

The Aquarist

and Pondkeeper

MARCH 1967



MONTHLY
Vol. XXXI No. 12

TWO SHILLINGS AND SIXPENCE

WALTER R. SMITH LTD.

For Complete Tropical and Coldwater
Aquaria also Tropical Marine
100 Varieties of fish usually in stock on view
in 76 polished stainless steel aquariums

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	Frames	Aquariums
24 x 15 x 12	£ 7 7 0	£ 10 10 0
30 x 15 x 12	£ 9 9 0	£ 12 12 0
36 x 15 x 12	£ 11 11 0	£ 14 14 0
48 x 15 x 12	£ 13 13 0	£ 23 2 0

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We couldn't make it BETTER so we made it BIGGER

At least—not much better. Besides minor technical improvements—just look at the new uses for this big new Dynaflo.

Big new filter box. Big new hanger $1\frac{1}{4}$ " wide to accommodate 1" angle iron tank tops.

Two Siphons—one with extension.

Of course you still have the same advantages of silence, lack of clutter and added health to your fish that you get from the regular Dynaflo model.

The new Super Dynaflo costs you £6-12-6d.

The highly popular Standard Dynaflo still costs only £5-17-6d.

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INTER-PET — DORKING — SURREY

Due to Re-organization & Increased Production

EHEIM POWER FILTERS DOWN IN PRICE

EHEIM "388" COMPACT (FRESHWATER) COMPLETE
NOW £8-0-0 DOWN 20/-

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NOW £16-10-0 DOWN 29/-

The world's most complete Aquarium power filter systems now all reduced, thus placing even the largest model within the reach of every hobbyist who demands the best.

DONT SETTLE FOR LESS THAN THE BEST

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Japanese Koi Carp ...	11/6-30/-
Large Single Black Moors ...	50/- 70/-
Females ...	7/6
Diamond Bass ...	5/6
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Golden Orfs ...	4/- 7/6
Goldfish and Shubunkins ...	1/6-7/6

Minimum order for fish 40/- plus 15/- carriage and packing.

LIVE FOODS

Wingless Fly Culture ...	7/6
Ground Worm Culture ...	3/6
Water Worm Culture ...	3/6
White Worm Culture ...	3/6
White Worm 1 qt. ...	7/-

Post paid.

NEW Adult Living Brine Shrimp ...	1/6
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Metaframe Stainless Steel Aquaria Covers and Knock-down Stands.

★
We now stock the larger improved "Dynallo" 66 lbs. 6d. Post paid.

★
"Metaframe" Tubicubes. The safe way to feed Tubifex. With feeder ... 4/9 Without feeder ... 4/3 Freeze-dried Brine Shrimp ... 4/6

★
Why not try "GRO-LUX" lighting Complete assembly ready wired with Starter and Choke { 18" 97/2 { 24" 100/-

A Few Tropical Fish From Our Selection

Arrowana ...	70/-
Congo Salmon ...	13/6
Combtail Paradise ...	6/6
Betta Stripes ...	8/6
Betta Lochas ...	8/6
Barbus Orphoides ...	5/6
Red Tailed Sharks ...	7/6
Large Silver Sharks ...	20/-
Red Finned Sharks ...	7/6
Copelina Arnoldi ...	5/6

Special Offers

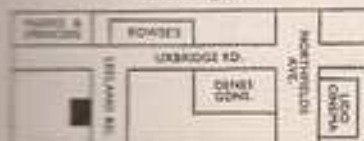
Neon Tetras ...	} 6 for 20/-
Cherry Barbs ...	
Tiger Barbs ...	
Glowlight Tetras ...	
Shuberti Barbs ...	
Nigger Barbs ...	
Lemon Tetras ...	} 5 for 10/-
Scissortails ...	
Black Neons ...	
Corydoras Aeneus ...	4 for 20/-
Zebras ...	} 5 for 10/-
White Clouds ...	
Angels ...	
Black Widows ...	} 4 for 12/6
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Red Flaty ...	} 5 for 10/-
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MIRACLE
FREEZE-DRIED TUBIFEX AND BRINE SHRIMP
 The Modern Aquatic Foods

First we introduced
MIRACLE FREEZE-DRIED TUBIFEX



Price 4/6d. per 5-gram Screw-topped Rigid Plastic Container.

Already this has become one of the most popular Aquatic foods on the market.

NOW WE PROUDLY PRESENT ANOTHER MIRACLE!
MIRACLE SAN FRANCISCO BAY BRAND
FREEZE-DRIED BRINE SHRIMP

Ingredients:— Live frozen then freeze-dried San Francisco Bay Brand Brine Shrimp (*Artemia Salina*). 0.1% Bovine Blood has been added as a fish attractant.



Price 4/6d. per 4-gram plus Rigid Plastic Container.

Immediately a small piece of the new **MIRACLE SAN FRANCISCO BAY BRAND FREEZE-DRIED BRINE SHRIMP** is placed in the aquarium the shrimps separate, absorb moisture and float until eaten. At the recent B.A.F. this food was tested in two of the Marine Aquaria and even "difficult" marine fish, never previously known to take dry food, consumed it avidly.

BE SURE TO ASK FOR "MIRACLE" FREEZE-DRIED FISH FOODS AT YOUR LOCAL STOCKIST
 PACKED IN THE RIGID PLASTIC CONTAINERS TO RETAIN FRESHNESS TO THE LAST PIECE

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THE A

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AQUARISTS THAT YOU CAN RELY ON**

JUDGE FOR YOURSELF

OUR QUALITY, OUR PRICES,
OUR SELECTION OF TROPICALS,
MARINE TROPICALS, COLDWATER FISH
AND PLANTS

WE ALWAYS GIVE 100% SATISFACTION

It is in your own interest to pay us a visit

NOW ARRIVING REGULARLY
WILD TOOTH CARPS FROM AFRICA
MARINE AND FRESHWATER TROPICALS
FROM ALL OVER THE WORLD

WHOLESALE ORDERS EXECUTED IMMEDIATELY

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SPECIAL MARINES NEXT
MONTH.



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BIRDS, BIRDCAGES.
EXHIBITIONS AND
INSTALLATIONS.



POSTAL SERVICE



TROPICAL FISH LIST

FEBRUARY, 1967

Regular Stocks arriving Weekly

LIVEBEARERS		Pencil fish		Apistogramma Reitzigi	
Guppies		4/- each	7/6 each
Delta guppies	12/6 pair	Splash tetra	8/6 ..	Pelmatochromis Guntheri	6/6 ..
Delta guppies, males only	8/6 each	Flame fish	2/6 ..		
		Silver tip tetra	4/6 ..		
Mollies		Danios		Cichlids	
Lyretail mollies, adult	10/6 each	Zebra	2/6 each	Blue Discus	£12 10s each
Lyretail mollies	5/- ..	Giant	3/6 ..	Jewel	4/6 ..
Black mollies	3/- ..	Pearl	2/6 ..	Jack Dempseys	6/- ..
		Trout	2/6 ..	Oscars	7/6 ..
				Vell Angels	3/- ..
				Standard angels	6/6 ..
				Black angels	3/6 ..
				Lace angels	3/6 ..
Swordtails		Sharks	15/- & 27/6 each	Labyrinths	
Red	3/- each	Silver	6/6 ..	Siamese fighter, male	10/- each
Red wagtail	4/6 ..	Red tail black	6/6 ..	Siamese fighter, male, black and yellow	12/6 ..
Green	3/- ..			Siamese fighter, female	4/- ..
Albino	4/6 ..	Rasboras		Three spot gourami	2/6 ..
Hi bred	5/- ..	Harlequin	3/6 each	Three spot gourami, wild adult	10/- ..
		Scissortails	3/6 ..	Moonlight gourami	12/6 ..
		Elegans	4/6 ..	Pearl gourami	3/6 ..
Platies		Toothcarps		Dwarf gourami	10/- pair
Sunset Flory variatus	15/- pair	Pachypanchax Playferii	15/- pair	Honey gourami	5/- each
Moon	3/- each	Aplocheilichthys Dayi	10/6 ..	Opaline gourami	3/6 ..
Black	3/- ..	Rivulus Achilles (new)	19/6 ..	Thick lip gourami, adult	10/- pair
Yellow wagtail	3/- ..	Aphyosemion Gardneri	16/- ..		
Red	3/- ..				
Red wagtail	3/- ..				
Blue	3/- ..				
		Barbs		Catfish and Loaches	
EGGLAYERS		Albino tiger	5/6 each	Spotted cat	7/6 each
Characins		Tiger	3/- ..	Congo glass cat	7/6 ..
Swordtail characin	4/6 each	Tiger, young adult	5/- ..	Leopard cat	10/- ..
Neon tetra 6 for 17/6	3/6 ..	Cummings	5/6 ..	Bronze cat	3/6 & 8/6 ..
Lemon tetra	3/- ..	Cherry	3/6 ..	Glass cats	6/6 ..
Cardinal tetra	6/6 ..	Cherry, adult	5/6 ..	Dwarf sucking cat	7/6 ..
Striped tail characin	8/6 ..	Vittatus	5/6 ..	Sucking loach	4/6 ..
Gold lame tetra	7/6 ..	Fasciatus	3/- ..	Kuhlii loach	2/6 ..
Rosaceus	5/6 ..	Golden	7/6 & 25/- ..	Flying Fox	5/6 ..
Red fin tetras	3/- ..	Tinoid	3/- ..	Bocia Modesta	5/6 ..
Serpae	3/6 ..	Nigger	4/6 ..		
Glowlights	3/- ..	Spanner	4/6 ..		
Black widows	3/6 ..			Various Others	£9 10s each
Penguins	2/6 ..	Dwarf Cichlids		Fire eels	8/6 ..
X-Ray fish	2/- ..	Pelmatochromis	8/6 each	Spiny eels	10/- ..
Beacons	3/- ..	Kribia	8/6 ..	Malayan angels	3/6 ..
Silver hatchets	6/6 ..	Apistogramma Ramirez	8/6 ..	White clouds	3/6 ..
Red tail characin	85/- ..	Apistogramma Agassizi	7/6 ..	Bumble bees	3/- ..
Metyna	19/6 ..				
Bloodies	3/- ..				

