average 4 in. to 6 in. long and about 2½ in. wide. They are brownish green above and rich crimson red tinged with a suspicion of violet below. The stout stems which hold the leaves aloft grow to about twice their length and are deep purplish in hue.

Once established in a favourable situation (though, as in other *Cryptocorynes*, a month or two may elapse after uprooting and replanting before any new growth is made) this species is not backward in making a clump of fine proportions and grandeur for subterranean runners are sent out in all directions from which numerous progeny arise. When these have reached a height of about 3 in. they are ready to be detached from the parent plant and grown on afresh.

C. blausii is not difficult to cultivate. All it needs to prosper are sufficient head and root room (obviously it is not suited to a small tank); a growing medium richer in chemical constituents than sand alone; a position in partial shade; water that is neither unreasonably hard nor alkaline; and, naturally, a temperature in the neighbourhood of 75°F (24°C).

A growing medium which suits *C. blausii* very well may be made of a mixture of equal parts (by volume) of loam, or clay, coarse sand, granulated or crumbled peat, and wood ash. Sufficient of this mixture to layer the bottom of a suitable container—a glass pie-dish, for instance—to a depth of about 1 in. is all that is required. After the roots have been spread out fan-wise and pressed carefully but firmly into place, a top-dressing of well-washed sand should be added. This will serve the double purpose of keeping the plant anchored until a roothold has been made and the soil from working out and muddying the water.

Interesting pond-dwellers

by BRENDA BARNES



Female *Dytiscus* water beetle at water-surface

WHILE the fish fancier and breeder may need to exclude most "foreign bodies" from his pond, the rest of us may be well advised to risk a little depredation among our fry for the sake of deriving more interest from the garden pond.

Initially, when once a pond has been constructed and filled with water, it is stocked with the bare framework of plants and a nucleus of young or breeding adult fish. It is not long, however, before other water-dwelling creatures find their way to such a virgin site and while some come overland like the frogs and newts, others arrive in the eggs deposited by winged insects. Some may be introduced in the eggs attached to aquatic plants and others arrive on the wing to take up semi-permanent residence beneath the surface. The habits, structure and adaptability of the numerous and varied water-dwellers is of the greatest interest to the student of nature and one's own garden pond can be quite a happy hunting ground and laboratory.

The majority of our pond visitors will be insect species of which the commonest will be mosquitoes. More spectacular and less unpleasant are the dragonflies which are absolutely harmless. Their appearance at the pond is usually motivated by a desire to mate and lay eggs and these operations can be watched in comfort from a pond-side seat. The male and female will be seen flying in tandem around the pond with frequent partings and subsequent visits on the part of the female to the water surface where she either deposits her eggs in the water or upon a plant according to her species. When hatched the larvae commence an underwater life of stealthily stalking their prey which consists of any fairly soft-bodied creature which can be captured and masticated by the powerful

jaws. Any losses to young fish may be partly compensated by the pleasure of witnessing the eventual emergence of the adult insect from the pupal case when the time comes for the transition from an aquatic to an aerial existence.

Usually arriving under cover of darkness, the great diving beetle (*Dytiscus marginalis*) quickly spreads fear and alarm among the lesser beings in the pond. A fast and active swimmer, this handsome insect of 1½ in. in length, chases its prey which may consist of tadpoles, newts, small fish, water-slaters, etc., and savagely cuts them up with its large jaws. The female lays her eggs in the stems of underwater plants in which she first makes an incision for the purpose. The larvae which result from the hatchlings are more voracious than their parents and feed continuously during this phase of their existence.

The water scorpion (*Nepa cinerea*) is not a common visitor to garden ponds but if it puts in an appearance it is worthy of study. Its body is so flat that it seems incredible that wing cases, wings and internal organs can be housed in so little thickness. Its front legs are claw-like and the second joints can be folded to fit into the first which makes escape impossible for any prey upon which the insect obtains a grip. Whilst held in this embrace the "beak" is brought into play and, in true bug fashion, the victim's juices are sucked from the carcass. From the tail end protrudes a sting-like filament of equal length to the body and this is pushed above the water surface to replenish air supplies for underwater breathing.

Allied to the water scorpion is the water stick-insect (*Rhantus linearis*) another bug which is rather local in distribution. This creature, too, has an incredibly odd shaped body which is attenuated and bears a very small head at the end of a long "neck." The front legs in this

Water scorpion (Nepa cinerea)



larvae, too, are adapted for capturing prey and terminate in sick-shaped joints, the whole being carried in an upright position as the stick-insect clammers clumsily among the submerged foliage. Sudden and swift is their descent, however, when prey comes within range to be seized and devoured. The opening of air is carried out the means of a tail end breathing siphon as with the water scorpion.

The water-boutan or back-swimmer (*Notonecta*) is a common water bug to most ponds and its rapid mode of swimming and sudden appearance at the water surface usually catch the eye. One of the few aquatic insects which can inflict pain upon human flesh, that bug possesses a sharp pointed beak which can puncture the skin causing a sudden but not lasting pain like the jab of a wasp's sting. A sudden but not lasting pain like the jab of a wasp's sting, the back is held like a boat and the action of the swimming legs as it progresses upon its back is very reminiscent of a strongly sculled boat.

Clinging among the detritus of the pond's bottom and among the thicker clumps of water plants will be found the water-bearer (*Ambrys*), a near relative of the common water bug. The thicker clumps of water plants will be found among the detritus of the pond's bottom and among the thicker clumps of water plants will be found the water-bearer (*Ambrys*), a near relative of the common water bug. The thicker clumps of water plants will be found among the detritus of the pond's bottom and among the thicker clumps of water plants will be found the water-bearer (*Ambrys*), a near relative of the common water bug.

For up to two years the larvae of mayflies lead an underwater existence if they are fortunate enough to escape the many predators which stalk them. During the long period they feed continuously and wax fat in order that they may eventually emerge as graceful little winged flies. But not for nothing are they called spheroptera (to live for a day) for in their adult state they are mountaineers and the short-lived energetic class of males and females must rely upon the nutrition taken in the larval and nymphal phases. Upon emergence the mayflies hurriedly seek their mates and joining an aerial dance they pair and expire, the female only outliving the male long enough to deposit her eggs.

The phantom-larva (*Chironomus*, formerly *Ceratomyxa*) measures only 1 in. in length and may be easily overlooked due to its transparency which renders it almost invisible. Its internal organs are all completely visible through the glass-like skin. Its habit is to remain suspended in the water by means of a pair of floats situated one within each end of the long thin body. At frequent intervals, however, the creature executes a sudden and rapid about-turn which must often successfully confuse a would-be predator.

These are but a very few of the host of aquatic creatures which inhabit the self-contained world which may be a river, lake, pond or puddle and which can afford so much interest to anyone who has access to water that is sufficiently "natural" to have invited the attention of these ubiquitous visitors. Although they are not all likely to be found within one stretch of water, some of them with others questing not when it is wielded by the inquisitive angler.

For up to two years the larvae of mayflies lead an underwater existence if they are fortunate enough to escape the many predators which stalk them. During the long period they feed continuously and wax fat in order that they may eventually emerge as graceful little winged flies. But not for nothing are they called spheroptera (to live for a day) for in their adult state they are mountaineers and the short-lived energetic class of males and females must rely upon the nutrition taken in the larval and nymphal phases. Upon emergence the mayflies hurriedly seek their mates and joining an aerial dance they pair and expire, the female only outliving the male long enough to deposit her eggs.

Phantom larva (*Chironomus*)

Phantom larva (*Chironomus*)

Around the aquariums

by MIKE SHEEDY

A FAMILY of four baby Puff Adders has been presented to the London Zoo by the Chester Zoo. These snakes were only about 8 inches long, and only a few weeks old when presented to the Zoo; they should grow to about 4 feet.

This poisonous African species derives its name from its habit, when angry or alarmed, of drawing in its breath and causing the body to swell visibly. The young of this viviparous snake are venomous from birth, and whilst they are becoming accustomed to dead rather than live prey, their food is offered to them on forceps and the keepers wear gloves.

The Terminal Station in Rome is so vast that it takes some time to explore it—and a tour of exploration reveals some unexpected features to divert travellers for an hour or so. A station is about the last place one would expect to find a Zoo-Aquarium, but one is included, and in a very good position being just between the main exit from the Metro and the stairs and escalators leading up to the central hall.

The price of admission is 200 lire (about 2s. 4d.) and one will find the place spotlessly clean. Most interesting exhibitions are arranged and presented in a most interesting and attractive way. By each tank or cage is a notice giving the name of the species in Latin, Italian, English, French, German and Spanish, and, in Italian only, details of where it comes from, what it eats, its normal dimensions, etc.

At the entrance soft music plays, and there is a large tank of spectacular goldfish and a gaily coloured toucan to welcome visitors. Once inside, there is a large hall, dimly lit. The sides are lined with glass tanks for the fish, and glass-enclosed cages for the animals. There are plenty of spectacular, brightly coloured fish, some quite large pythons, and many species of the lizard family, including iguanas.

The choice of species has clearly been made with great care and only those that can thrive in artificial light have been included. Also, colour has been considered—an important factor in a small exhibition.

The number of visitors to the London Zoo during 1965 was higher than any previous year since 1954. The figure was 2,126,000, about 300,000 more than the previous year. The number of visitors to the Aquarium and the Children's Zoo also increased considerably.

In the Freshwater Hall of the Aquarium there has been an increase in the number of species of British freshwater fish exhibited, the most notable addition being some Burbot which have not been seen in the collection for many years. Other additions include a number of species of

Gerrhonotidae, a family confined to North America. There have been several improvements in the Sewwater Hall, mostly concerned with the design of the tanks. New methods of circulation and filtration are being tested experimentally.

The number of pupils attending lecture-demonstrations organised under the Society's education programme continues to increase each year. During 1965 attendances were as follows: Spring Term—Regent's Park (Secondary Schools), 10,492. Summer Term—Whipsnade Park (Secondary Schools), 3,107. Summer Term—Regent's Park (Primary Schools), 12,681. Autumn Term—Regent's Park (Secondary Schools), 11,426. Total, 37,706.

At the end of 1965 the permanent staff of the Society totalled 574. Of these 142 were employed at the headquarters of the Society, 43 in the Research Institute, 275 in the management and Menagerie of the London Zoo, and 114 were employed at Whipsnade Park.

Australia has 10 per cent. of the world's total of women taking The Pill. But at Sydney's Taronga Park Zoo they have used a fertility pill to create the Zoo's biggest-ever baby population.

Sir Edward Hallstrom, the director, started the experiment several years ago on giraffes and the zoo soon had so many baby giraffes that some had to be given away. This season's baby arrivals include a bird of paradise, a kiwi, a rhino, an orang-outang, tigers, giraffes and several birds. The powdered pill is taken with meals.

When the Bristol Zoo's 600 gallon water tank is loaded on a lorry it is a sign that replenishments for the Aquarium are due. Bristol Zoo's Aquarium keeper, Alf Elliot, does his angling for more fish the easy way.

He loads up the tank and drives down to a fishing village in Cornwall. Here friends of the Zoo have collected a big family of interesting marine life. The fish, anything from bass to starfish, are decanted into the tank now filled with sea water, and the whole affair travels back to Bristol.

New arrivals at the Bristol Zoo include two monitor lizards six feet long, with dragon-like heads, sharp teeth and claws and powerful tails. They are now settling down happily on the rock ledges of their new home in the Reptile House. A couple of snakes have also arrived at the zoo.

Llanerch Deer Park, N. Wales has now been changed to Llanerch Zoo Park. Already Wales' largest zoo, over 200 acres, the rapid growth in attendances coupled with its complete change in function has necessitated the change in name.

Readers of *The Aquarist* visiting the zoo this season will find a big change in the Aquarium. This has been enlarged and will now include a collection of marine species in a newly opened section of the 15 century Hall Gallery. A new and a much larger reptilium has also been constructed in one of the largest cellars and the old reptile house has been converted to house cold water fish and the common family in large concrete tanks.

Now let's take a look at the new Flamingo Park. This Whipsnade of the North will be found at Kirby Misperton, St. Malton in Yorkshire, and what a place it is to visit, with its vast grounds, amusements, boating lakes, exhibition ferns and many other items of amusement and interest.

Many changes have been made over the winter months and visitors will find the Aquarium most interesting. The biggest venture of all is the new Marineland. This will include dolphins, whales, sea-elephant and, they hope walrus. There will also be an exhibition of trained dolphins and performing sea-lions taking place in the building each day. The lay-out of this Marineland will include an 80 ft. by 40 ft. pool where the performing dolphins will be able to jump high out of the water. Other aquatic creatures such as otters and penguins will also be housed in this building.