All fish guaranteed live delivery and in good disease-free condition. Carriage and packing 7/6. All fish to be met at nearest station. Advice given of despatch.

Open until 8 p.m. Fridays

Half-day closing Wednesday

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 215 GREAT HORTON ROAD - BRADFORD 7 - YORKSHIRE
 Telephone: BRADFORD 73372

THE AQUARIUM

MARSHALL'S AQUARIA

Phone: BUC 4708

26, WESTBURY LANE, BUCKHURST HILL, ESSEX

It is quite easy to get to Buckhurst Hill. By tube train on the Central Line thirty-five minutes from the West End, and we are three minutes from Buckhurst Hill station. Or by bus routes 20, 24A, 167 to Red Funnel Stop, five minutes walk from there.

OPEN SIX DAYS A WEEK 10.00 A.M. TO 6.00 P.M. (CLOSED TUESDAYS)

A WIDE RANGE OF **TROPICAL FISH** IN STOCK

OVER 120 TANKS ON SHOW

TANKS AND ALL EQUIPMENT SUPPLIED.

PLANTS IN STOCK

MINIMUM ORDER 10/-

POST PAID

AMBULIA	8/- per doz.	CRYPTOCORYNE	
BACOPA	8/-	BALANSAE ..	3/- ..
CABOMBA	8/-	" CILIATA ..	3/- ..
ELODEA-DENSA ..	6/-	" CORDATA ..	2/6 ..
HYGROPHILA	8/-	" HARTELLIANA	2/6 ..
LIQWIGIA	8/-	" NURII	3/6 ..
HYRIOPHYLLUM ..	8/-	BORNEO FERNS ..	4/6 ..
WALLIS (Twisted) ..	8/-	MALAYAN SWORDS ..	4/- ..
WALLIS (Straight) ..	8/-	SAGITTARIA LORATA ..	2/- ..
WATER WISTARIA ..	1/6 each	" SUBULATA	6/- per doz.
AMAZON SWORD ..	5/6 each	LAGENANDRA	
		OVATA (limited)	10/- each

Please send S.A.E. for price lists.
For wholesale plant list, TRADE headed paper please.
Please address all correspondence as address above.

Testimonials prove that
**IT PAYS TO BUY
 WINDMILL
 PRODUCTS**



**"WINDMILL"
 HAND REJECTOR
 AQUARIUM
 CLEANER**

Complete with
 Hand Bellows
 15/- each



**"REGENT"
 INSIDE
 FILTER**

Designed for
 easy cleaning
 10/- each

**"WINDMILL"
 AIR REJECTOR
 CLEANER**

will work
 connected to
 any make of
 Aerator

10/- each



**"WINDMILL"
 BREEDING
 TRAPS**

Beautifully
 Designed and
 Constructed

19/6 each

RETAIL ENQUIRIES FROM
 ALL LEADING WHOLESALERS

Tried, Proven and Tested

THE ORIGINAL
 PREMIER BIOLOGICAL FILTER

**It is unique. It is reliable. It is unseen
 It is nature's own method of filtration
 It is permanent. It needs no attention**



They are saying

1. **BETTER CIRCULATION.** The Premier Biological Filter collects water from the bottom and recirculates it, thus preventing cold spots—in tanks fitted with this filter, fry will even feed at gravel level.
2. **HEAT ECONOMY**—the action of the Premier Biological Filter gives a continuous circulation of heat and thus provides the desired temperature evenly throughout the aquarium. saving of current costs is noticeable.
3. **PLANT GROWTH**—in tanks fitted with the Premier Biological Filter, plant growth has been more healthy—plant roots do not rot away.
4. **WATER CLARITY**—tanks are kept suspension free, always crystal clear water. The Premier Biological Filter continuously filters and purifies the water.
5. **NO MESS**—filter mediums are not required for use with The Premier Biological Filter, saving need for replacement, provides a cleaner job and saves money spent on filter mediums. Completely eliminates need for syphoning and prevents black gravel, disposes of sediment where it settles.
6. **NEATNESS.** The Premier Biological Filter is fitted underneath the gravel, only the air lift is visible. Can be worked by even the smallest of vibration aerators. Once installed can be left for years—will not clog up. Suitable for both cold water and tropical aquariums.

Made for 18" tanks at 12/6 each. 24" tanks at 15/- each
 Other size tanks see fitting chart of filter box

Pamphlet willingly sent on receipt of 3d. postage

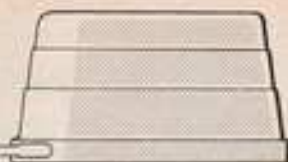
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THE AQUARIST

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*do away with those
untidy dangling air lines
by following the
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Flexible "Aquatube" is used from pump to aquarium where it connects to rigid tubing bent as required by immersion in hot water (only a few inches need be immersed at the points where angles are required). The rigid tubing will not fit directly over the airstone nozzle and a short piece of "Aquatube" should be used to complete the connection.

The "Fine Flow" airstone is an all British product specially manufactured to controlled porosity and for use from under-sand air supply.

FOR PERFECT AERATION TEAM UP WITH A "SUPER SUMMIT" AIR PUMP — see your dealer.

SINGLETON BROS. (Electronics) LTD.
THE PRAZE, PENRYN CORNWALL

SPECIAL PLANT COLLECTIONS

A surer to necessary to substitute certain plants owing to the time of year

TROPICALS	£1	H	£1
A	30 plants including Dwarf Lily Cryptanthus Wisteria	4 Yucca 4 Moneywort 4 Euboea 3 Harewort	
B	12 Vallisneria 12 Myriophyllum 3 Micro Sagittaria 4 Ludwigia 4 Euboea Densa	12 Sagittaria 4 Myriophyllum 4 Ludwigia 4 Moneywort 4 Harewort 1 Persian Rizia 3 Euboea Densa	
C	12 Vallisneria 4 Myriophyllum 4 Ludwigia 4 Euboea Densa 4 Bacopa 1 Amazon Chain Sword 1 Persian Clover	12 Sagittaria 4 Myriophyllum 4 Ludwigia 4 Moneywort 4 Harewort 1 Persian Rizia 3 Euboea Densa	
D	4 Nymphaea Stellata 1 Giant Hygrophila 1 Apogonon 1 Wisteria 1 Giant Sagittaria 1 Cryptanthus 1 Indian Fern 1 Persian Clover	4 Nymphaea Stellata 1 Giant Hygrophila 1 Apogonon 1 Wisteria 1 Giant Sagittaria 1 Cryptanthus 1 Indian Fern 1 Persian Clover	
E	4 Vallisneria 4 Myriophyllum 4 Hygrophila 4 Euboea Densa	4 Yucca 4 Moneywort 4 Euboea 3 Harewort	
FOND PLANTS	£1	2	10/-
G	4 Ludwigia 4 Cabomba 4 Ambulia 4 Yucca	2 Giant Hygrophila 1 Giant Sagittaria 1 Wisteria 1 Nymphaea Stellata	

BOW AQUARIUMS

36in. x 12in. x 12in. bow-fronted aquarium with wrought iron lockcase stand £19/19/- complete.

48in. x 12in. x 12in.—29 gns.

Feasy bronze, black & gold, and chrome. Also plain stands

Please add 2/6 extra postage on appliances orders up to 10/- 4/- up to 20/- 5/- up to 30/-

STANDS

18 x 10 x 36	— 37/6
24 x 12 x 36	— 47/6
30 x 12 x 36	— 52/6
36 x 12 x 36	— 57/6
48 x 12 x 36	— 67/6

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BLUE SKYS

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24in. long x 30in. high 1/6 per sheet, or 1/3 per face, (post free)

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Springfield External	— 34/-
Springfield Ins./Adj.	— 15/-
Springfield Ins./Adj. UNO	— 10/-
Ins./Adj. "Popular"	— 15/-
Ins./Adj. "Popular" with neon indicator	— 22/-
Reno (with Neon)	— 21/-
"Ex-Ec" Sealed	— 25/6

THERMOMETERS

Mercury	each
Germ.	— 6/6
Plastic Backed	— 4/6
Spirit Best Germ.	— 5/-
"Ex-Ec" Dummy	— 6/6

FILTERS

"Woodhill" Plastic Outside Filter	each
"Woodhill" Biological Aquarium Filter 12in.	15/-
"Woodhill" Regen Inside Filter	— 10/-
Counter Filter	— 6/-
Adv Life	— 2/6
"Slim Jim" Outside Filter	17/6
"Clear King" Outside Filter	22/6
Berlin Filter	— 2/3
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Orn-Wall Bubble-up	— 3/-

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Mintmore	— 2/6
Fair	— 2/6
Star	— 2/6
Rams	— 2/6
Zacharia Tank	— 7/6
Hydra Junior	— 10/6
Hydra "A"	— 12/6
Hydra "B"	— 14/6
Hydra "C"	— 20/6

HEATERS

"QUEENSBOROUGH" 25w., 40w., 60w., 75w., 100w., 120w., 150w.	— 18/-
Rama (75-200w.)	— 18/-
"Ex-Ec" Flexible Heaters (50w.)	— 18/-
"Ex-Ec" Thermomatic Heaters, (100w. and 150w.)	— 30/-
Press-ostat	— 24/6
Stano-Pet Thermomatic Heaters 25- and 30-watt	— 2/3

REMEDIES, etc.

Holland	— 2/6
Liquidin	— 2/-
Dissolve	— 2/6
Resistan White Spot Cure	— 2/6
Sea Salts	— 1/6

SEDIMENT REMOVERS

"Woodhill" Air Receptor	each
"Woodhill" Hand Receptor	— 15/-
Fairall	— 2/-
Syphon Tubing	— 7/6 b
Hand Type Plastic Siphon Away	— 4/6
Siphon Away	— 4/6

PLANTS

Pollinaria Special	each
Euboea Densa	— 1/-
Hygrophila	— 1/-
Bacopa	— 1/-
Sagittaria nutans	— 1/-
Sagittaria minima	— 1/-
Pollinaria totia	— 1/-
Ludwigia	— 1/-
Myriophyllum	— 1/-
Cryptanthus Beckwithii	— 1/-
"Slim Jim" 2/6 and 5/-	— 2/6 and 5/-
Water Wisteria	— 3/6
Giant Hygrophila	— 2/6
Giant Sagittaria	— 2/6
Amazon Chain Sword	2/6
Duckweed per portion	1/-
Algae per portion	2/-

FOODS

Basic Flakes	— 1/6
Hydra Flakes	— 1/6
Worms 1/8 and 2/6	— 2/6
Worms Fresh	— 2/6
Locally Made 1 and 2	— 2/6
Salmon	— 2/6
Dried	— 2/- and 4/6
25in. Daphnia	— 4/6
Ground Herring	— 1/-
Fish Food	— 1/6
in 2 sizes	— 1/6
Amoeba Eggs	— 6/6
Worms' Food Pac.	— 6/6
7 kinds of food	— 8/6
Hi-Glow	— 8/6
Red	— 8/6
J. Ruppman	— 8/6
Foodies	— 8/6
Supramin	— 2/6
Tetra-min Flakes (all sizes 1/1, 2/2, 5/5)	— 2/6
24/6 and 5/5	— 2/6
Ranipon (100 grains)	— 1/3
Vitacraft 1/-, 6/6, and 20/6	— 1/3

FULLY-GLAZED AQUARIUMS

Pressed Steel

Angle Iron

Inches	Feet 1/2 x 1/2	Feet 1/2 x 1/2	Feet 1/2 x 1/2
12 x 4 x 8	12/6	12/6	12/6
12 x 4 x 12	18/6	18/6	18/6
12 x 6 x 12	24/6	24/6	24/6
12 x 8 x 12	30/6	30/6	30/6
12 x 10 x 12	36/6	36/6	36/6
12 x 12 x 12	42/6	42/6	42/6

LIVE FOOD

Brown Shrimp Eggs	2/6 and 4/6
Colours of	
Near Worm 1 oz.	— 7/6
White Worm 2 oz.	— 13/6
Micro Worm	— 3/-
Tablix worms 1/6 and 2/6	— 3/-

BOOKS

Tropical fish in the Aquarium	— 15/-
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Exotic Tropical Fishes	— 138/-
Aquarium Plants Exotic	— 37/6
Fishes W. T. James	— 63/-
Tropical Fish	— 6/-
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Goldfish	— 9/-
All T.F.H. Books each 2/- postage included	

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Snapping Trap	— 15/-
Snakes Knot or Shank	— 4/6
Double	— 6/6
Flaming Stick	— 1/6
Dry Floating Rings	— 1/6
Sawyer	— 1/6
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Cover plate

Madshipper (*Periphyllus* species). An interesting subject for the aquarist who is going marine, this semi-saltwater fish has most fascinating amphibious tendencies.

VOL XXXI No. 12

1967

Breeding in a limited space

by D. E. Sale

THERE comes a time in the life of every aquarist when the thrill of baby guppies, floated precariously in a jam-jar in a community tank, loses its appeal and he wishes to try his hand at breeding egglayers. Many species have been suggested as ideal to start with but before deciding which to try, several considerations must be taken into account.

Firstly, the species should spawn readily without too much preparatory special feeding. Secondly, parents which eagerly eat their own eggs are best avoided since the nascent breeder often has too little time to remove parents immediately after spawning or to construct traps. Thirdly, the young should not be excessively numerous, small nor delicate. Lastly, and this is very important, the young should be of sufficient interest or rarity to be disposed of easily.

With these considerations in mind, I venture to suggest *Rivulus miltis* as an ideal beginners' fish. This is a most attractive toothcarp, the female being mottled brown with a clearly-defined "Rivulus spot" at the base of the back. The male is difficult to describe. His colours include blue, green, olive, with tiny red spots and a black and gold border to his tail.

A pair of these fish may be obtained for fifteen shillings or less, and, if placed in a community tank to recover from their journey, will soon settle down well, accepting most foods. Like most toothcarps they will eat fish small enough to be swallowed whole but they are not bullies or fin-nippers.

While the adults are settling down, the breeding tank

Continued on page 273

Berlin's Aquarium - the world's largest

by Susan Lester

HALF a million of West Berlin's yearly visitors make a point of seeing one of that bright and vital city's most popular institutions—the Aquarium. With its population of over 10,000 creatures and more than 1,300 different types, the Berlin Aquarium is the largest in the world.

Unlike much of the striking modern architecture there, the Aquarium is a plain, functional, three-floored building on the site of the Berlin Zoo. It also houses a terrarium and insectarium. After the destruction of the old Aquarium, which was built some fifty years ago, it was rebuilt in 1952, with the latest equipment for keeping and exhibiting its vast population. This consists of sponges, worms, star-fish, sea-urchins, shrimps, crabs, lobsters, insects, spiders, scorpions, molluscs, fresh-water and sea-water fish, amphibians, lizards, snakes, tortoises and crocodilians, in 300 tanks of all shapes and sizes.

In the halls of the first floor, the fresh-water and sea-water specimens are kept in brightly illuminated tanks, lining the walls of the darkened passages. The centrepiece is the display of the many colourful smaller tropical fish so popular with private aquarium-keepers. But more interesting, certainly in shape and colour, are the fresh-water fish in the larger tanks: the gar-fish, with its elongated body, and long, beak-like snout, and the small, colourful but voracious piranha from South America. New acquisitions are two young arapaimas, the largest fresh-water fish in the world. Quite peaceful and interesting creatures are the electric eels and the electric cat-fish, equipped so they can track their prey through a radar-like technique and numb them by electric shocks.

The Aquarium's most expensive fish is the Australian lung-fish, over three feet long, brought to Berlin in 1961 from Queensland. It is also the Aquarium's most precious specimen—its ancestors date from the Mesozoic era. Together with some specimens of the African and S. American lung-fish family, these represent all five existing species of lung-fish, giving this Aquarium a unique exhibit.

One of the stranger inhabitants of the fresh-water section is the very lively Double-Eyed Fish, so called because its eyes are split down the middle so that it can look with half the eye over the water surface and simultaneously into the water with the other half.

With the successful breeding of the sepia type of cuttle-fish last year, the Berlin Aquarium caused quite a sensation. In August and September some hundred ten-armed off-springs of this very delicate and short-lived species were born, and the fish is now bred in the third generation. The cuttle-fish is a fascinating animal, as it changes colour when in danger or ejects an ink-like fluid to screen itself from its pursuers.

One specimen of the eight-armed octopus-type of cuttle-



Many varieties of lizards and reptiles are exhibited at the Aquarium. Above can be seen a gecko.



An octopus being held down, showing its long tentacles.



The shore crab.

fish nicknamed Otto made headlines in the Berlin papers last year. Word had gone round that Otto was starting to eat up, one by one, its own sucker-bearing arms. The Berliners poured in to watch the spectacular process, working out how long it would take for Otto to finish eating himself up. Then Otto provided another sensation. It laid dozens of eggs; even the keepers were caught by surprise over this unexpected change of sex. After being re-named Ottile the creature died a natural death a few months later.