The old dolphin pools in the Reptile and Tropical Bird House will be used to exhibit Manatees. These strange mammals found in tropical estuaries were once popularly believed to be mermaids.

The following information about Flamingo Park will I am sure be of very special interest to readers of *The Aquarist*, who may be on a tour of the district during their holidays, for I am sure some of our readers have a caravan with them on holiday touring around. If so, there is a new caravan site under construction and will, by the time this article appears, be completed and they are also converting a site into a large centre where caravan owners will find every facility to hand. Owners of touring caravans will be glad to learn that part of the field is to be set aside for them. Bearing in mind the comfort and convenience of their visitors, Flamingo Park has provided a petrol station within the grounds.

Will Mr. JOHN CARTER, late of the late London Aquarium, please get in touch with the editor.

Pimelodella gracilis

by B. KATTERNS

NATIVE to South America and very plentiful in its natural habitat, it is only in recent years that this fish has been available to aquarists and even now there is sometimes difficulty in obtaining specimens in this country.

Some of the books refer to this fish as the Graceful Catfish, and state that it is quite peaceful. Graceful it may be when at rest but when on the move nothing is further from the truth; it will charge round the tank like a torpedo out of control but strangely enough, no damage results from these mad antics which usually coincide with feeding time.

Normally very peaceful, this fish can have sudden outbursts of fury if robbed of a particle of food by another fish and will savagely attack the thief no matter how large he may be. My own experience has shown that other fish realise this danger and never take liberties at meal times.

Pimelodella has a very large adipose fin and three pairs of barbels, the outer pair being extremely long, in most cases reaching the full length of the body. In general appearance it resembles a pale copy of the coldwater catfish seen in the pet shops and at a quick glance could easily be mistaken. Growth is very rapid indeed. They are one of the fastest growing fish I know and a batch coming into my possession at around 2 inches long were all over the four-inch mark in under three months and that without any special feeding. While on feeding, any type of food is taken although the favourite is any form of live food.

If you have a *Pimelodella* in the tank you need never fear food being left to decompose for it will dig out every particle and will eat until it is blown out like a small balloon. This digging habit I find can be most useful in clearing the bottom of a tank covered with blue algae. I have never seen them actually eat the algae but the constant digging acts the same as a hoe in the garden. Unfortunately they do not extend their efforts to the algae on the plants.

Temperatures around 75°F suit these fish very well and they seem to be all round tough fish but must have plenty of space to get around and I would not advise placing them in small tanks along with other fish for I feel that under such conditions they may turn spiteful as is the case with many other fish having the reputation of being peaceful.



Pimelodella gracilis



"You could say that I, too, am a young and enthusiastic fan-fancier" (common otter)

THESE pages are addressed to you who are on the threshold of what will grow to be a lifelong fascination with the world of water and the creatures and plants with which it teems. It will be our endeavour to foster the interest this subject has already aroused in you by providing features designed to help your aquatic activities and by inviting you to submit your own ideas and observations on your own particular aspect of the hobby. Space will also be allotted for your own correspondence column and letters intended for inclusion should be addressed to:

**"The Junior Aquarist",
The Butts,
Half Acre,
Brentford, Middlesex.**

Articles of not more than 800 words (as well as photographs and drawings) considered suitable for publication will be paid for at our usual rates.

We look forward to hearing from you!

The Junior Aquarist

Collecting Specimens

AT this season of the year natural ponds and streams have a magnetic attraction for many of us and a great deal of interest and pleasure may be gained from collecting trips to such waters. The additional interest of housing the catch for observation makes these excursions doubly worthwhile but there are some basic factors which should, at all times, govern these activities. These are times of diminishing numbers among many of our native life-forms—due to a variety of different causes—but it is still often possible to come across a particular pond which is very rich in certain species of creatures relatively rare in other regions. On such occasions the temptation to collect many more specimens than is required is often very great but should be resisted if we are to assist in halting the complete disappearance of life-forms which were quite recently very common.

When specimens have been taken from natural waters and kept under aquarium conditions until they have served their purpose, it is always a good plan to return them, whenever possible, to the pond or stream from which they came. Other waters nearer at hand may seem just as suitable but very often there may be unknown factors present which will prevent all chances of survival for the creatures liberated in them. The ecology of one pond, where nature has achieved a balance between the life-

forms present, will rarely be exactly the same as another a few yards distant and any attempt to alter the balance established over the course of time by introducing "foreign bodies" will result in failure. Either the introduced species perish or so thrive that they will threaten the existence of other species native to that locality. A good example of this can be found on the Romney Marshes where a very small number of laughing frogs (*Rana subulana*) were liberated and have so multiplied and spread that they cover many square miles of this part of Kent where, partly in consequence, the native common frog has disappeared.

The study of ecology and ecological control is now an international science of growing importance and there is no finer vehicle for experiment in this field of research than the home aquarium. The successful aquarium—be it cold water, tropical or marine—is one where the aquarist has succeeded in assisting a balanced set of conditions to evolve between plants, fishes and other aquatic creatures and this should be the goal when setting up an aquarium. An aquarium is, in fact, a self-contained establishment independent of the outside world except for its need for light and contact with the atmosphere for the reception of oxygen.

The Guppy

by M. PARRY

THE Guppy (*Lebistes reticulatus*), which attains a maximum length of 2½ inches in the female, and 1½ inches in the male, needs little introduction as it is a fish that is kept by practically every aquarist whether beginner or expert. Indeed, throughout the country groups have been established devoting themselves exclusively to the study of this fascinating species. Its common name is derived from that of its founder, Dr. R. L. Guppy, a Bristolian, who collected them on a large scale in Trinidad around 1859. It has, since that time, been brought into many countries as an anti-malarial measure, including Barbados, Dutch Guinea, the Leeward Islands, South Brazil, and Venezuela.

The guppy is a prolific breeder, young being brought forth alive every four to six weeks. In addition it is a very active peaceful fish, seldom contracting disease. The female is generally of a plain-greyish colour, totally different to the male, whose body coloration reflects every colour of the rainbow. It is a fish ideal for those aquarists who wish to attempt line-breeding, many well developed varieties of the fish having been produced. Those interested in general breeding should approach either the specialist societies, the Federation of Guppy Breeders' Societies, or the Fancy Guppy Association. Amongst varieties recognized by the former of these bodies are Bottom-Sword, National, Pintail, Roundtail, Scarftail, Spicetail, and Whisker.



Male Guppy

Frog Spawn



Female common frog with spawn

DID you collect any frog-spawn this spring and if so, how are the tadpoles getting on? Every year keen young collectors gather jars of spawn and eagerly carry them home in the hope that they will successfully rear hundreds of little frogs. Alas, something so often seems to misfire and few, if any, are the frogs which result from so many tadpoles.

The first secret, of course, is not to collect too much spawn. A few dozen tadpoles, when they emerge, will stand a better chance of reaching "froghood" than a few hundred. The second tip for success is correct feeding after the tadpoles have ceased to browse off the algae and other aquatic plant-life. Once they are seen to be actively and ceaselessly swimming around their container, it's time to start them on a diet of flesh in the form of chopped garden worms. Small pieces of cooked meat from the dinner plate may also be fed them but in moderate quantities, care being taken to ensure that all has been consumed before further helpings are given. This diet will see the tadpoles through to their complete metamorphosis.

With the appearance of the forelegs and the shortening of the tail which soon follows, we enter the final and most difficult stage of rearing young frogs. Even when all facilities are provided for the emergent froglings to leave the water, many of them die from drowning and one wonders how they survive this stage of their development in the wild. Well, of course, very many of them don't but we should be able to ensure their survival since we are setting out to do just this. If possible it's advisable to remove them at this stage from their aquarium and house them in something more like a wide, shallow dish at one end of which rocks, gravel, clay or soil has been formed into a sloping "beach" up which the terrestrial-bound frogs can roam into the wide world of your garden. If losses are still seen to occur, make a daily inspection and net those specimens whose tails have almost vanished. These can be released with safety in some convenient corner of the garden which offers cover from queering birds of the thrush family whose liking is for such meaty morsels as these.

The freshwater crayfish

by G. N. DOWNS



Female crayfish with young (bottom left)

THE crayfish is the largest, most highly organised and probably the most interesting British freshwater crustacean.

It is an Arthropod belonging to the order Decapoda, which means ten legs, of which the pincers are the first pair. There are two species to be found in Britain, but I intend to deal with the only indigenous species, *Potamobius pallipes*, or "white claw" although except for its smaller size and different colouring on the underside of the pincers it is similar to the continental species, the "red claw."

The usual adult colouring is very dark, greenish grey, but the colour is extremely variable and some specimens are yellow or even an attractive brick red. The under sides of the pincers, abdomen and cephalothorax are off-white. The cephalothorax refers to the head and the thorax which are fused together in this species. Small specimens are paler and have a semi-transparent appearance. *Potamobius* grows to a length of four inches or more and the large specimens are usually males. The crayfish can be sexed with certainty by inspection of the pair of appendages located under the first section of the abdomen. In the male these are deeply grooved and are used for passing the sperms to the under side of the female.

Although crayfish are not common, where they do occur they are usually abundant. They usually inhabit

the slack water of fast clear streams but moving water is not essential to them and many reservoirs and gravel pits contain crayfish.

There has been much literature published which describes the crayfish as an aggressive predator, but I have kept crayfish with native fishes for several years and I have found them to be perfectly trustworthy.

These lobster-like creatures make interesting and unusual additions to the aquarium but they should be obtained during the cooler part of the year and acclimated to room temperature gradually. Warm water and overcrowding is fatal to newly-caught crayfish.

When setting up an aquarium for crayfish, a hiding place should be provided for each specimen and rocks should be placed so that the inhabitants will feel secure when taking refuge while giving, at the same time, a clear uninterrupted view of the crayfish to the observer.

Although the size and hard chitinous structure of the crayfish may cause the aquarist some consternation for the safety of his plants, provided they are normally well secured they will not be uprooted or damaged. Plants should be arranged so that they do not provide too much cover in which the crayfish can hide.

Continued at foot of page 47 ▶

The Glowlight Tetra

by H. E. R. THOMPSON

A LITTLE gem, without any vices, and suited in every way to the communal life of our aquaria," is an apt description of the Glowlight Tetra. One of the most beautiful of Characins, it is endowed with an extremely peaceful nature, adapting itself readily to aquarium conditions where it usually lives a long and trouble-free life. As with all our fishes, some pains in providing the correct conditions and setting will show this little beauty off to its best advantage and provide ample reward to its owner.

The aquarium should be clean and set up with soft, slightly acid water (pH 6.7-6.8 is ideal). A well planned aquarium with a moderate top light enhances its beauty and we then see a fish with a grey to greenish and somewhat transparent body, silver to white in the belly region and bearing a fairly broad gold-to-red brilliant longitudinal line running from the upper curve of the eye to the base of the tail where it ends in a wider glowing spot. This brilliant line places it in a class with the Neon and Cardinal Tetras to which it is closely related. The anterior rays of the dorsal fin are gold to red and a trace of red is also visible in the anal fin; tips of the dorsal, anal and ventral fins are a milky white, more pronounced in the male. Pectoral and caudal fins are colourless; an adipose fin is present in this species. A maximum growth of 2 in. is reached in fine female specimens; males are somewhat smaller and slimmer, having a flattened appearance in the anterio-ventral belly region.

From the time of the introduction of this fish in the middle 1930's when it was discovered in the Guianas and surrounding areas of the Amazon, there has been some controversy as to its proper name. Some writers quote it as *Hyphloscopus gracilis*, while others name it as *Hemigrammus gracilis* and again as *Hemigrammus erythrozonus*. Which of these is correct and if they refer to one and the same fish is open to discussion.

Although the keeping and maintaining of the Glowlight in good health is a fairly simple task, it is a different proposition when it comes to breeding. Firstly, this should not be attempted with fish that are under 15 months of age, and secondly, as I maintain with most of the "difficult to breed" fishes, pairs should be self-mated. The potential breeder should, therefore, purchase six to eight Glowlights when very young and grow them on together until their second year when, by careful observation, a "pair" may be spotted as breeding condition develops.

A scrupulously clean tank must be provided; quite a small tank will suffice, 24 by 8 by 8 in. being ideal, filled to a depth of 5 to 6 in. with soft, acid water over peat moss (approximate water analysis: pH 6.6-7.5; of hardness by German table). The spawning medium should not be mixed too thickly as the Glowlight differs from other Characins in that it spawns with a barrel-roll movement

and heavy root or plant thickets would, to some extent, confine its activities. Coconut fibre or willow root serve as excellent egg traps, or finely-leaved plants such as *Miriophyllum* or *Azobolla* may be used. Place the breeders in the tank in the evening and maintain a temperature of 76° to 80°F.