The water temperature in the large exhibition tanks in the sea-water section is kept low by special coolers, as the cold-water fish are obviously very sensitive to changes in temperature, particularly in summer. Special attention is paid to the frightening Northern Cat-Fish, four feet long, which lives in deep waters near the Icelandic coast and is dreaded by all seamen. This creature needs even cooler temperatures.

Among the sea-water section's beauties are the coral fishes from Asia and off the Red Sea coast. A specially attractive specimen of this group is the blue-striped Koran Fish, so called because its tail fins have a decorative pattern resembling arabic letters. Less appealing, in spite of its brilliant dress, is the dangerous Dragon Fish with its long poisonous spines.

One of the most intelligent group of aquatic animals is the trigger-fish family. They are temperamental, quarrelsome creatures, amusing themselves with empty snail shells. The star among them, brightly coloured and of bizarre design, was named Picasso Fish by the Aquarium some years ago. This impressive name has now of course been adopted by other aquariums.

The huge Reptile and Amphibian section occupies the second floor. In the large tropical hall, with its exuberant vegetation visitors can watch from a bamboo bridge the large, powerful crocodiles, alligators, caymans and gavials—a group most reminiscent of the fearsome giant reptiles of former times. The collection of crocodiles of twenty different species comprises all existing types except two. Some of them, such as the Mississippi alligators, have grown to giants of up to ten feet within six to eight years. The African Nile crocodile, one of the (few) dangerous crocodiles, is also in this section.

In the terrariums and aqua-terrariums there live more than 100 different types of the tortoise family. As public exhibits perhaps the most interesting are the giant tortoises. The most important among them are the ones from the Galapagos Islands and the Seychelles—being the last of a widely distributed group far back in time and now strictly protected by law. These vegetarian creatures, which can live for well over a century, turn the scales at well over a cent. The rarest specimen is the New Guinea Soft-Shell Turtle.

Among the large number of snakes and lizards, the exceedingly poisonous snakes are drawing big crowds. These include cobras and mambas; the green mamba is a

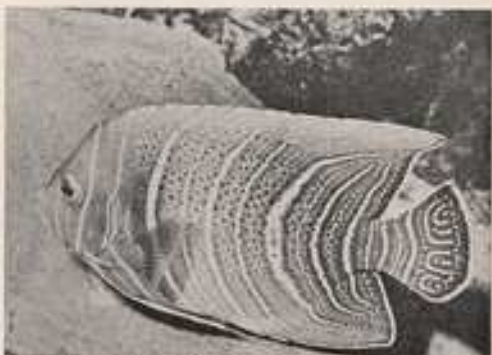
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Sepia type of Cuttle-Fish. The Berlin Aquarium is the only one in the world breeding the species



Picasso fish of bizarre design, belonging to the trigger fish family



Blue-Striped Koran fish, a specially attractive specimen of the coral fish family

Going marine

by T. Ravensdale

The tropical marine aquarium

As we have pointed out already, your tank must not contain or utilize metals of any description which are not coated or protected by a plastic sheath. The cement used to keep the glass in place must also be separated from the water. A tube of 'Aqualac' used on the edges where glass meets glass will do the job quite well provided it is allowed to dry for at least 24 hours.

The size of your tank should be the largest you can possibly manage—anything less than 10 gallons is almost suicidal to most marine fish; compare the size of an average river to that of an ocean and it is easy to see why.

Water is the next and undoubtedly most important concern, but even this problem is simplified by the chemists who have developed artificial compounds which are quite safe to use and are generally superior to natural sea water. They are totally free of the countless myriads of plankton and noxious which natural water embodies. 'Live' waters may be more natural in their normal surroundings but it would be a fantastic coincidence if the Caribbean held exactly the same microscopic life as our British highly trafficked coastal waters so, assuming you don't want to go to Bermuda for your water, we must settle for Meersalz, Tropicmarin or some other well-known brand of artificial salt. Going one step further and provided you have enough enthusiasts in your club to ensure a reasonably large order, you may wish to purchase from the London Zoo some of the marine water they import from the Bay of Biscay. Their modest charge is a little over 2/- per gallon. If, however, you use a chemical substitute make sure you test the hardness of fresh water used before you add the salt. A hard water should not be used. Check also the pH of the water first as the average pH tester will not read correctly in salt water. Most marines prefer a pH of around 8.3. Water from copper pipes should be regarded with suspicion as should distilled water which is not always distilled in glass units. If in doubt as to the copper content of your water (.01 p.p.m. max.) add $\frac{1}{2}$ gram of citric acid crystals to 1 pint of water and from this solution add 1 cc. per gallon to your tank water. Whilst on this subject it may be advisable to place $\frac{1}{2}$ oz. of Sodium Carbonate (per 10 gallons) into your filter medium. This helps to keep the pH constant without introducing the chemical to the water too quickly. Once you are satisfied with your water allow a further 24 hours for the salt to be absorbed. This is assisted if the salt is added in liquid form by mixing it with about one quart of tank water first, not forgetting to allow for the water space taken up by ornaments etc.; a twenty gallon aquarium may only hold 18 gallons of actual water. Most commercial salts recommend their own mixture ratios although $\frac{1}{2}$ lb per gallon is normal. To ensure accuracy a hydrometer should now be used to determine the exact



The clown fish

specific density of the water. The normal figure recommended is 1.25 which simply means that the water now weighs 1.25 more than it did before you added salt, but this figure is only average and will depend upon the type of fish kept. Generally speaking, the smaller the fish the more the salt so, unless you intend keeping only the very smallest specimens, I would recommend an average figure of 1.20 to 1.25. However, you should always take a salt reading from the water your specimen arrives in and balance the water in your aquarium to match. Once your water is satisfactory you must now aerate fully for at least 48 hours. As you can see, like H.R.H., the Discus, marines are very fussy about their water and, unless you are prepared to accommodate them with perfect water, then you should stick to guppies.

Once your water has been purged of all floating debris (considerable in even the cleanest of new water) you may add the floor covering. This should be as light as possible to deter waste absorption and, as there will be no plants in the bottom, it isn't necessary to have much. Silver sand no deeper than $\frac{1}{2}$ inch is commonly used as is quartz, but I have found the ideal floor covering to be crushed coral for not only does it add a natural look but it helps to deter an acid build-up by producing calcium. Most wrasses like to chew coral chips as well.

Filtration

Now your tank should be crystal clear and almost ready

to receive ornaments and, finally, specimens but however clean it looks now your job is to keep it that way and first-class filtration must obviously be the answer. If you intend keeping marines at all and are prepared to spend considerable sums on expensive fish then don't risk spoiling all by buying an inferior filter. A fast power filter is essential. A Dynaflo costs under £6 and a good Elheim can be bought for £9 so, if you can afford either, don't hesitate; anything less than a bubble-up simply won't do. Aeration is vital to the life of marine fishes, for salt water contains 20% less oxygen than fresh water and it is constantly on the move, so artificial waves must be produced with the aid of an air stone. Whatever filter you do decide upon take the precaution of adding one return pipe—if one fails you won't be left with a tankful of water on the front room floor. Use a coarse air stone, for fine air-bubbles pumped into the tank at too great a pressure can cause 'popeye'.

There are several marine filter mediums on the market containing ion exchange resins and one of them should be used in place of the regular carbon. On the subject of ions perhaps the more enterprising marine fancier may wish to use an Ozone unit. These units, although controversial, undoubtedly do the job of killing bacteria, but care should be taken in the use of the variable type. Do not use on full blast but increase dosage slowly from 5 m.g. to 20 m.g. over a period of fourteen days. When newcomers are added to the tank cut down the Ozone and build up as you did to begin with. Keep fish from the Ozone stream by fitting a 3 inch tube around the bubbles or by adding a reactor tube. Finally, do not use Ozone in any form with sea anemones or they may die overnight.

Ornaments

You will no doubt wish to add one or two ornaments to enhance your marine tank but in doing so may add unwanted elements. Plants, although scarce, are available but I strongly advise you to disregard them altogether. Almost all 'plant life' seen under the sea is in fact algae and most algae is undesirable. The majority of algae forms prefer a pH of 10 and although they may not directly harm fish whilst living, their deaths can contaminate a tank immediately. Should you however wish to try a 'plant' or two remember that marine 'plants' are almost needless to do not increase the depth of your gravel. Plastic plants may be used provided they are soaked for at least 48 hours in fresh water. It may be of interest to note that most ladies' hairpins are plastic coated and can prove quite useful in tying down plastic plants.

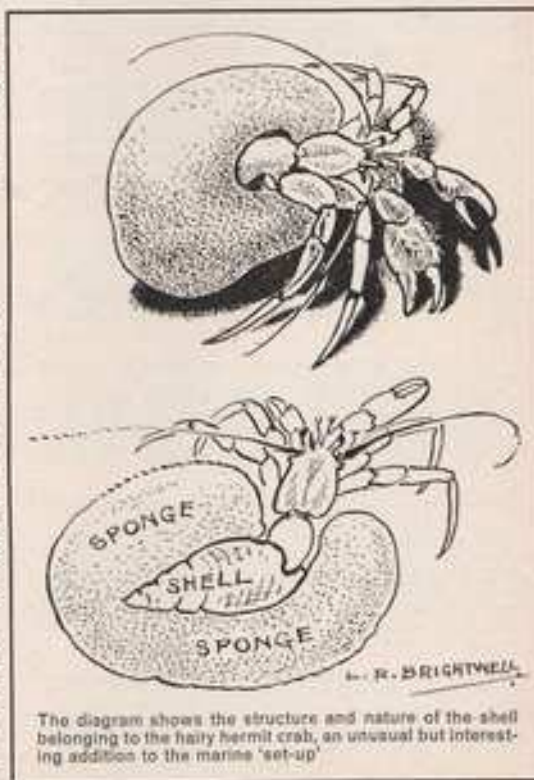
Shells are to be found in many marine set-ups but genuine shells are highly suspect. Most shells sold in shops have already been treated but, if you must use them at all, boil them for at least two hours as most wild shells have contained life of some sort or other. I once found a small scorpion lodged in a giant golden helmet! Better than real shells are the china copies one can purchase in gift stores

and they are little different from the real thing except in their ability to stay free from bacteria. Sea fans or ferns are quite harmless provided they are thoroughly boiled before use. These twig-like structures are in fact colonies of tiny animals all joined together. Boiling removes the flesh and leaves the skeleton in a large frame-like leaf. Direct immersion in the salt water will result in immediate discoloration of the water.

Invertebrates

Although one often sees photographs of anemones in company with the Clown fish I do not personally agree with anemones (or fan worms) in the community tank. They emit a great deal of undesirable mucus and uneaten food, can sting to death smaller fish and are rarely happy in a tank that is clean enough to contain fish. Furthermore, Ozone is unsafe to use and most toxics such as copper

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The diagram shows the structure and nature of the shell belonging to the hairy hermit crab, an unusual but interesting addition to the marine 'set-up'

Our experts' answers to tropical fish-keeping

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.

Can fishes of the family *Mastombridae* (Spiny Eels) be kept in a community tank, what food suits them best, and what, generally speaking, are their habits in the aquarium?

Spiny eels can be kept in a community tank, though in their larger sizes it would not be wise to keep them with slim fishes much smaller than themselves. Spiny eels hide away most of the day at the back of the aquarium, among the plants or half-buried in the compost. But in a fading light and after dark they become active at all levels of the water. They flourish best on a diet of small worms, live daphnia, and the like. They do not appear to take dried food, but the spiny eels the writer has owned from time to time have never refused to accept descending pieces of red meat.

Please tell me what exotic fishes would stay alive and well in an unheated tank in a room in which the temperature never falls below 70°F (21°C).

White Cloud Mountain minnows, black-banded sunfish, the common paradise fish (*Macropodus opercularis*) and the red-tailed Australian rainbow fish (*Melanotaenia nigricans*) should do very well at comfortable room temperature. But a word of advice. Do not place any of the hardier "tropicals" in water at a temperature of 65°F (18°C) to 70°F (21°C) immediately after you have obtained them from a dealer. Acclimatize them to the lower temperature range very gradually.

Please explain the difference, grammatically speaking, between "fish" and "fishes".

Several different species of fish living together in a tank are correctly referred to as fishes, but several members of a single species should be referred to as fish. In short, a tank housing guppies only is a tank of fish; a tank containing platys, angel fish, zebras and barbs is called a tank of fishes.

Is it true that the mud-skipper (*Pseudorasbora*) can live for hours out of water?

We do not know whether the mud-skipper can live for hours out of water, but it is true that this fish will climb out of the water and squat on debris or the risen roots of certain trees and eye its surroundings for quite a long time before returning to its natural element.

Please give me details of the spawning procedure of *Mastombridae*, and is it easy to tell the sexes apart?

M. rosenfeldi spawns in thickets of plants or tufts of algae. The male is an ardent driver and chases the red-distended female all over the aquarium. Be this as it may, this species is not a ready-spawner. A mature male (at least 3½ in. in length) shows quite a lot of red (and sometimes black) along the outer edges of the unpaired fins. The female is thicker through and paler in coloration.

Please give me the scientific name, general requirements, and maximum size of the Persian pearl fish.

The scientific name of the Persian pearl fish is *Aphanius niphidae*. It seldom exceeds 1 in. in length and usually does well in any well-lighted and well-planted tank maintained at a temperature in the low to middle seventies (°F). Living and dried food is taken freely.

Please give me some information about *Rasbora elegans*.

Rasbora elegans, commonly called the yellow rasbora, is found in the natural state in the freshwaters of the Malay Peninsula and beyond. It attains a length of about 5 in. and makes a trustworthy community fish in a tank large enough to house it in comfort. It is easy to feed on live and dried food and is not particular about temperature. Furthermore, *R. elegans* is one of the rasboras that are not too difficult to spawn in captivity.

Can small *Cichlasoma auratus* be placed without fear of their killing other fishes in a community tank?

Up to a length of about 1½ in. *C. auratus* will live at peace with other fishes except tiny neons or, say, tiny guppies which, quite naturally, they will usually look upon as something extra special in the way of live food. But in their larger sizes *C. auratus* are best kept in a large tank by themselves, or with well-grown barbs or the least pugnacious of the medium-sized cichlids.

What is the life-span of the paradise fish (*Macropodus opercularis*)?

Ordinarily this species lives for about five years, but occasionally the odd specimen will exceed this age by several years.

Clearing out a lot of old junk, I came across an attractively coloured piece of quartz rock. Would this piece of rock harm my fishes if I introduced it into their aquarium?

Quartz is quite safe in the aquarium. After all, silica sand is only a kind of pulverized quartz. But give the piece of rock a good soak and scrub before placing it with the fish.

What is a black cocorob?

This is a fish of the family *Nandidae* (this family now includes the once separated *Polycentridae*) and is better known to aquarists as Schomburgk's leaf-fish (*Polycentrus schomburgkii*).

Please give me some information regarding the livebearer called *Blepharodon bellianus*?

This outsized livebearer—a large female may attain up to about 8 in. in length—is native to the Atlantic side of Central America. It must be kept by itself because it is a savage predaceous species. Indeed, it must be kept well supplied with small fish, tadpoles, and the like, if it is to flourish in the aquarium. A temperature in the middle to upper seventies (°F) suits it best.

I have just bought a fish called the purple-striped gudgeon. Please tell me something about this species.

The purple-striped gudgeon (*Mogurnda mogurnda*) is native to Australia. It has been kept by tropical aquarists since before World War I. At that time it was erroneously referred to as *Kreffia adipera*. It reaches a length of about 6 in. but in its larger sizes cannot be trusted with smaller fishes. It needs live and flesh food and a temperature of about 72°F (22°C) to 75°F (24°C). It can be bred in captivity.

I have just acquired a fish called *Synsphyronotus*. My dealer says it is a rare African species. I should like to know which part of Africa this fish is found and what are its requirements and reactions to other fishes in the aquarium?

S. convarius is an uncommon cichlid from the river Congo. It grows to a length of about 3½ in. and will not molest other fishes unless they are very much smaller than itself. It appears to be quite contented at a temperature of 75°F (24°C) and will take any live or dried food. Another thing in its favour is that it does not chew the plants.

Coldwater fish-keeping answered by A. Boarder

I recently bought a couple of shubunkins for my tank and noticed that they have a small transparent spot on the tail. The fishes appear healthy; can this be white spot disease?

If the spots are transparent and soon clear up it is probable that the trouble is not white spot disease but a form of embolism. When some fishes are placed into water which is very highly oxygenated they develop these transparent spots, like tiny bubbles. Fishes usually soon recover from this complaint and may not be harmed by after effects.

I have noticed one or two fish in my tank pairing off and chasing others. Can they be wanting to breed? It seems late, as this is November?

If goldfish are kept in a well balanced tank in a living room it is possible for them to come into breeding condition at almost any time of the year. They may not actually spawn but this chasing can often occur. The fish appear to be quite healthy and in good condition to show these symptoms.

After searching many pet and book-shops I have been unable to find any books which describe how to keep and breed fancy goldfish. Where can I obtain one please?

Get the book *Coldwater Fishkeeping* from "The Aquarist and Pondkeeper," this will give you all the information you need.

It has been recommended to keep only one Stickleback in a tank with others if it is a male. I have several and cannot tell males from females. How can I do this?

These fishes can be kept together until the spring. In the breeding season, usually May or June, the fishes take on a brighter colour and the males have very red under-parts. They then become belligerent to other males and in a fairly small tank the males should be kept apart.

I recently bought a pair of Kuli carp but can find no reference to any information as to their care. Can you give me any information please?