Remove parent fish as soon as spawning is observed; although this fish is not rated as an avid egg eater, a change of diet in the form of freshly laid fish eggs may prove too much of a temptation! Now cover the tank to shield from bright light and especially sunshine which could prove fatal to any exposed eggs. The babies should hatch in 24 to 30 hours, when they will enter the bed of peat moss. The tiniest of infusoria must be provided for about seven days when the fry can graduate to egg yolk and freshly hatched brine shrimp. Once they have reached this size, growth is fairly rapid and periodical partial changes of water will greatly assist growth and prove beneficial to them; and, of course, move the fry to larger growing-on quarters when a size of $\frac{1}{2}$ in. or a little under is reached.

Although I have quoted the Glowlight as a most suitable subject for the community aquarium, a tank containing a dozen or more of these little gems is a sight to behold.

▶ continued from page 46

The freshwater crayfish

No more than two or three crayfish should be kept in a twelve gallon aquarium which should be filled with fairly hard water for best results. Slightly green water will be tolerated but it must be stressed that crayfish are very vulnerable to foul water and great care must be taken to remove uneaten food which should consist of worms, pieces of fish or meat.

If the water becomes too warm or foul the crayfish will try to find a more suitable abode and they can travel considerable distances overland. The water should have a good oxygen content but although artificial aeration is usually described as essential for crayfish, I have found that a clear well balanced aquarium contains enough oxygen without artificial aeration, except in warm weather with newly obtained specimens.

The crayfish is well worth obtaining and is quite hardy when acclimatised to life in the aquarium and by adhering to a few simple rules a great amount of pleasure can be derived from keeping this fascinating long-lived and curious creature.

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.

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

Cold Water Tropical Fish?

I have just finished reading your latest edition of "The Aquarist and Pondkeeper" and would like, through it's columns, to pass comment on the tropical fish in the canal at St. Helens.

On reading your article about the tropical fish in the canal at St. Helens I would like to give my support to the gentleman who wrote it.

This chance survival of tropical fish in our own waters may be the beginning of a new species of fish if, of course, the perch are not introduced to this part of the canal. In time the tropicals may breed, spread and eventually adapt themselves to a cooler temperature, possibly being able to live in cold water.

Obviously one must consider the safety of the local children as being more important, but I am sure that once the initial attraction has worn off the fish would be responsible for no more danger than the traffic on the roads. In fact kiddies will always "go playing about on the river".

If, however, the parents do feel justified in their worrying, then I would suggest that the F.B.A.S. should try, if possible, to raise enough money to fence off this area and conduct the experiments in a full, professional manner in order to help science as well as the ever inquisitive aquarist.

Then maybe, one day, we will have the phenomenon of cold water tropical fish.

B. JOHNSON, Hounslow West, Middlesex.

New Names

I OBTAIN this excellent magazine from my newsagent every month.

In your March 1966 issue in "Fishes of the Characidae family (Beginners guide) it states the neon tetra's Latin name is *Hyphessobrycon amon*, but it is now officially *Pamachrosodon innesi*.

A. COLES, (Age 14)
319, Queens Road, Maidstone, Kent.

[Congratulations Master Coles on being so up to date with nomenclature changes.—Ed.]

Illustration for Aquarium Studies

AS a teacher of backward children I wish to undertake a project on the setting up of an aquarium but there seems to be a distinct lack of literature on this subject.

I would be grateful, therefore, if you could advise me of suitable books on the subject, and also where I may obtain diagrams or pictures.

Your assistance would be much appreciated.
GEORGEY R. MORRIS,
50, Crown Woods Way, Eltham, S.E.9.

MY daughter, who attends Plymouth High School for girls, is doing a project on "Pond and Stream Life".

Although she has excellent books and has borrowed many more from our local library, she has not been able to obtain any photographs, illustrations or diagrams which can be included in the project.

I would be grateful if you could inform me where I may obtain such photographs, illustrations and diagrams at a reasonable cost.

P. F. M. COMER, (Mrs.)
382, St. Peter's Road,
Manadon,
Plymouth, Devon.

Editor's Note

Perhaps there are some readers who have back copies of the "Aquarist" to dispose of from which, it is certain, many suitable illustrations could be culled by the above two correspondents.

Jumping Swordtail

IN the April edition of *Aquarist* I read Michael Hir's paragraph about his siamese fighters. I would like to tell you about one of my swordtails. Early in the morning I put a gravid female into a breeding trap measuring 4" x 4" x 8". Later in the morning, when I went to see her, she had jumped completely out of the trap into the aquarium and from there to another aquarium nearly one foot away! Could you tell me if this is natural as I did not have any male swordtails in the later tank?

GRAHAM FEATHERSTONE,
11, Tenplegate Walk,
Whitkirk, Leeds 15.

Goldfish Classes

WITH reference to the letter by Mr. B. Simmons in *The Aquarist* dated April 1966, I would have placed the shubunkins in the fancy goldfish class if I had been asked as judge to amalgamate classes. On the other hand, if the judge had been a member of the Goldfish Society of Great Britain, he would have placed them in the single-tail class. When the Goldfish Soc. was formed, the well-known and established varieties of fancy goldfish were ignored and four new basic varieties were made. These were single-tail, twin-tail, globe-eye and bramble-head. Consequently, the shubunkins were not recognised and all single-tailed fishes such as common goldfish, comets, London shubunkins and Bristol shubunkins were lumped together. The fantails and veiltails went into the twin-tails, the globe-eyes took the moors and any telescopic-eyed fishes, and the orandas and lionheads were in the bramble-head.

The Federation of British Aquatic Societies had standards for the fancy and other goldfish with special pointings to reward the special features which differentiated them from others. The Goldfish Soc. persuaded the Federation to change this system of pointing to a flat type so that any special feature could no longer be rewarded. Such features were the colour of the shubunkin, the hood of the oranda and lionhead and the tail of the veiltail. Since the formation of the Goldfish Soc. there has been considerable confusion among exhibitors and I have been noticing that at all the shows I have visited there has been a lessening of numbers of goldfish and a great reduction of the quality of fancy goldfish. Where would you see a class with 33 families today, as was the case when one was provided at the Olympia in 1950, and I have cards to prove this statement.

A. BOARDER,
Ruislip, Middx.

Goldfish Classes

I ENTIRELY agree with Mr. Simmon's letter—"Goldfish Classes"—in the April issue. As exhibitors know, among conditions to be found in Show Schedules are "the judges' decision is final," and "the show committee reserve the right to amalgamate classes if they think fit." Coldwater enthusiasts unite! For far too long have we suffered at the end of the classes, being fobbed off with "AOV Goldwater" or "AOV Goldfish Singletail" and "AOV Trout" or with more enlightened Societies "AOV River and Pond Fish." "Please bring your own tanks." Rubbish! These are YOUR fish, it is YOUR show, and the ultimate success or failure depends upon YOU, THE EXHIBITOR. We must stick out for more classes; each Goldfish variety can only be fairly judged against its own kind, and the many other equally (almost) interesting coldwater species kept by aquarists, merit a greater sub-division of classes than we can find nowadays. I recall the great National Exhibitions in London during the early fifties; you would not find the 30 common Goldfish entries being lumped in with the 31 Bristol Shubunkins, and the 15 Londons.

My Society (Reigate & Redhill) has a most enthusiastic Coldwater Section, and our breeders are also members of the Goldfish Society of Great Britain. Together with our fellow-members, we shall be competing in a great many shows during the season.

We very much hope, and I am sure our wishes are shared by Mr. Simmons, and Coldwater enthusiasts everywhere, that Show Schedules will include a greater number of Coldwater classes this year and in the future. Show summaries, please note, we have the fish, other aquarists wish to see them, and so do the general public, who at the present time can find more information and encouragement regarding pond and aquarium keeping than ever before. So we ask in for a fair crack of the whip, the rest is up to us.

R. M. WHITTINGTON,
P.R.O. Reigate & Redhill
Aquarist Society.

Glass Fry Tubes

REPLYING to Mr. Collett's letter—"Answer please"—in the April issue, I am afraid that I also do not know if the glass fry catching tubes are still obtainable. I used to see one several years ago, but passed it on as I never wanted to get the hang of it.

Mr. Collett may like to try the methods I use to sort out fancy goldfish fry each summer. If I am only concerned with moving a whole spawning into larger and denser conditions, I catch up a number in a largish net or 5 in. by 4 in., and with the net still partially submerged, I then catch up a number of fry at a time in a small plastic jug or tin. A better method, though more laborious, is to catch each little fish one by one in a teaspoon, again with the net partially submerged. If the teaspoon were painted white, it would facilitate inspection of the divided

tail in goldfish varieties. I have transferred many thousands of 10-day old fish by this method.

R. M. WHITTINGTON,
P.R.O. Reigate & Redhill
Aquarist Society.

Required: Darker Planting Medium

I LOOK forward every month to reading your most interesting magazine, particularly the article by K. N. Puleston, in January edition, entitled "Shedding some Light on Aquarium Plants."

It is my intention of following K. N. Puleston's advice, and setting up the same lighting in my 36 by 15 by 15 in. tank. I would also like to change my entire set-up by acquiring some different planting medium. Recently in your magazine a supplier advertised to send for a free sample of Natural Silica Quarzine Gravel, for which I duly sent. I have now received a sample which I find to be the ideal type of gravel except that the colour is not what I expected. What I am looking for is a very dark gravel to enhance the colours of the fishes, etc.

I have tried using sifted coal but it doesn't appear to be very satisfactory in that it is too light in weight, and gradually moves to the front of my tank.

I am also aware that one can purchase commercially coloured gravel from pet stores, but upon reading an article by P. M. Foller in February edition, he states that it is best to avoid all forms of artificial ornamentation, etc., as they often lose their colour with the release of detrimental substances into the water.

Could you please inform me if and where I can acquire some dark gravel and rocks. I was thinking of using granite chippings one finds on the roads, but they are rather too large in size. I believe the correct size is about 1/16th in. diameter. I would be most grateful for any advice and help with this matter.

S. A. GELLENGHAM,
30, Queen Street,
Upper Weedon, Northants.

Calling Mr. Collett

IN reply to the letter from Reginald W. Collett asking about fry tubes, I would agree that there is nothing to equal clear glass.

I am an aquarist of fairly long standing but I cannot remember these tubes. However, if Mr. Collett will send me a sketch and measurements of the tube, I will make him one for just the cost of postage. I have my own design which I am sure will please him more, so he can have both *free* and I would like his comments.

REGINALD G. PELL,
24, Northfield Road,
Ponders End, Middx.

Blue Carp

I AGREE with Mr. R. Chown of Surrey regarding his notes on blue carp, but would also like to mention another aspect on this coloration which occurred some 30 years ago in a small canal in the Reddish district of Manchester. It was noticeable that the majority of carp caught by line or net had a distinct blue colour. I obtained a couple of these specimens and placed them in an aquarium. They were dark on the sides but more blue when seen from above. I talked with several interested persons at the time and we formed the conclusion that a number of black moors had been released in the canal by the owner of the fishing rights who also had a fishing tackle and aquarist's shop in the district. The canal water was heated by the local mill and the moors survived and interbred with the Crucian or Prussian carp already established in this water.

FRANK BRADDOCK,
Flixton, nr. Manchester.



Informal pond with surrounds incorporating numerous varieties of ornamental dwarf conifers

Conifers at the pondside

by JAS. STOTT

AMONG these subjects, collectively known as conifers, are to be found quite a number which rate high for inclusion in the planting scheme of the pondside or water garden. They are capable of providing varying shades of green or tinted colour masses to the surround at a time of the year when there are few flowers and foliage for the eye, in the main, evergreen. By virtue of the differing shapes, styles and sizes there are varieties suitable for both formal and informal design and the large or small group. Some go well among the rocks in an alpine setting for a pool while others, with their symmetry and grace, are used for tub planting or pockets in the paved surround of the formal pond.

Doubtless first choice must come from the family formerly known as *Cupressae* but now by the more ponderous name of *Chamaecyparid*. It contains many delightful species and varieties both large and small; in fact, the range is very wide but thinking in terms of the average sized setting, I have selected three of the smaller species.

Offering an ultimate height of some four to five feet of dense, pyramidal shaped blue-greyish-green foliage *C. Lawsoniana nana*, var. *Fletcheri* is one of the best conifers for its wisdom choosy, even tolerating industrial grime better than most conifers and seems to do well in most parts of the country. Shape and outline make it an excellent choice for the informal design.