I have never heard of a Kuli carp. The only fish I can recall answering to a rather similar name is a tropical loach, known as *Acantopoma kuhlii*. It is also known as the coolie loach, leopard eel, prickly eye and striped loach. It is a native of Sumatra and Java and requires tropical conditions.

You may be interested in the small beetles I have sent. I found these in a packet of fish food. I have been feeding my fishes in the pond on this food and although I have had several spawnings I have lost all the fry. When looking at the pond at night with a torch I caught two large water beetles; have these grown from those in the packet?

The water beetles are nothing to do with the creatures you found in the fish food. These are a type of corn weevil, possibly *Calandra granaria*, and they would not live in water. The water beetles in your pond could eat fish fry and can fly into a pond, usually at night.

I have some goldfish and shubunkins in my pond and they are showing swelling bellies in late autumn. Is this natural, as it seems a long way to the spring?

It is quite natural for female goldfish to form roe at the latter part of each year. They will remain swollen until the warmer weather in the following year. Sometimes one of the deep bodied fishes, especially a female full of eggs, will become troubled with swim bladder trouble in the early spring. This could be caused by the pressure of the

eggs on the swim bladder and the trouble usually clears up once the fish has spawned.

I have had a garden pond for some years and have been fairly successful. However, this late summer I lost a number of fishes. Is there any reason for this?

It is possible that a large amount of muck and filth has collected in the bottom of the pond. Over a few years this can build up considerably and become very foul. This will pollute the water and the fishes would soon die. It is a good plan to clean out all medium sized and small ponds every year, especially concrete ones with a fair amount of fish life in; also, the water plants could be getting too rampant and need pruning back.

We have constructed a garden pond with a plastic liner. There is a large amount of Algae in the water and on the sides. Is there any way to cure this?

Most freshly constructed ponds will get a large amount of Algae form in them. This is a natural process and usually clears up after a time when the water plants have become better established. Once this happens it will be found easier to keep the water clear. Meanwhile, if the water gets too thick you can change most of it. The green Algae will no doubt form again but at least you will be giving the water plants a chance to get growing well and so be able to cope with the nuisance.

About three weeks ago I moved my coldwater fish to a tank which had previously held tropicals. Some have now developed red patches on the body and head, and blood veins in the fins. Can you explain this please?

It may be that the temperature of the water was different and the change upset the fishes. Unless any parasites could be seen it is probable that the fishes are suffering from *Oodinium* or some other parasitic disease. This can sometimes be encouraged by catching the fishes when some of the mucus covering is removed. Often this is upset by changed conditions in the tank water. If no signs of improvement are seen give the affected fishes a salt bath of a tablespoonful of sea salt to a gallon of water. They may recover by themselves if the water temperature is raised somewhat.

How can I keep my garden pond water really clear?

By having plenty of underwater oxygenating plants and some duckweed on the top. You have only to shade out most of the sunlight for this to choke out much of the green Algae which causes the trouble.

I have a tank of goldfish. Why is the sand at the bottom black?

It is probable that the black on the sand has been caused by over-feeding with dried foods. The un eaten food soon pollutes the water and can turn the sand black. If all dried food is withheld for a week it is probable that the sand will clear. If any loose muck lies at the bottom this should be removed by siphoning.

I have made a small garden pond with a bath. What can I use for growing plants in and can I have a water lily?

Do not put any soil or sand in the bottom of the bath but plant in separate containers. These can be removed easily from the pool when you want to clean it out. A very small type of *Nymphaea* (water lily) could be used, but make sure that it is of the miniature type.

Marine queries answered by T. Ravensdale

Is sea salt, commercially available, safe to use or should I collect my own sea water in plastic buckets? Which species of tropical marines would you recommend to a novice?

Your first question is easy. Definitely use scientifically prepared artificial sea-salts in preference to natural water. The uncountable microscopic life existing in natural sea water cannot live long in the aquarium and pollution will undoubtedly follow their death.

Question two is difficult to answer without knowing the size of your aquarium but generally speaking those available in English pet shops are the harder species or the importers would not have risked stocking them in the first place. There are, however, one or two do's and don'ts. Don't mix several identical species of the same size. Two 2" damocls will fight where a 1" and a 3" will not. The sergeant major is a good 'feeding teacher' and will accept anything. Nearly all of the chaserodons are easy to keep as are the smaller wrasse. Keep away from the larger angel fish until you are more experienced.

Can coldwater anemones live in tropical temperatures?

Provided the temperature is raised slowly any coldwater anemone can live happily in a tropical tank. The only problem here is that the coldwater variety has a far more lethal sting than imported tropicals and a nastier temper. Keep them in heated tanks by all means but keep an eye on fish deaths.

Where can I obtain a live lobster and can it be kept alive?

Live lobsters can be purchased early in the morning in

Billingsgate market but great care should be taken when introducing one to an aquarium. Direct immersion will kill the lobster by drowning. It should be gently splashed for about one hour until it is drenched with water and all the air is removed from its system whereupon it can be kept alive for up to six months in the tank.

Is there such a thing as marine clab in Gt. Britain?

The Marine Study Society of Gt. Britain will welcome you as a member I am sure. They issue an extremely good marine magazine, have an answering service conducted by an efficient panel and collect a great deal of welcome knowledge about the tender art of keeping marine fish. The address of the Secretary, Mr. Hall, is 23, Canfield Gardens, N.W.6.

The Coral in my tank has turned a dark brown. Is this due to algae and if so, can I prevent it? I have tried darkness.

The probable answer to the discoloration of your coral is not algae but copper. Have you used copper sulphate as a cure recently? Coral absorbs copper rapidly but plain cold tap water will remove it. If it is not feasible to remove the coral then add $\frac{1}{2}$ gram of Citric Acid to 1 pint of water using 1 c.c. per gallon of this fluid to remove the copper. Should the discoloration prove to be algae then, put a sponge into the tank. Sponges and loofahs in the marine tank are not only decorative but are good algae collectors. The sponges should be taken out and cleaned of algae at monthly intervals.

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Going marine

sulphate or methylene blue are lethal to anemones. Therefore, if you wish to keep these highly colourful and entertaining creatures, another tank seems the answer. This tank may also be used as a hospital for some of the inhabitants that require sid in the community tank. It has been widely accepted that Clown fish will always head for the nearest anemone and that a substance is emitted from the fish which renders it immune to the poisonous tentacles. Experiments conducted by myself violently disagree with these findings for I have seen several types of damsel performing the same 'dance with death' and with the same immunity. On the contrary, close examination of the 'dancers' shows a distinct removal of white spots during the contact between fish and anemone. The anemone is presumably feeding on the parasite attached to the fish! As soon as the parasites were removed the fish left the anemone and went its way. At no time did the anemones sting infected fish but woe be to the healthy one caught in its lethal tentacles. Perhaps the Clown fish is particularly susceptible to that particular parasite. On the other hand, the common sea will promptly eat any anemone placed in the same tank with it! Proof of the 'doctor' phenomena can be obtained by placing a sick fish alongside a healthy one in an anemone tank. The sick fish will fight with tooth

and tail in an effort to stay with the anemone.

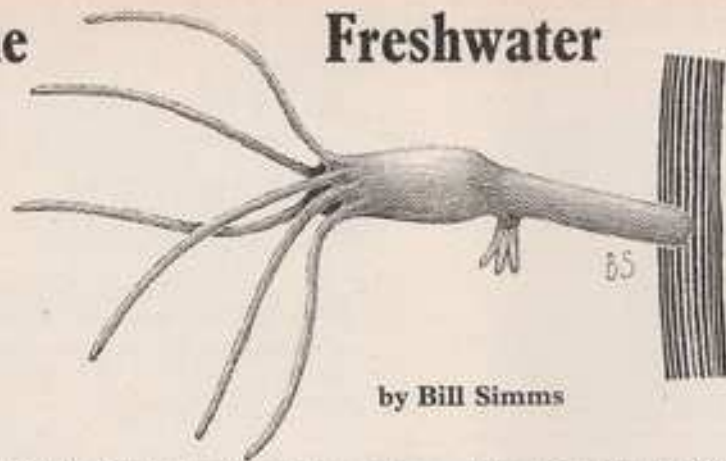
Crabs, provided they are protected by an outer shell (e.g. the hermit) and are not too large, make excellent scavengers. Their discarded inner shells should be removed immediately they are discovered for they change skins every month and these shells can soon litter the floor of the aquarium. Some shrimps can also add to the interest of a marine set-up but care should be taken that they are not eaten by the larger fish. Fan worms, with their enormous feather-duster-like appearance, look absolutely gorgeous as do numerous other saltwater creepy crawlies, but I would prefer to see all these creatures out of the community tank and in their own tank. Their impurities, which seem not to harm themselves, soon pollute the water.

So now it seems you need two tanks and, if we continue at this rate, you will no doubt soon have marine tanks all over the front room. Marines aren't so different from tropicals, are they?

Next month: *Marine fish*—Mixers; Non-mixers; number of fish per tank; feeding; types of fish; hardy specimens.

All queries regarding marine fish-keeping must be accompanied by an a.s.c. and will be answered personally and may also be answered in the column "Your questions answered".

The Freshwater Hydra



by Bill Simms

THE sight of a tiny fish struggling near a leaf or stem and apparently stuck to it in some almost invisible manner, is sufficient warning to the initiated that there is hydra in the aquarium.

To those who have not seen this nasty pest it comes as a shock to find that a tiny thread-like body, with thinner threads at its business end and only half an inch long all told, is responsible for killing many fish fry.

There are two main kinds of hydra in our waters. *Hydra viridis*, the green one; and *Hydra fusca*, the brown one. The colour of the greenish one is caused by the presence of unicellular algae in the skin, but otherwise these two live similar lives.

All hydra have both male and female organs and so are hermaphrodite. However, the male organs develop before the female in each individual, so there is no self-fertilisation. The "temporary" male ejects sperm, and these float in the water until they meet the ova in the organ of a "temporary" female. There, fertilisation of the single egg takes place.

When the egg has grown sufficiently it is released and drops to the bottom. In our ponds it lies there until the following spring, but in aquariums, where the seasons are not so distinct, it need not lie dormant so long. In spring tentacles grow around the mouth end and the young hydra is in business. Any living creature is grabbed and pushed into the hollow interior, there to be digested.

This method of reproduction is not all, however, for the hydra—if conditions warrant it—can grow a youngster out of its own side, and frequently does. The drawing shows one just beginning to sprout tentacles.

Catching and holding a passing fish or daphnia appears so easy for the hydra that its method has been studied closely. Each of the tentacles carries a number of specialised cells that can eject stinging threads or darts. These completely paralyse small creatures and weaken larger ones, thus making it easy for the hydra to hold its prey.

This stinging action will be recognised as similar to that of some jellyfish, and in fact the hydra is related to them. It is a serious pest to all small fishes.

Large fish are not easily affected and, in fact, Gouramis in tropical tanks enjoy eating the hydra. This indicates one simple way for the 'tropical' fan to rid his tanks of these pests. Some of the larger snails also browse on them but they rarely move fast enough to entirely clear a tank. Hydra should be watched for in any tank, and once seen are easily recognised.

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Berlin's Aquarium

recent acquisition as is the most poisonous of them all, the Taipan of Australia.

Berlin's Aquarium has one of the largest snakes ever kept in captivity—the twenty foot reticulated python from Sumatra with its phenomenal power of swallowing. Fed once a month with a 20 lb young pig, it crushes it to death and then swallows it whole.

The boa family from the steamy tropical forests in S. America is represented by the giant anacondas—a very long, heavy snake, and some of the smaller boa constrictors, noted for their appetite for rats. One of the Argentine boas gave birth to 45 babies in one year.

Apart from the European family of gecko lizards, there are African skinks, S. American basilisks (with their supposedly fatal gaze), giant iguanas, as well as agama lizards from Australia and the fascinating chameleons.

The world's largest lizard and the only two poisonous lizards, the Mexican bearded lizard and the gila monster from Arizona are also exhibited here.

Enthusiasts could probably work out a special party visit through Cook's. Otherwise the return fare to Berlin via British Railways and the Harwich-Hook of Holland route costs £21 11s. return (£20 16s. via Ostend). The air fare is £45 11s. return.



The Junior Aquarist

It's quicker by Shell! Female Great Diving Beetle resting on *Paludina* snail

Water beetles in the aquarium

by Cartwright Timms

EASILY the liveliest inhabitants of cold water tanks are the water beetles. They may lack the gay colours of some of the fishes, although some are attractively marked. It is also true that all beetles have a close family resemblance, the chief difference being in size. They are certainly entertaining and interesting additions to an aquarium.

The first thing to determine is whether your beetle is a predator or a vegetarian. If it feeds on the weeds, then it may be introduced quite safely into any of the tanks, for it will not harm the fish. It will certainly entertain your visitors. The predatory beetles however must be treated in a different way. Some predators will live quite happily in a tank with fishes and other creatures, always provided that they are well-fed and given plenty of space.

The acknowledged tyrant of the waters is the Great Diving Beetle (*Dytiscus marginalis*). This insect is about an inch and a quarter in length, is olive brown in colour and has a yellow margin around the wing cases. The wing cases of the male are smooth and glossy, those of the female being furrowed along their length. In the male three segments of the front feet are enlarged to form a circular sucker-like pad. This is to hold the female during mating. A powerful swimmer, equipped with strong biting jaws and encased in armour, it is not surprising that it is the terror of the pond.

This bold and greedy insect is best in a tank by itself. Here, given reasonable attention, it may live for some time, even up to two years. If a pair is kept, the male will often die in a few months. The female is more deadly than the male and cannibalism is quite frequent. The tank in which the Great Diving Beetle is kept should always be covered, for the beetle takes to the wing easily and is a strong flier. It often flies by night and if the moon is shining, it will pick

out water below. It then closes its wings and drops like a stone. This accounts for its appearance in garden ponds where it has never been previously seen. Sometimes however it is deceived by the moonlight and falls to its death on the roof of a greenhouse or on a cucumber frame.

The *Dytiscus* beetle will feed on small fish, tadpoles, tiny frogs, most insects and on worms. In the aquarium it is perhaps best fed on the "gentles" of the angler or on pieces of raw meat. Small pieces of meat may be held on thin wire and offered to the beetle. Any uneaten food should be removed without delay otherwise the water will become polluted. It is a good idea at feeding time to remove the beetle to a glass jam-jar and there give it the meat or the dead worm. Afterwards it may be returned to the tank. This removes any possibility of contamination.

When handling *Dytiscus* some care should be taken, for they are able to bite and they also emit a white evil-smelling fluid. They should be fed twice a week.

The Great Silver Beetle (*Hydrophilus piceus*) is the ideal aquarium beetle. It is one of the largest of our beetles, being about one and three-quarter inches in length. This beautiful insect is a vegetarian, feeding on weeds, and so causes no trouble to any other occupants of the tank. Because it does not have to chase living prey, it lacks the superb swimming powers of *Dytiscus*. Instead it moves slowly through the water and spends much of its time crawling among the weeds. This beetle has become rare of recent years and is now found only in the South of England. However, it has made a number of appearances at the mercury-vapour traps of the moth collectors.

Whirligig beetles, so familiar for their lively gyrations on the surface of pond and stream, are entertaining creatures in the aquarium. They are fond of company and a number are always found together. This should be remembered



Above—Male Diving Beetle above, female Silver Beetle below, showing difference in size.

when they are kept in captivity. These are creatures of the surface film, living half-way between air and water. Their eyes are divided horizontally and it is believed that this enables them to see above water as well as below the surface. They feed upon those insects that carelessly settle upon the water, but they will eat small worms, drowned gnats and pieces of raw meat. The whirligigs fly with ease and should be kept in a covered tank.

Among the smaller beetles, *Hyphidra venata* will flourish in the aquarium. This insect is less than a quarter of an inch in length and is almost spherically domed. They will not attack snails but should a snail die, they will devour the remains and use the empty shell as a hiding place. These beetles are excellent scavengers.

There are more than two hundred species of water beetles found in this country. A few are found only in fast-flowing streams, but most are inhabitants of ponds, ditches and canals. With a few exceptions, they have to rise to the surface of the water to take in air.

If you want water beetles in your aquarium, you must arm yourself with a net and go out into the countryside and get them. For preference, the net ring should be of brass or stainless steel, to avoid rusting. These trips to the ponds and canals may be made at all times of the year and there is always the excitement of wondering what will come to the surface at the next dip of the net.

When bringing water beetles home it is unnecessary to carry them in a container of water. They will travel much better in small tin boxes filled with wet pond weed. But remember to keep your captives separate, otherwise you may reach home with one triumphant *Dytiscus* and the mangled remains of all the others.

Water beetles require the same attention in the aquarium as any other inhabitants. Generally speaking, they are little trouble considering the interest they provide. Tanks containing beetles should never be exposed to direct sunlight. And remember, if you have predatory beetles it is no use introducing pond snails to remove the conspores. Pond snails are easy victims.

Primarily vegetarians Silver Beetles will scavenge; this pair are feeding on a dead garden worm (male on right)



The comet—ideal for the garden pond

by A. Boarder

THE Comet goldfish is one of the best fishes for the medium sized garden pond. It is a fast swimming fish which is almost as good for the pond as the golden eye. For a tank it is not such a good proposition as being such a stream-lined fish it requires plenty of swimming space and even a small specimen will need a tank not less than 36in. long to enable it to move about at speed. As it is quite as hardy as the common goldfish it is an ideal fish for an outdoor pond. The main difference from the goldfish is that it has a very long caudal fin or tail. The body is also much more elongated than the goldfish and all the fins are well developed and more pointed than usual in goldfish varieties.