For inclusion in one or two pockets in the paving of the formal pond surround *C. obtusa* var. *nana aurea* is a grand selection. It is compact in growth eventually reaching a mature height of three to four feet. The foliage is golden-green and the overall shape of the conifer is conical.

Another for the alpine surround is *C. obtusa* var. *pygmaea*. It is somewhat fan-topped with horizontal, fan-like branches and bronze-green foliage with an eventual height of 1½ to 2 feet. This particular conifer looks well with limestone outcrops.

There are several attractive forms suitable for the pond-surround among the junipers and two come to mind immediately from personal experience. One is *J. sibirica stricta*, an ideal outlined conifer for the formal surround with grey-green foliage and graceful, sweeping lines. The ultimate height is around five to six feet. The second is *J. procumbens* for the informal setting. It assumes grey-green foliage and a creeping, wide spreading

habit of growth with a maximum height of twelve to fourteen inches but it can spread to cover an area of some four to five square feet.

Another juniper which always looks well when placed among rocks close to the edge of the water is *J. horizontalis*, also flat growing but with an attractive blue-green foliage that turns plum coloured in the Autumn. The maximum height is even less than that of *procumbens* for it seldom exceeds twelve inches and frequently matures at around six to eight inches but it is also a greater spreader.

There are several charming small growing subjects among the *Thuja* species ideal for the informal lay-out and they offer the advantage of a change of colour in Autumn and Winter although none are deciduous. Without a doubt, to my mind, *T. occidentalis nana* var. "Rheingold" is the most beautiful. It has brownish-green foliage in Spring changing grey-green during the Summer months and turning to a lovely golden-bronze in the Winter. Another variety is *T. occidentalis* var. *ericoides*, the variety name meaning heath-like. It forms a pyramid-shaped bush of firm foliage which turns a dark bronze in Winter and, although not as intense as "Rheingold," is worthy of consideration as a background subject. It is also a taller growing variety.

Two Japanese Cedars, *Cryptomeria japonica*, can also be found suitable; one for formal designs the other for the informal surround and given in that order. *C. jap. globosa nana* is a rounded, dense-growing bush with bronze-green foliage and a matured height of four to five feet. The other is *C. jap. elaeagnifolia* somewhat smaller both in height and depth but a dark, richer green.

Conifers are, but for a few exceptions, fairly hardy although they never give of their best when they are compelled to endure heavy industrial air pollution. The best time for planting is in the late Autumn but most nurseriesmen sell pot-grown plants and these can be planted out at any time of the year providing the ground is open and not frozen and the plants are fully hardened off. There are many more to choose from than those mentioned in this article suitable for pond surrounds but care should be taken, when making the choice, to determine the mature height if bought as young plants. Some are very slow growing but may eventually end up quite large trees.

OUR EXPERTS' ANSWERS TO TROPICAL FISH-KEEPING QUERIES

Please tell me whether a pair of *Aequidens latifrons* would be easy to keep and breed in a 24 in. by 12 in. by 12 in. tank maintained at a temperature range of 72°F (22°C) to 80°F (27°C)? Is the species quarrelsome by nature? Also, what foods suit it best?

A pair of *A. latifrons* (*palcher*) should live and breed quite well in a tank measuring 24 in. by 12 in. by 12 in. Nevertheless as this cichlid reaches a solid 6 in. in length, more spacious quarters are recommended. A temperature range of 70°F (21°C) to 75°F (24°C) for general maintenance, and up to 80°F (27°C) for breeding is satisfactory. Large specimens are not entirely trustworthy with other fishes, especially those smaller and less sturdily built than themselves. A mixed diet of crunchy dried food, whole or chopped earthworms, and lean meat is all that is needed to keep it in good health.

I have been told that a male Siamese fighting fish will do no harm in a well-planted community aquarium stocked with the usual run of small fishes. Is this correct?

Provided the fishes living in the tank are alert and always on the go, one male fighting fish should do no harm.

Limnaea snails are nibbling far too many holes in my plants. What can I do to rid my tank of these pests?

Remove all the large snails you can see from the aquarium and then introduce a non-pugnacious cichlid such as *Aequidens maroni* or a couple of young paradise fish—harmless in their smaller sizes—to kill off the rest.

Every time I feed my neon tetras with a well-known brand of dried food they lose their balance (temporarily) in the water. Please tell me the reason for this.

Neon tetras are hearty eaters and the dried food they gobble up so greedily swells up in their insides. This causes them to swim about for a time in a jerky, head-down position. The best thing you can do is to soak the dried food in a small quantity of tepid water before introducing it into the aquarium.

I have heard that acid water is not the ideal medium for the development of microscopical aquatic life. Is this true?

It is true that acid water is not the ideal medium for the development of microscopic aquatic life. This is the reason why there are fewer sigal growths and few bacteria in an acid water aquarium than in an alkaline one.

Please give me the names of some plants that should do well in a shady aquarium.

Cryptocoryne affinis, *C. blaini*, *C. willisi*, *C. griffithii*, *Sagittaria subulata*, *Didiplis diandra* and *Vesicularia dubyana* are among the plants that usually grow well in a poorish light.

What is the life-span of *Corydoras paleatus*? Furthermore, what conditions and what sort of food are most certain to help it attain a long and healthy life?

C. paleatus lives for upward of ten years. It lives longest and usually enjoys good health if given a sandy floored tank filled with water that is neutral to alkaline. It is not particular about temperature, but the middle sixties to low seventies (°F) appear to suit it best. Meat and worms should make up the bulk of its diet.

I would be grateful for any information you can give me regarding the peppermint catfish, which I cannot find mentioned in any of my aquarium books.

The so-called peppermint catfish is known to science as *Leocassis namensis*. It is, as its trivial name suggests, a native of Siam. In its natural state it attains about 6 in. in length and was first introduced to tropical aquarists in 1936. It is a bottom-dweller and thrives best on tiny pieces of meat, worms, *Daphnia* and the regular live dried

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



Aequidens maroni, commonly known as the keyhole cichlid

foods. It flourishes well at the usual range of temperature and is not out of place in a community tank. So far as we know it has not bred in captivity.

I bought two small *Scopelogadus* eggs a week ago. Dried foods they will not touch. Not wrapped raw beef. Yet in a book I have just read, the author states that scats are gluttons for food and will eat anything. May I have your comments please?

It is not unusual for newly imported scats to be fickle about their food. In all probability the sudden change in their living conditions (mainly marine or brackish to fresh water) robs them of their appetite. The best thing you can do is to tempt them to eat tiny worms (red or white) dispensed from a perforated feeder just submerged in the water. If these worms are taken freely (as they usually are) throw pellets of crushed lettuce into the aquarium, for in their natural state the *Scopelogadus* include a lot of vegetable matter in their diet. A very small quantity of evaporated sea-salt added to their aquarium water may help to restore their lost appetite.

I am a comparative newcomer to the tropical fishkeeping hobby and would be obliged if you can tell me the names of a few labroid fish which are amiable, attractive to look at, hardy and in your experience, well-suited to life in a community tank.

Colisa labia, *C. labiosa*, *Trichogaster leeri*, *T. microdon* and *Macropodus chinensis* (not to be confused with *M. opercularis*, though the albino form of the type is quite docile) will meet with your requirements.

Continued on page 38

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have eight goldfish in a tank which is 26 x 15 x 12 in. and wish to breed them. Please give me detailed instructions on how to do so. I have one fish with three tails like a rocket, what to do?

You are not likely to breed many fish in your tank as goldfish eat many of their eggs and fry if any hatch. It is safer to hatch and rear the fry in a separate container. Use the book "Coldwater Fishkeeping" from *The Aquarist*, and you will find all you want to know about breeding these fishes. The goldfish with the three tails is what is known as a "tri-tail". Fishes such as this often appear in strains of fancy goldfish which have a double tail. The eggs you have are throw-outs and are of little value.

I have recently bought a moor for £5 from a private dealer. It swims in a perpendicular position with the tail up. What is the matter with it and how can it be cured?

It sounds as if the fish has swim-bladder trouble. This may have been brought on by a chill. Many fancy goldfish, including moors, are bred at a warm temperature, even up to 70-75°F. If such fishes are transferred to a coldwater tank suddenly, they may get a chill and then develop swim bladder trouble. It may be possible to effect a cure providing the fish is not inheriting this complaint from its parents. Place it in very shallow water, one deep enough to cover the dorsal fin. Add a teaspoonful of salt to each gallon of water and if possible raise the temperature of the water to about 65°F.

I have a 3 in. golden eel in an 18 gallon tank. It has developed a few white spots at the extremities of three of its fins. The spots are in a row and close together and I feel certain that they are not white spot disease. The fish seems quite healthy and active. What is the matter with the fish?

The white marks on the edges of the fins may be where some slight damage has been caused in the past. If any fish-like attacked the fins then, when the damaged fin was renewed, it is possible that a small raised white mark would appear. If the fish is not inconvenienced in any way and the spots do not spread there is no need to take any action. The spots may disappear but they may also remain always.

I have a dozen shubunkins in a 4 ft. tank and am hoping to condition them for breeding. I have read many contradicting statements as to how old or large goldfish have to be before they can breed. What is the correct condition?

All types of goldfish can breed at a year old, or three inches in length. This will, however, depend on how the fishes have been reared. I have bred from fantail goldfish when they were 11 months old. Any goldfish which came from an early hatching, say April or May, should be able to breed the following late spring or early summer. This depends, of course, on whether the fish had a good upbringing, being given plenty of food and space. As a general rule I think that they breed well at two years of age, if well grown, and can breed for many years, at least ten.

Can you please suggest a waterproof preparation to paint over my newly constructed pond? It is made with an outer wall of brick and an inner wall of sandstone and limestone. It is losing water at a fast rate.

The sandstone and limestone are no doubt porous and you will find that water will soak away through them. You do not want to lose the beauty of the stone by covering with any opaque substance you say, but after a short space of time the stone would become covered with Algae, etc., and would not be seen. The best way to make the pond waterproof is to float it over inside with an inch of concrete mortar, three parts fine, sharp sand, to one part fresh cement. Try to get this on in one period as once the cement starts to go off the next coat may not join up well with it. Once the cement has dried off give it a couple of treatments with a stiff broom and plenty of water. It

should then be safe for fishes, but if left for a few days filled it will help to season the cement and remove any free lime.

I have installed a pond in my garden, 3 feet by 2 feet. I put seven small fishes in and two scavengers as well. Three of the fishes have died and two have disappeared altogether. I propose to install a fountain but wonder if I have too much plant life in the pond?

Your pond is very small indeed and it will be very difficult to keep it in good condition. The smaller the pond the harder is it to keep fishes healthy in it. I doubt if the fishes died because you had too much plant life; the opposite is the usual case. You may have over-fed and the uneaten food has polluted the water. You do not state which scavengers you have in the pond. If they are Catfish (coldwater ones), they could have eaten the small goldfish. These catfish grow very quickly to a large size and as they are fond of live fishes it is very dangerous to include them in any pond where there are smaller fishes. I cannot see what good a fountain would be in such a small pond, I imagine that the water would fall mostly outside your pool.

I am interested in keeping some small trout in a large aquarium. Please can you give me some information on this problem?

To keep trout in a healthy condition you must be able to keep a well oxygenated water for them the whole time. A strong aerator must be kept working or the fishes would soon die. These fishes are river fishes and rarely do well in any slow or still water. Most aquarists who are successful with keeping trout have a system whereby the water can be purified as well as oxygenated.

I have trouble with blanket weed in a small pond and have been told that the Great Pond Snail would clear this up. How many would I need?

I do not think that the snail you mention would be of any use in clearing the blanket weed from your pond. They might eat some of the soft filamentous algae but the blanket weed would still thrive even if you put a hundred snails in the pond. There is no chemical which would kill this pest without also killing the water plants which were needed. The best way to get rid of the weed is to have plenty of growing water plants which would choke out the weed in time. You can help by twisting out large masses of it with a broken stick.

I had several goldfish in a pond and brought them with me to my new house where I made a pond with polythene. After a few days the fishes were rolling about and then they started to die off. It is not fungus as I would recognise this complaint. They show no signs of damage either. What do you think is the trouble?

It appears to me that the water is impure. The actions of the fishes suggests this. There may be some form of poison in the water. It could have come from copper pipes if in the house system, or from some external cause such as the use of insecticides in the neighbourhood of the pond. You had better check up on the water supply, clean out the pond and start again.

I have a pair of shubunkins which spawned early last summer. They were pulled out of the pond by a cat but I was able to save them. There were no subsequent spawnings, perhaps due to the interference. Do you think that I should strip the female of eggs as she looks very full, or would the fish go through the water all right and spawn in the spring?

Female fishes which still hold some eggs in the winter will continue to do so until the following spring. You should not try to strip the eggs from the fish as you are likely to damage the fish in this way. Although eggs can be taken from a fish when in spawning condition at other times it is dangerous.

Tubifex

by B. FRY

THE scores of species of aquatic worms popularly referred to as *Tubifex* live with their heads in the mud and their oxygen-absorbing tails waving incessantly, or almost incessantly, in the water. Running waters over a thick bed of putrefying organic waste suits them best. In fact, the oily-looking sludge that collects near the outlet of a sewer is pasturage dear to their hearts.

It follows, therefore, that these worms must be thoroughly clean before they are introduced into an aquarium. But it is not enough that they look clean when they are obtained from a dealer. You must make certain that they are clean.

Perhaps the best way of ridding a tight cluster of tubifex worms of dirt is to pull them apart (with two pointed sticks rather than the fingers) and then wash them around in a jar of water.

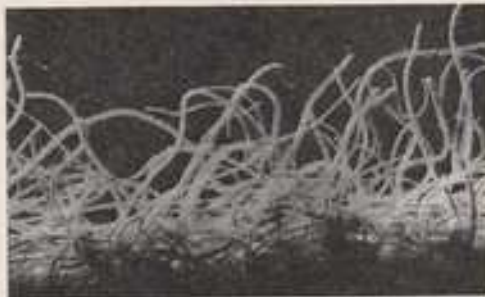
The healthy worms (liveliness and a beefy red colour are signs of health) will react to this treatment by ganging

up in a tight ball; the dead and dying worms and fecal residue will swirl about in a cloud of grey bits and pieces. Before this fish has time to settle, tip the jar and flush it away. To maintain the cleansed worms in good condition until they are fed to the fish, stand them under a slow-

dripping tap or change their water every day. And one more point: stand the jar containing them on a solid floor out of the sun.

It is not uncommon for some tubifex worms to climb the mouths of middle or upper layer swimming fish and burrow into the compost. If there are no bottom-burrowing catfishes or loaches present to ferret them out (for no amount of siphoning or spooning out of the compost will make any

appreciable difference to their numbers), they will continue to wriggle and writhe until the unaccustomed warmth and the scarcity of food leads to their gradual extinction.



Insect individualists: *Gyrinus* and its alarm system

by F. WILMOT

THE Whirligig Beetle (*Gyrinus*) is a creature of the surface-film, that extremely thin, rubber-like covering which is a natural property of all surface water. But it is also a powerful underwater swimmer. These little beetles (they are only about $\frac{1}{4}$ inch long and have bluish black bodies which glisten like burnished metal) are quite common on ponds, particularly in late summer.

There is really no mistaking them because as soon as one beetle of the little company becomes aware of an intruder (in which category it includes human beings) it commences to dash erratically to and fro like a tiny speed-boat. One after the other, all the *Gyrinus* in the vicinity start to do the same, having obviously picked up the alarm signal. Then, if one or more beetles judge that danger has become imminent they dive below or scatter, immediately followed by all the others.

The Whirligig Beetles obtain their great speed in swimming mainly from the shape of their middle and back legs

which are very short, flat, and wide like paddles. These legs are also fringed with hairs which the beetle can adjust according to whether it is moving its legs backwards or forwards.

In common with nearly all species of aquatic beetle, *Gyrinus* can store a supply of air beneath its wing-cases, and also frequently carries a bubble of air attached to its tail. These supplies enable it to stay beneath the surface for quite long periods. It does, however, need its ability to swim strongly and to be able to cling to underwater plants as the air supply makes it extremely buoyant.

One of the most interesting things about the Whirligig Beetle is that its eyes are divided into upper and lower parts. This arrangement is believed to enable it to see both above and below the surface at the same time... a most useful thing for such a fast mover!

Like all aquatic insects, *Gyrinus* was originally a creature of the land, and in its move to the water it certainly appears to have done well for itself.



Fish diseases (25) Fin and tail rot

by R. E. MACDONALD

ALTHOUGH fin and tail rot is a very common disease it can be contagious and fatal if not treated immediately.

The symptoms are easy to recognize for the tail and fins gradually rot away and blood spots can be seen in the area of amputation. The finnage is consumed until eventually the body is reached; when the body of the fish is infected a cure will be almost impossible and death will certainly follow.

Fin and tail rot is a bacterial infection generally solicited by poor living conditions, although it is a serious complaint there are several good cures on the market that can be used successfully or alternatively any of the following treatments can be used with good results.

(a) The diseased fins are carefully brushed with a solution of iodine that is prepared by diluting 1 part by volume of iodine with 9 parts by volume of water.

(b) 50 cu. cm. of a 1 per cent. stock solution of phenoxethol is added for each Imperial gallon of water in the tank. A 1 per cent. stock solution is prepared by dissolving 1 cu. cm. of phenoxethol in 99 cu. cm. of water.

(c) A stock solution of acriflavine is prepared by dissolving approx. 0.46 grain of neutral acriflavine in 330 cu. cm.

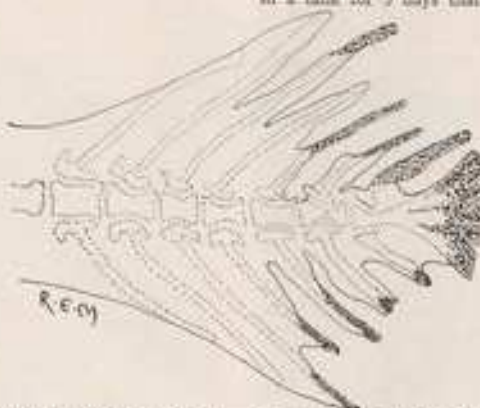
of hot water. The affected parts of the fins should be brushed with this stock solution and the fish then placed in a tank for 3 days that has been prepared by adding

10 cu. cm. of the stock solution of acriflavine for each Imperial gallon of water in the tank. After this bath, the affected fins are again brushed with the stock solution and the fish returned to a tank that contains fresh, clean water. A solution that is too strong or a prolonged treatment with acriflavine is found to have an adverse effect on fishes.

(d) As a last resort, surgery may be applied by cutting away the putrefied area of the fins with a pair of scissors so that the infected parts are completely removed. The wounds are then disinfected by first brushing them with a

1 per cent. solution of silver nitrate that has been prepared with the use of distilled water only and then by brushing with a 1 per cent. solution of potassium dichromate. The fish are then placed in a tank, until the wounds have healed, containing 50 cu. cm. of a 1 per cent. stock solution of phenoxethol which is added for each Imperial gallon of water in the tank.

All chemicals mentioned can be obtained from dispensing chemists.



Automate your aquarium

by P. G. BOND

ALTHOUGH the use of electric or clockwork time switches would seem readily to suggest itself for the control of illumination and aeration or filtration, this

idea does not appear to be so. Inquiries among friends suggest that being a conspicuous family object, somebody usually remembers to switch the aquarium on in the morning, and the last one up to switch it off at night.

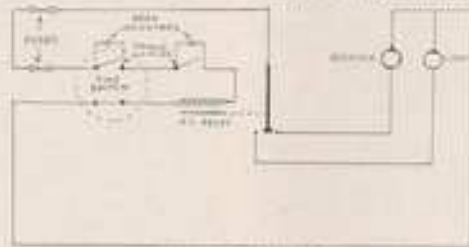
Apart from the obvious use of switching the aquarium lights on a pre-determined timer, the time-switch can also be used to perform a dual function of switching on the filtration or aeration pump.

This simple control scheme comprises a time switch, motor toggle-switches, indicator-lamps and fuses housed in a small metal box or cabinet. The equipment is connected

automatically to switch the light on and the aerator/filtrator off and vice versa. If under-gravel filtration is used this arrangement has the advantage that, as the filtration unit runs only at night,

the controversy as to the desirability of operating the filter during the daily growing cycle is avoided.

The time switch and relay should be connected as shown below. The relay being a small 240 volt A.C. type with at least single pole change over contacts. The time switch could be a 1-2 amp. vemm-o-set; this is one of the smaller types available and is suitable for installing within a small case.

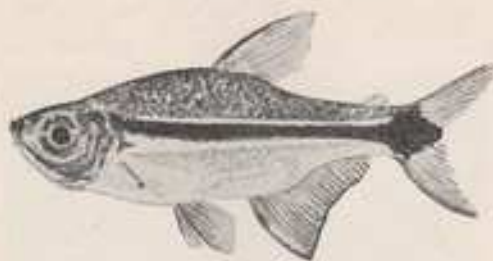


smaller types available and is suitable for installing within a small case.

Continued on page 57 ▶

The black-lined tetra

by JACK HEMS



THE black-lined tetra was first collected and made available to tropical aquarium keepers in 1936.

It was given the scientific name of *Hyphessobrycon scholzei* by the late Dr. Ernst Ahl, a distinguished German ichthyologist, in the same year. Like so many meritorious characins it is indigenous to the fresh waters of Brazil (the north-eastern half, to be precise) and attains a length of about 2-2½ in. It will eat any type of live or dried food and is sufficiently hardy to withstand a temperature range of 68°F (20°C) to 85°F (29°C). For normal maintenance, however, a temperature of 75°F (24°C) or thereabouts is recommended.

By nature it is a shoaling fish (a dozen or more playing follow-my-leader in a large tank is a pleasing sight) that frequents the middle and upper levels of the water. Clear, soft water giving a neutral to slightly acid reaction suits it best. It has a reputation (sometimes exaggerated) of nipping at the fins of fishes less active than itself. But provided fishes with voluminous or thread-like fins are excluded from a community tank in which it is placed no harm will be done.

The general colour is olive on the back, metallic brassy yellow to green on the upper sides, and silvery white on the throat and belly. A black line (hence its common name), accompanied above and below by a thin ribbon of gold, extends along the centre of the body, from just behind the head to the base of the forked caudal fin, where it expands into a diamond-shaped marking. In the main the fins are yellowish to red, except the pectorals which are unpigmented. The posterior edge of the anal fin and the anterior edge of the dorsal fin are prettied with black, sometimes enlivened with a touch of white. The two sexes are similar in appearance, but in well-grown specimens the female is noticeably fuller, and slightly longer, in the body than the male. Also, the colour in her fins tends to be less bright. Given the right conditions, *H. scholzei* usually proves a ready and easy breeder.

Before introducing a pair of these fish into the tank intended for spawning—a 24 in. by 12 in. by 12 in. tank is perfectly satisfactory—they should be separated for about a week to a fortnight. For separation of the sexes, combined with a rise in the temperature to about 80°F (27°C) and a diet rich in live food and shredded red meat

(uncooked), helps to bring them into tip-top physical condition.

As soon as the female shows a marked fullness in the lower sides and abdomen and the male assumes bright tints and a livelier manner, it is time to bring them together. If this is done last thing at night it is not unlikely that they will spawn before the following afternoon is out.

There are two points connected with the transferring of the conditioned fish from one tank to another (the spawning tank) which must be observed. Firstly, do not subject them to any sudden change of temperature. Secondly, see that there is no appreciable difference in the quality of the water. Thus fish removed from soft or well matured, acid water must be reintroduced into a similar type of water and not water drawn a few hours previously from a tap.

Reverting to the spawning tank; this should be furnished with bunches of feathery-foliated plants (well-washed and cleared of any snails) massed at one or both ends of the aquarium. The plants, which are necessary to trap the eggs, can be kept in position on the compost—only a thin layer of this is necessary to cover the shiny glass floor—with lead weights.

The mating act is nothing more elaborate than a series of excited chases about the aquarium. During momentary pauses in the plant life, the female releases her sticky-surface eggs. The male is not at all gentle in his approaches and the female takes a lot of punishment.

Immediately spawning is over both fish should be removed from the aquarium for they are avid eaters of their own eggs. As a rule, the eggs hatch out within the space of two days and roughly two days later the minnow fry become free-swimming.

It goes without saying that they need plenty of microscopic live food (*Infusoria*) for the first nine days of their lives. After that, larger foods such as micro-worms, Grindal worms, brine shrimps, *Daphnia* and powdered dried food should be placed on the menu.

Growth is quite fast, and provided there is no overcrowding or lack of oxygen in the water (guard against possible pollution by dip-tubing the bottom fairly frequently) the young *H. scholzei* develop most of their colour in their fourth to fifth week, and attain full size in nine months to a year.

Ozone in the aquarium

by KEITH A. PULESTON

A NUMBER of devices for introducing ozone into the aquarium are available on the British and European markets, and for those aquarists who know little or nothing about this chemical, the following notes may be of some interest.

Ozone is a tri-molecular form of oxygen and, in layman's terms, could be described as concentrated oxygen. The chemical symbol is O_3 , and it normally takes the form of a bluish gas, although it can be manufactured into a liquid and in this state is highly explosive. As a gas, it is a powerful oxidiser and is commercially used as an antiseptic bleaching agent for oils and textiles, and for controlling bacteria in cold-storage rooms and air-conditioning systems. The Paris and Philadelphia water authorities use ozone for purification in place of the cheaper chlorination processes due to its superior ability to eliminate objectionable tastes and odours.

It is this antiseptic purification property that can be used in aquariums to rid the water of harmful bacteria and, in some cases, to treat infected fishes. The artificial manufacture of O_3 normally employs one of two methods of production. If air or oxygen is exposed to intense ultra-violet radiation, ozone is formed together with heat. The more common method—and usually the aquarium "Ozonizer"—is of this type—uses a silent electrical discharge passing through dry air or oxygen. A typical "Ozonizer" costing from £5 to £10, looks similar to an external fitting aquarium thermostat. Air from a vibrator or piston pump is passed through the instrument before it enters the aquarium.

Some care must be exercised in the use of ozone as even a concentration of one part ozone to one million parts free air can be considered hazardous to man and smaller doses can cause irritation to the respiratory tract. Of course, an aquarium "Ozonizer" cannot produce sufficient to cause any health dangers to the aquarist but an overdose supplied to the aquarium can cause similar irritation to the fishes' gills. It is impossible to determine the exact times of treatment as so many factors are involved. The types of fishes, their age and their condition should all be taken into account. However, for healthy fish the treatment should not exceed two hours, but it may be repeated several times in a day. It will be found that one two-hour session of ozone-bearing air fed through a diffusing stone will be sufficient to produce a crystal clear tank, completely devoid of bacteria.

Continuous use can be made of the instrument if the diffuser is placed in the clean water chamber of an outside timing filter unit, or the dirty water chamber of an inside timing filter. The ozone will then only oxidise the bacteria in the filtered water and the fishes will not be exposed to the direct ozone supply. Ozone is only very slightly dissolved in water and the danger lies more in fishes swimming through bubbles of ozone-bearing air for long periods, than ozone actually dissolved in the water.

Live food can be effectively sterilised by passing ozone-

bearing air through the *Tubifex* or *Daphnia* for a few minutes. Using the instrument carefully, sick fish can benefit from short periodic treatments but the usual chemical treatments may prove more reliable and effective.

In conclusion, some explanation of Nature's methods of producing ozone offer some interesting comparisons. The two commercial methods already mentioned are closely related to natural production. Lightning forms small amounts of ozone in a similar way to the electrical discharge employed in aquarium "Ozonizers" but really large quantities are formed in the Earth's upper atmosphere where the photochemical action of uninterrupted Solar ultra-violet light and oxygen in the air create, not only the ozone, but considerable heat which has a worldwide effect on winds and weather. It is rather an interesting point to ponder when you consider that it is only the almost total absorption of ultra-violet radiation by the ozone that prevents this lethal short-wave radiation from killing all life on our planet, but instead, allows just sufficient through to give us a sun-tan.

► continued from page 55

Automate your aquarium

The operation of the device is simple and adjustable. However, by using one time switch to control two functions, reduction in the illumination period correspondingly extends the filtration period. Therefore, if say, a ten hour lighting is adopted starting at one p.m. until eleven p.m., by setting the time switch accordingly, the relay is de-energised and automatically starts the aerator or filtration unit which runs until one p.m. the following day.

Override switches are fitted for manual control to enable either of the periods to be varied, perhaps at week-ends, without altering the time switch. The simplest method of effecting this is by the use of two single-pole toggle-switches, one connected in parallel with the time switch contacts and the other in series with it. When connecting the time switch override, ensure that it is on the same pole and does not bridge the supply causing a short circuit.

Two small mains neon indicator lamps are used, one in parallel with each switch to indicate if the switch is open or closed. Each section of the circuit is separately fused with miniature panel mounted fuses, 1-2 amp. for the lighting and pump circuit and a 500 milliamp. for the relay circuit. The equipment can all be housed neatly and conveniently in a small box with the neon indicator, fuse and toggle-switch in line with each other. If, however, a metal box or case is used, it is essential that it be effectively earthed.

The installation could be completed by the addition of an electric fish-feeder and a couple of Sucking Loach, thus making the set-up virtually independent of human interference or attention particularly if the aquarium is stocked with the slower growing varieties of plants.

Gas embolism

by R. E. MACDONALD

IN my article "Winter Sickness" (February, 1960) I described the conditions present in a tank that is deprived of an adequate supply of oxygen and how seriously fishes can be affected by the resultant unbalancing of the biological equilibrium. If the circumstances are reversed, however, and the supply of this most indispensable gas becomes too great, an undesirable state will form that proves to be just as dangerous and can affect either pond or aquarium fishes. Too much oxygen in the water will cause an illness known as "gas embolism".

Fishes absorb the soluble atmospheric oxygen found in water through their gills. If there is an excessive amount of oxygen in the water the blood will become over-saturated to such an extent that gas bubbles form in the blood vessels. Should these bubbles reach the main vessels the blood circulation may be seriously impeded or perhaps even stopped. If the blood circulation of a fish is stopped it will die.

No difficulty should be experienced in diagnosing gas embolism for in practically every case it is possible to observe the presence of small bubbles of air either on the surface of the gills, fins or bodies of the affected stock. These gas bubbles generally become apparent well in advance of the really dangerous stage. The fishes will most probably lose their colour and swim quite frantically about the tank, spending perhaps some considerable time near the surface of the water.

If the conditions that produce gas embolism are allowed to develop the general health of the stock will deteriorate until, one by one, the fishes begin to die. To the unsuspecting aquarist it will appear as if some deadly contagious disease is rampant.

Gas embolism in fishes is caused mainly by allowing the water in the pond or aquarium to be exposed to direct sunlight for excessive periods. The effects of this will be noticed particularly during the summer months when the hours of sunlight are prolonged. Not only will the fishes be affected by the high oxygen content of the water but certain chemical changes occur which provide extremely adverse conditions for the fishes. Excessive exposure to direct sunlight causes the vegetation present to produce vast quantities of oxygen through photosynthesis. As a result, the plants will begin to assimilate rapidly and take in relative amounts of carbonic acid (carbon dioxide) from the water. If the carbonic acid content of the water is insufficient for the needs of the vegetation the extraction of carbonic acid from the bicarbonates present will begin. This will cause the bicarbonates to be converted into carbonates (i.e. salts of carbonic acid) which precipitate in the form of a white encrustation on the leaves of the plants. Following this, if a sufficient amount of carbonic acid is not found in the bicarbonates, the vegetation will finally begin to extract carbonic acid from the remaining carbonates. When this happens the water will become

dangerously acid with a pH value reaching perhaps pH 3.5 in a very short time and the skin of the fishes will subsequently begin to corrode.

The dangers of a high oxygen content will obviously be greater if the pond or tank is over-planted with vegetation. The more plants there are, the greater will be the photosynthesis and resultant chemical change.

The way to prevent an occurrence of gas embolism in ponds is to ensure that the water receives shade of some sort during the most dangerous hours of the day (i.e. the afternoon period). The most natural shading medium is provided by the use of surface plants with very wide leaves (e.g. the water lily).

With aquariums the answer is simple. Never place the tanks where they are exposed to the direct rays of the sun (e.g. by a window), and never over-plant with vegetation. A 24 in. by 12 in. by 12 in. tank should not contain more than 30 small plants.

Providing that serious damage has not already been caused the fishes will soon recover from the consequences of gas embolism or alkaline water if the water is changed immediately with fresh water as soon as the symptoms are noticed and the causal faults remedied.

▶ continued from page 52

Tropical aquarium queries

How much and what type of salt is needed to give an illness fish a medicinal bath?

Some fishes can endure a greater concentration of salt in the water than others. Be that as it may, a level teaspoonful of salt to every gallon of water in the treatment tank is about right for most species, with the exception of catfish and loaches which are best kept away from salt unless it is known for certain that the species involved are neither distressed nor injured by it. The salt to use is ordinary block or cooking salt, or sea-salt, and not table salt which has chemicals added to it for easy running.

Recently I bought an African fish called *Cichlasoma nigrofasciatum*. I have not been able to find any information about this species in my books. Can you give me any details as to its temperature and feeding requirements and maximum size attained in the aquarium?

C. congicus is quite comfortable at a temperature in the lower to middle seventies (°F). It takes live food and dried food quite freely. In the natural state it reaches a length of about 17 in. It is reasonable to assume that given plenty of swimming space it could exceed 12 in. in captivity.



from AQUARISTS' SOCIETIES

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

THE open show results of the Houghton and Swinton A.S. were as follows: Guppies—1, B. Renshaw (Swillington A.S.); 2, Martin (Newcastle Guppies Club); 3, J. Haslop (Petersley A.S.). A.D.V. (prebears)—1, F. Pattison (Hartlepool A.S.); 2, J. Chamberlain (Stockton A.S.); 3, B. Skyring (Newcastle G.C.). Small Barb—1, M. E. Whitlock (Tadcaster A.S.); 2, E. Motherwell (Horden A.S.); 3, R. Skyring (Newcastle G.C.). A.O.V. Barb—1 and 2, I. Hunt (Horden A.S.); 3, L. Collins (Stockton A.S.). Small Characin—1, R. Furness (Horden A.S.); 2, C. Bridge (Houghton A.S.); 3, H. Bell (Petersley A.S.). Large Characin—1, W. Skilling (Hartlepool A.S.); 2, J. Hunt (Horden A.S.); 3, L. Collins (Stockton A.S.). Dwarf Cichlid—1, D. Pooter (Horden A.S.); 2 and 3, J. Chamberlain (Stockton A.S.). A.O.V. Cichlid—1 and 2, I. Hunt (Horden A.S.); 3, Miss V. Kinsey (Horton A.S.). Fighters—1 and 2, J. Baxter (Tadcaster A.S.); 3, A. Bailey (Tynedale A.S.). A.D.V. Labrid—1, R. Ashburn (Horden A.S.); 2 and 3, F. Pattison (Hartlepool A.S.). Sharks and Rays—1, M. Watson (Petersley A.S.); 2, M. Green (Houghton A.S.); 3, C.

Bridge (Houghton A.S.). Rabbits and Ducks—1, A. Bailey (Tynedale A.S.); 2, Miss V. Ramsey (Horton A.S.); 3, N. Rumbold (Tadcaster A.S.). Egg laying tooth carp—1, R. M. Fairclife (Tadcaster A.S.); 2, W. Hensman (Hartlepool A.S.); 3, F. Pattison (Hartlepool A.S.). Catfish and Loach—1, R. Glover (Swillington A.S.); 2, R. Dean (Horton A.S.); 3, J. Hunt (Horden A.S.). A.O.V. eel—1, R. Ashburn (Horden A.S.); 2, E. Motherwell (Horton A.S.); 3, W. Hensman (Hartlepool A.S.). A.V. goldwater fish—1, Mrs. A. Hunt (Houghton A.S.); 2, A. Bailey (Tynedale A.S.); 3, A. Amy (Horden A.S.). Breeder (goldwater)—1, L. Collins (Stockton A.S.); 2, J. Withers (Horton A.S.); 3, R. Hensogway (Swillington A.S.). Breeder (egglayer)—1, R. M. Fairclife (Tadcaster A.S.); 2, R. Hayes (Hartlepool A.S.). Furnished jar—1 and 3, A. Bailey (Tynedale A.S.); 2, Master S. Rowson (Horden A.S.). Children's class—1, Miss H. Woodgate (Houghton A.S.); 2, Master N. Woodgate (Houghton A.S.); 3, Miss A. Amy (Horden A.S.). The Blue Ribbon Trophy, awarded to the club with the highest number of points, was won by

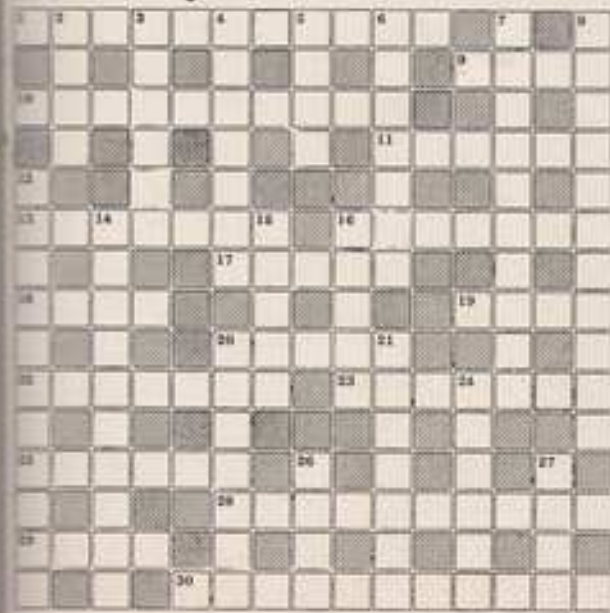
Sunderland A.C. for the second year running. The Houghton A.S. President's Trophy, awarded to the person with the highest number of points, was won by Mr. I. Hunt of Sunderland A.C. The best fish in the show was a male reared by Mr. A. Ashburn of Horden A.S.

THE Swillington A.S. inter-society table show was held recently and the results were as follows: Best fish in show—1, Mrs. A. Fair (Bradford); 2, Mrs. E. Hales (Bradford); 3, Mr. E. Hales (Bradford); 4, Mr. R. Hampton (Aireborough); 5, Mr. A. Fair (Bradford); 6, Mr. J. Hooper (Bradford); 7, Mrs. Helen (Aireborough); 8, Mrs. A. Fair (Bradford); 9, Mr. D. Carr (Bradford); 10, Mrs. Helen (Aireborough); 11, Mr. C. Hollisworth (Bradford); 12, Mrs. Helen (Aireborough); 13, Mrs. Dickinson (Aireborough); 14, A.D.V. egglayers—1, Mr. D. Carr (Bradford); 2, Mrs. Helen (Aireborough); 3, Mrs. J. Hooper (Bradford); 4, Mrs. E. Hales (Bradford); 5, Mr. K. Glover (Swillington); 6, Mr. Colton (Patefield); 7, Mr. L. Hales (Bradford); 8, Mrs. G. Hales (Bradford); 9, Mr. N. Rumbold (Tadcaster); 10, Mr. W. M. Fairclife (Tadcaster); 11, Mr. J. Baxter (Tadcaster); 12 and 13, Mr. C. R. Wilson (Bradford).

The next show is to be held on the 19th June. This will be the society's first open show and schedules can be obtained from Mr. K. Hensogway, 10 Cairn Avenue, Whitkirk, Leeds, 15.

THE South London section of the Fancy Guppy Association held their spring open show on 24th April. The show results were as follows: Delta fish—1, D. King, 78 pts.; 2, D. King, 75 pts.; 3, Dr. Atkins, 73 pts.; 4, V. V. V. (4); 5, M. G. (4); 6, A. Park, 76 pts.; 7, T. J. Price, 71 pts.; 8, Farnall, 1; Goodall & Mossall, 78 pts.; 9, D. Carter, 76 pts.; 10, G. Bow, 74 pts.; 11, M. Richardson, 75 pts.; 12, M. Richardson, 74 pts.; 13, B. Colver, 73 pts. (Continued on page 60)

The AQUARIST Crossword Compiled by L. BRADLEY



- CLUES ACROSS**
- Put the beton back with the French in between and a European fish results (11).
 - So the Football Association sits on it (4).
 - Dans malabarais (5, 5).
 - 3 (6).
 - Words that start equal but tend to decay at the end (7).
 - Bubbles over (7).
 - Makes money by putting one's ear to both the north and south (5).
 - Pull the Americans (4).
 - Fun of children's tales (8).
 - The place where you bow to the Queen (5).
 - Give one that holiday look (7).
 - Chemically a reactive substance (7).
 - Utensil postprandially (6).
 - Ended (10).
 - Mixed soap mix (4).
 - Repeat over (long) (6, 5).
- CLUES DOWN**
- Caude! fit (4).
 - Gallup in a form of tracer (6).
 - The archaic who roared in the eighteenth century (7).
 - A premium certificate? (4).
 - There is a lot in chess but on losing direction becomes well worn (7).
 - I bear a boot (anag. in Latin) (5, 5).
 - Cryptogam (Halterid) (5, 4).
 - And 24 Down—Yellow Galaxi (11, 6).
 - aquatic. Water crow's foot (10).
 - The surprise room in which a pink-fleshed symbiotic fish is reduced by a matrix (5).
 - Turn up one's nose (5).
 - The British Railways is let in another way making one's hair stand on end (7).
 - Relief by draining 8 Down and mixing the remains in one direction (7).
 - See 12 Down.
 - The breeding variety usually ensures a greater percentage of young fish (8).
 - Two from 7—No, only one (4).
- Solution on page 62

agreements, visiting the New Forest area, to one of the ...

The annual general meeting was held on ...

The New Forest A.S. have decided to ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

to which two members would be retained ...

ED.A.S. meetings are held every Monday ...

The meeting of the Westmoreland A.S. ...

At the annual general meeting of the ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

THE Middlesex and District A.S. held their ...

Meeting was held at ...

The meeting of the Westmoreland A.S. ...

At the annual general meeting of the ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

The meeting was held at ...

A.I.A.E. Past chair, E. W. Hale, Secretary, M. J. Farnham, Treasurer, Bernard Gardner, M. and Mrs. Dixon, Regional committee. Mr. and Mrs. Dixon, Regional committee, Secretary, M. J. Farnham, Treasurer, Bernard Gardner, Past chair, E. W. Hale, Secretary, M. and Mrs. Dixon, Regional committee. Mr. and Mrs. Dixon, Regional committee, Secretary, M. J. Farnham, Treasurer, Bernard Gardner, Past chair, E. W. Hale, Secretary, M. and Mrs. Dixon, Regional committee.

The newly formed **Societud A.V.** have their first meeting on Thursday, June 23, 1966, at 7.30 pm. It will be held in the hall of the Royal Victoria Club, 100, Victoria Road, Southsea, Hants. The new committee consists of: Chairman, Mr. E. W. Hale; Secretary, Mr. M. J. Farnham; Treasurer, Mr. Bernard Gardner; Regional committee, Mr. and Mrs. Dixon; Past chair, E. W. Hale.

THE SOCIETY OF A.V. ENGINEERS held their 1966 general meeting at the Royal Victoria Club, Southsea, Hants, on Thursday, June 23, 1966. The meeting was held in the hall of the club. The President, Mr. E. W. Hale, presided over the meeting. The minutes of the previous meeting were read and approved. The Treasurer, Mr. Bernard Gardner, reported on the society's financial position. The Secretary, Mr. M. J. Farnham, reported on the society's activities during the year. The President then presented the President's report for the year. The meeting closed with a vote of thanks to the staff of the Royal Victoria Club.

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The **Midland Association of Amateur Scientists** held their 1966 general meeting at the Royal Victoria Club, Southsea, Hants, on Thursday, June 23, 1966. The meeting was held in the hall of the club. The President, Mr. E. W. Hale, presided over the meeting. The minutes of the previous meeting were read and approved. The Treasurer, Mr. Bernard Gardner, reported on the society's financial position. The Secretary, Mr. M. J. Farnham, reported on the society's activities during the year. The President then presented the President's report for the year. The meeting closed with a vote of thanks to the staff of the Royal Victoria Club.

The **South Coast Amateur Scientists** held their 1966 general meeting at the Royal Victoria Club, Southsea, Hants, on Thursday, June 23, 1966. The meeting was held in the hall of the club. The President, Mr. E. W. Hale, presided over the meeting. The minutes of the previous meeting were read and approved. The Treasurer, Mr. Bernard Gardner, reported on the society's financial position. The Secretary, Mr. M. J. Farnham, reported on the society's activities during the year. The President then presented the President's report for the year. The meeting closed with a vote of thanks to the staff of the Royal Victoria Club.

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in British Railways Social Club, Edgler Road, Stockport. New members will be made most welcome. Anyone requiring further information please contact either Mr. L. Irwin, 17 Turner Grove, Offerton, Stockport (club secretary) or Mr. D. P. Johnson, 17 Aldhame Avenue, Chadwell Heath, Cheshire (secretary).

AT a recent meeting of the Southend, Leigh and District A.S., members were entertained by D. M. Clowright, who gave a talk on the breeding of members of the barb family. To complete the theme of barbs a table show was held for those interesting fishes. The results were as follows: 1, P. F. Capon; 2, C. Ward; equal third place went to B. Dwan and A. J. Mason.

The society meets every first and third Tuesday in the month at the Liberal Hall, Clarence Road, Southend. Interested members and interested persons are invited to contact the secretary, M. J. Willis, 17 Arundel Gardens, Westcliff.

THE chairman of Thurveth Aquarists, Mr. R. Nicholls, entertained the club with a lecture on the range of all aquarists at some time or other—'White Spec.' The annual meeting of the month was a business meeting plus a table show. The results were as follows: Division 1, 2, and 3, all won by Mr. P. O'Brien. Rainbow and minnows: 1 and 2, Mr. R. Nicholls; 3, Mr. G. Egan. These of the members started the Chelsea show and found the opposition rather too strong excepting in the coldwater class where Mr. B. Barber, who had a first and second in common goldfish, and a fourth in shubunkins. Mr. Dwyer had a third in fighters, and Mr. Barber also had a fourth in charrans.

THE annual general meeting of the Washeldon and Merion A.C. was held recently, when the following members were elected to office: Chairman, Mr. D. Holliman; vice-chairman, Mr. C. Harrard (previously show secretary); secretary-treasurer, Mr. D. G. Crag (previously show secretary); Mr. G. Giles; treasurer, Mrs. I. Jones (previously); assistant publicity officer, Mrs. E. Holliman; Committee: Mr. J. Gorton, Mr. A. Wood (previously) and Mr. B. E. Dudley (retiring chairman). Votes or members within the Washeldon and Merion area are cordially invited to join on the first and third Thursdays of each month, between 7.30 p.m. and 10 p.m. at the Holy Trinity Hall, The Broadway, Washeldon, London, S.W.19.

THE Cambridge and District A.S. held their first show of the year on 7th May. It was very successful and well attended, much preparation and effort being thus rewarded by members. Mr. Lagan, of Mough, F.R.S.S., judged and presented the trophies, commencing on a good show and some excellent fish. Prizes were awarded as follows: the Simpson Cup for best in show went to Mr. Ott with his blue swordtail; Mr. P. A. Ward won the Benders Cup with platy varietal; Goldwater: 1 and 2, R. W. W. Barn; 3, P. A. Ward; Best barb: 1, R. W. W. Barn, with silver barb; 2, A. F. Hulzer (cherry); 3, R. K. Edney (grey); Livebearers: 1, R. A. Ott (dark swordtail); 2, P. A. Ward (light variant); 3, R. K. Edney (swordtail); Cichlid: 1, G. P. River (rustred); 2 and 3, R. W. W. Barn (Hansa and hollowed); Amantide: 1, T. W. Ingrave (dark green); 2 and 3, R. K. Edney (red yellow and thicklip green); Guppy: 1, A. F. Hulzer; 2, S. A. Bayley; 3, T. W. Ingrave; Catfish and loach: 1, A. F. Hulzer (armoured catfish); 2, R. W. W. Barn (holist); 3, G. P. River (striped barb); A.C.S. eelster: 1, R. W. W. Barn (red-tailed shark); 2, G. P. River (flying fish); 3, A. F. Hulzer (Aphrodisiac calluscat shd); Best pair: 1, A. F. Hulzer (tropical); 2, B. Gentry (tiger barb); 3, I. S. Cooper (Australian rainbow); Best school: 1, P. A. Ward (dark green); 2, R. K. Edney (grey barb); 3, A. F. Hulzer (Aphrodisiac Australia).

It has been proposed to hold an inter-club competition with Bedford and District A.S. on Thursday, 18th July at Bedford.

AT a recent meeting of the Portsmouth A.S., a table show was held, the results were as follows: Labyrinth: 1, Mr. E. Warren; 2, Mr. M. Brooks; 3, Mr. V. Hunt; 4, P. Carlton. Dania:

1, 3 and 4, Mr. R. Wylie; 2, Mr. A. Smith; Minnow: 1, Mr. N. Franklin; 2, Mr. V. Hunt; 3, Mr. G. Lawrence. Miniature furnished aquaria (in jars): 1, Mr. G. Marks (tropical); 2, Miss W. Ryder (goldwater); 3, Mrs. J. Howard (striped); 4, Mr. J. Howard (marine). The show was judged by Mr. J. Sillwell, whilst Mr. E. Warren, spoke on the breeding and keeping of the dania.

AT their meeting in April, Wigton A.S. acted as hosts to the Leigh A.S. A lecture was given by Mr. R. Whitton of Bolton, and afterwards a table show was held, the judging being carried out by Mr. D. Jans of Chorley. Wigton opened their records for an earlier date at Leigh and the results were as follows: Cichlid: 1, Mr. E. Warren (Wigton); 2, Mr. D. Pimmington (Wigton); 3, Mr. A. Mathias (Leigh); Amantide: 1, Mr. D. Kilduff (Leigh); 2, Mr. D. Storton (Leigh); 3, Mr. G. Brown (Wigton); Livebearers: 1, Mr. D. Storton (Leigh); 2, Mr. A. Benson (Wigton); 3, Mr. E. Warren (Wigton). Meetings of the Wigton A.S. are held on the last Thursday of the month at the Vine Inn, Carncliffe Street, and visitors and new members are very welcome. Enquiries should be made to Mr. K. Birch, 49 Masses Avenue, Worsley, Manton, Wigton.

AT the May meeting of the Alrethorough and District A.S. the evening's entertainment consisted of a slide show, with slides provided by Mr. R. Hampton and Mr. P. Joyce of their own tanks and of the open show. The table show results were as follows: goldfish class: 1, Mrs. Helen; 2, Mr. Hampton; 3, Mrs. Dickenson. A.O.V. class: 1, Mr. Hampton; 2, Mrs. Helen; 3, Mr. Lark. Novice class: 1, and 3, Mr. P. Joyce; 2, Miss L. Hampton. Junior class: 1, Miss L. Hampton; 2, Maureen P. Kelly; 3, Maureen Campbell. Anyone requiring information on how to become a corresponding member should write to the secretary, Mr. R. Hampton, 'The Headlands,' Norfolk Lane, Horforth, York.

THE membership of the Mid-Herts A.S. now totals over 50, an excellent start for a new society. Meetings have proved lively discussion with lectures on furnished aquaria, pH, slide quiz and breeding. Future events on the calendar include lectures on Worm Culture by Mr. Arnold; Diseases of Fish by Mr. Wilton; Breeding barbs, labyrinth and livebearers; Kite shows and more aquaria, and visits to the R.A.S.S. meeting to London zoo and breeding establishments. Mr. T. Van Kralingen has had to resign owing to illness and all communications should now be sent to Mr. T. Tams, 55 Beechwood Avenue, St. Albans, Herts.

RECENTLY, the sixth annual open show, sponsored by the Association of Aquarist Societies was held at Garforth, and was organized by the Garforth and District Aquarist Society. There were 237 entries from 24 societies, and it was pleasant to welcome visitors from as far afield as Mansfield and Newcastle.

The results of the show were as follows: Livebearers: 1, C. Bunn (Bradford); 2, W. Hutton (Sheff); 3, K. Swales (Swillington); Barbs: 1, A. Firth (Bradford); 2, Mrs. M. Firth (Bradford); 3, J. Jackson (Leeds); Charrans: 1, Mrs. M. Firth (Bradford); 2, K. Glover (Swillington); 3, Mrs. South (Sheff); Amantide: 1, Mrs. M. Whield (Garforth); 2, K. Glover (Swillington); 3, Mrs. Smith (Sheff); Fighters: 1, P. Reynolds (Swillington); 2, J. Buxter (Tadcaster); 3, C. Bunn (Bradford); Cichlid: 1, W. Hutton (Sheff); 2, J. Buxter (Tadcaster); 3, I. Hart (Chatterham); Livebearer breeders: 1, Mrs. M. Firth (Bradford); 2, K. Glover (Swillington); 3, P. Clarke (Garforth); Livebearer guppies: 1, P. Bradley (Pontefract); 2, N. Mansfield (Tadcaster); 3, W. Hutton (Sheff); Gerys and minnows: 1 and 2, D. Carr (Bradford); 3, R. Bunn (Bradford); Catfish and loach: 1, Mrs. Helen (Alrethorough); 2, C. Holdsworth (Bradford); 3, F. Holtz (Mansfield); Goldwater: 1 and 2, C. Booth (Bradford); 3, C. Lindsey (Garforth); A.O.V.: 1, R. Bunn (Sheff); 2 and 3, Mrs. Helen (Alrethorough); Tacticians: 1, G. Helms (Bradford); 2, Mrs. Whitley (Sheff); 3, C. Holdsworth (Bradford). Best fish in show

was a chequer barb entered by Mr. A. Firth (Bradford).

AQUARISTS' CALENDAR

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

18th June: Ayrington A.S. Open Table Show, Harrogate Arms, Manchester Road, Ayrington.

19th June: Swillington A.S. Open Show, Subscribers are available from Mr. R. Hampton, 10, Carter Avenue, Worsley, Leeds, 17.

23-25th June: Bristol Tropical Fish Club, Open Show at Congregational Church Hall, Newton Street (off Stapleton Road), Bristol; 3. Full details are available from F. Barry, 14, Pilsbury Road, Bristol, 3.

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. Details from Show Secretary, Mrs. Natalie Jordan, 42, Fernbank Place, Ascot, Berks.

9th July: Basingstoke and District A.S. Annual Open Show, Cardinal Hall, Community Centre, Show schedules from Brian Taylor, 45, South Avenue, Basingstoke.

9th July: Bath A.S. Annual Open Show, Peter Boys' Club, New King Street, Bath. Subscribers may be obtained from Mr. E. A. Short, 22, Calverton Road, Tisbury, Bath.

9-10th July: Dogstham Town Show. Details are obtainable from Mr. J. Pyle, 3, Ashway Drive, Cranham, Essex.

10th July: Romsey A.S. Show at the Victoria Institute, Queen Street, York. Details from M. T. Adlam, 11b, Barrow Lane, York, Clifton, York.

8-10th August: Portsmouth A.S. Open Show. Schedules are available from W. J. Kellie, 493, Commercial Road, Mile End, Portsmouth.

14-17th August: Milland Open Aquatic Show, Bagley Hall, Broad Street, Basingstoke. Details available from Mr. J. Edworthy, 15, Victoria Close, Bally Oak, Birmingham 29.

27th August: Roundlow A.S. Open Show, Chatterworth School, Heath Road, Hamatow.

1-6th September: Nottingham and District Annual Open Show at the Drill Hall, Dore Road, Nottingham. Full details are available from M. W. J. Christie, Home Show Secretary, 40, Moor Lane, Bussy, Notts.

17th September: Newport A.S. (preliminary date). Details from Hon. Show Secretary, Mr. M. I. Parry, 43, Western Drive, Gabaia, Cardiff.

14th October: Stone A.S. Second Open Show, Welton Community Centre, Stone, Staffs. Schedules from Mr. K. J. Harvey, 61, St. Vincent Road, Stone, Staffs.

26th-30th October: British Aquarist Festival, Bally Voe Garden, Manchester. Full details available later.

Crossword Solution

STICKLEBACKS
 A A U O I L S O F A
 GIANT DANIO
 GLT D D TH RICE
 A E E I H A A
 PAROTS SEETHES
 H A E A R N S O P
 Y A N K L E B R E
 O U B O W E R A
 SUNBURN REAGENT
 E C I S U
 M O U T H S T P L P
 I L T E R M I N A T E
 O P U S L A T R A
 N S S E R P A E T E R

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BERKSHIRE

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

CHESHIRE

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

CORNWALL

Marine Facilities Ltd.,
Commercial Buildings,
Custom House Quay, Falmouth
Telephone: Falmouth 88
E.C.D. Tuesday (in winter only) WR. T. P. AA.

DEVON

Plymouth Tropicals
North Hill Nurseries, Tavistock Road, Plymouth
Telephone: Plymouth 62663
Closed Wednesday. R. C.T.P.AA.

DURHAM

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

Metcalf, G. R.
187, Northgate (near Minories Garage)
(On original A.1 road) Darlington
Telephone: Darlington 5991
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

ESSEX

Goodmayes Aquaria
70 Grove Road, Chadwell Heath
Telephone: Goodmayes 2594
E.C.D. Thursday. R. C.T.P.AA.

Skilton, G. J., Aquarist
139, Galleywood Road,
Chelmsford
Telephone: Chelmsford 56878
E.C.D. All Day Saturday. W. C.T.P.AA.

Stan's Aquarium
466, Southchurch Road, Southend-on-Sea
Telephone: Southend 67859
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

GLOUCESTERSHIRE

Cheltenham Aquatics (Prop. Mr. B. R. James)
10 & 11, Suffolk Parade, Cheltenham
Telephone: Cheltenham 24949
Closed all day Monday R. C.T.P.AA. R.&A.

HAMPSHIRE

Arundel Aviaries & Fisheries (Taylors)
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Telephone: Portsmouth 20047
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

Bridgemary Pet Stores
56, Gregson Avenue, Gosport
Telephone: Fareham 4781
E.C.D. Wednesday. R. C.T.P.AA.

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

KENT

Gillingham Pet & Aquatic Centre
(Proprietors F. & E. Alderman)
125, Canterbury Street, Gillingham.
Telephone: Medway 52049
E.C.D. Wednesday. R. C.T.P.AA.

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

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

LANCASHIRE

Hornby's
Trafford Bar, Old Trafford,
Manchester, 16
Telephone: Trafford Park 2969
E.C.D. Wednesday. R. C.T.P.AA. R.&A.

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

Tachbrook Tropicals Ltd.
244, Vauxhall Bridge Road, Victoria, S.W.1
Telephone: Victoria 5179
(Open all week except Sundays).
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136, Chiswick High Road,
London W.4
Telephone: Chiswick 6549 WR. C.T.P.A.A. R.&A.

Owen Reid's, Aquarium Dept.
12, Spring Bridge Road, Ealing Broadway, W.5
Telephone: Ealing 3259
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The Aquarium
192, Wellingborough Road,
Northampton
Telephone: Northampton 34610
E.C.D. Thursday. R. C.T.P.A.A. R.&A.

The Pet Shop
120, Kettering Road,
Northampton
Telephone: Northampton 38941
E.C.D. Thursday. R.C.T.P.A.A.

OXFORDSHIRE

The Goldfish Bowl
9, East Avenue, Cowley Road,
Oxford
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STAFFORDSHIRE

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147, Horseley Field, Wolverhampton
Telephone: 24147
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Aquapets
1, Grand Parade,
Telworth
Telephone: Elmbridge 0678
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Brassy Hour, New Zealand Avenue,
Walton-on-Thames
Telephone: Walton 24076 R. C.T.P.A.A. R.&A.

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176, Blackness Road, Dundee, Co. Angus
Telephone: Dundee 66469
E.C.D. Wednesday. R. C.T.P.A.A.

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continued on page xxiii

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Encyclopedia of Tropical Fish (Axelrod)	40 0	Woodmill Feeder Dry	1 0	Broslan Sea-Vit	8d., 1/4
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Tropical Fish as a Hobby (Axelrod)	35 0	Woodmill Feeder Live	1 4	McLynn's Tropical Fish Food	1/4, 1/2, 5/-, 4/4, 12 6
How to keep and breed Tropical Fish (Dr. Emmons)	40 0	worm feeder	1 4	Suregrow	1/4, 2 4
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All About Tropical Fish (McIntyre)	75 0	and dry feeder	2 0	Datum Shrimps	1 4
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Exotic Tropical Fishes (Louse Leaf)	150 0	feeders	1 4	Hydro Flakes	1 0
Exotic Tropical Fishes (Sound Cover)	150 0	Hydro four-in-one feeders	2 0	Hydro Natural Flakes	1 0
Freshwater Fishes of the World	27 6	Small 1 P	2 0	Hydro Shrimps	1 0
A Manual of Aquatic Plants (Roe)	27 6	Use bowl feeder	1 4	Hydro Dried Flies	1 0
Tropical Fish in Your Home	25 0	Use stock on yours	1 4	Foodex No. 1	3/-, 13/-
Aquarium Plants (De-Wit)	25 0	Floating dry feeder square	1 4	Hobby Fish Food	2/-, 2 0
Under the Sea (Burton)	25 0	5a Et Plura Mani	0 6	Hobby Leaf green flakes	2/-, 2 0
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Tropical Fish (T.F.H. Publ.)	15 0	Vitaliser mix (3 foods in one)	2 3	Wardleys	
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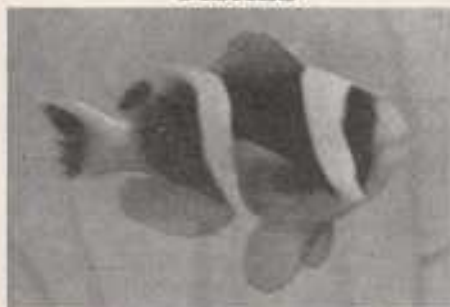
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