Unfortunately, this fish has become rather scarce and during the past twenty years very few good specimens have been seen on the show bench. About the early nineteen-forties the late Arthur Derham had some very good comets which were mainly variegated, being about half silver and half gold. I tried to whip up interest in this variety some years ago but the result was disappointing. No-one seemed to have any good specimens and so it seems that this type has gone out of fashion. However, I saw a very fine specimen at the Brent (Willenden) show this year. Unfortunately it was not large enough to judge, as this fish should have a body length of three inches to be acceptable at a show. The fish in question was an ideal shape and all red in colour. I do not know how this particular fish will turn out, but with the correct treatment it should make a winner next season. One can only surmise as to how such a young fish will develop, but it is my guess that the firmage will grow well in another year or two and as the fish has practically everything else necessary I have great hopes for it.

The comet is a visibly scaled fish and no shobunkin-coloured types are acceptable. This hard scaling does tend to ensure that these fishes are hardy in any outdoor pond which can house common goldfish throughout the winter. The illustration of the comet in the 1947 standards of the Federation shows a fish with a very large caudal fin which is very broad from top to bottom. In the later standards the caudal is slightly longer and less spread.

The body depth should be less than half the length and the dorsal fin more than half the depth of the body. The caudal fin should be at least three-quarters of the length of the rest of the fish. The body should have a good equal line on the top and lower part of the fish with no humps or irregularities on the back. The dorsal fin should be well developed; in the old standards this fin was deeply indented in the upper centre but in the later standards this was evened out somewhat. The colour could be a rich red or rich chamo-yellow. A variegated type is also allowed but the colours are not defined; presumably gold, silver with some black.

The pointing for the comet under the newer standards is very unimaginative and gives no preference to the character-



istics which differentiate this fish from other varieties. Under the old standards the caudal fin could receive 30 points which, in my opinion, is as it should be. After all, this is the most important feature of the fish. There were 10 points for the dorsal fin, four for the pectorals and pelvic fins and 2 for the anal fin. The colour was awarded 10, as also was condition and deportment. Under the modern system of pointing the type and colour can get 40 points, 20 each for fins and body and 20 for condition and deportment together.

My own suggestions for pointing the comet are: Body, 20; Caudal 35; Dorsal 10; Pelvic, pectoral and anal fins 10; Colour 15; Condition 10.

It will be seen from this that the outstanding features of the comet are given more points and also it will be seen that I do not recommend points for deportment. I consider that the 10 points for condition cover this as I have yet to see a variety of goldfish which has good deportment if it is out of condition. When judging the fish the head should be included for pointing in the body. Another point I would like to make is that a fault should not be down-pointed twice. I have known judges take off points for a damaged fin and then take off more for condition. This should not be so.

The breeding of comets is no more difficult than breeding ordinary goldfish. All that is required is patience to wait until the firmage has developed properly and this could take a year or two. I know that it is difficult to obtain good specimens for breeding but one should not be too ambitious. A pair of fish showing a long caudal fin could be used as parents. It is almost certain that among the youngsters there will be a few with extra long tails. These should be kept for breeding and then as the strain develops the other

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THE AQUARIST

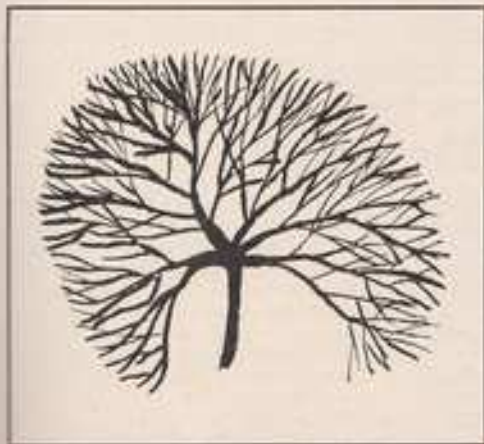
Cabomba—a tropical aquarium plant

by B. Whiteside

FOR years I have been trying to grow what I consider to be one of the most attractive tropical aquarium plants but until recently I met with no success. Having questioned other aquarists and even dealers, and having followed the rather sparse advice given in several books on tropical plants, I could not gain any practical advice on how best to grow the plant. None of my aquarist friends had had any luck with the plant either. I have seen a few display tanks in which the plant seemed to be growing well, but these tanks all appeared to have a lot of calcium carbonate in the gravel, this pointing to hard water conditions and these, according to the books, were completely unsuitable for *Cabomba*. Unfortunately, I was not able to carry out any water tests on these display aquaria which were situated in such places as theatre foyers, etc.

Having recently moved to a new house which has a soft water supply, I have at last managed to grow *Cabomba*, something which has pleased me a lot. There are about six species of *Cabomba* which are often available for use in the aquarium. The genus *Cabomba* belongs to the family Nymphaeaceae, to which also belong the water lilies.

Cabomba caroliniana is the species which I have managed to grow and the plant can reach a length of between 24 in. to 36 in., given the right conditions. In the aquarium the plant can reach the water surface and spread across it, but it can be kept within bounds by pinching out the tip to encourage branching, or by taking cuttings of the longer more mature plants. *C. caroliniana* is easily propagated from cuttings and the plant is usually sold in this form.



A length of stem about 6 in. in length should be cut across beneath a node, at its base, and the lower leaves removed. About 1 in. of the stem should be inserted into the aquarium and this should soon produce roots. As the plant gets older and settles down in the aquarium it will often produce adventitious roots from the ascending nodes. Such rooted sections of the stem may be removed and used as rooted plants.

The plant looks best when several stems are planted towards the rear half of the aquarium in a position where they will remain undisturbed but will receive a fair amount of light. Their bright green colour and attractive fine leaves contrast well with broader leaved plants such as some of the *Cryptocoryne* species with darker coloured leaves. *Cabomba* and *Cryptocoryne* both appreciate similar water conditions and the former can be planted in conjunction with the latter, providing the shade which the *Cryptocoryne*s appreciate.

In shape, *C. caroliniana* has leaves which are approximately semi-circular in shape, being about 1 in. long, by 2 in. broad. The individual leaves split at the base into five parts, each of which in turn divides and sub-divides until there are often over 140 segments, each of which is minute, and can, if light is excessive, become covered in algae. None of my plants has, as yet, flowered but this species produces yellow centred white flowers which are accompanied by narrow floating leaves. These floating leaves are completely unlike the normal under-water leaves.

Plants of *Cabomba caroliniana* which I have managed to grow have thrived under the following conditions, in calcium carbonate-free gravel:—water temperature 76°F, pH 7.2 and hardness level 4½ DH. The plants receive 8 hours of illumination per day, at the rate of 30 watts (tungsten bulbs) per square foot surface area of water at 12 in. deep. An undergravel filter is in use and no form of artificial feeding is supplied.

Plants cost between 1s. and 2s. 6d. each, but should only be purchased if you can supply the soft water necessary for their growth. They soon fade away in hard water, but given suitable conditions are fast growers and are, I think, one of the nicest plants for the tropical aquarium.

WANTED: CLUB MEMBERS

Aquarists in the Maidstone, Kent area are invited to attend the monthly meetings of the newly-formed "Pisces" club. All enquiries to Mr. H. A. Gayleard, 10 Trent House, Westmoreland Road, Maidstone, Kent.

Water mint

by B. Fry



THE mints (*Mentha*) are plants well-known for their rapid growth and scent. This is overpowering and sickly in some species and pleasantly refreshing in others. Indeed, the painstaking and adventurous cook would be lost without a speig or two of ordinary garden mint (*M. viridis*) to dress up a roast leg of lamb or impart a delicious flavour and aroma to certain vegetables and preserves. It is to be remarked, too, that various mints are used by distillers of choice liquours and perfumes to give their products a distinctive fragrance and/or taste. But this is all by the way.

Water mint (*M. aquatica*), which is widespread in Britain, is found in the wild in ditch bottoms, boggy depressions on commons, and along the margins of rivers, lakes and streams. Although it is not absent from shady places it gives of its best only in full sun.

The serrated-edged leaves are pointed oval in shape, pale green or greyish green above and purplish below. They grow in pairs up the stout stems that arise, sometimes to a height of about two feet, from a running—and running is hardly an understatement—rootstock. Both stems and leaves are covered with a nap of silky hairs.

From the end of July to the beginning of September water mint bears globose heads of tiny, lilac flowers. These are produced at the top of the stems and in the axils of the last few terminal leaves. The flowers, like all other parts of the plant are strongly perfumed with a rather heady scent.

For its aromatic qualities alone water mint is worth a place in or by a garden pond. It needs nothing special in

the way of a growing medium but grows lushest in a rich loam. It is advisable to keep its roots within bounds by confining them in a deep pan or pot. If you neglect to take this piece of advice and plant water mint direct into a pond above or just below the water line it will soon smother all other marginal vegetation.

Water mint may also be used to add attraction—olfactory and visual—to a brightly lighted coldwater aquarium. But a word of advice. With the approach of autumn it is best to remove the mint—now past its prime—from the tank and overwinter it under a few inches of soil outside.

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The comet

features can be attended to. Colour is one of the least important features in the early stages of building up a strain. The caudal and body shape are the most vital and given these it will then be possible to improve the necessary shapes of other fins if necessary.

Although it may be difficult to sort out the best fishes when they are quite small, it is possible to place some of the best in a tank and examine them for long caudals and a slim body. Even at an early age it is possible to cull out many which are not likely to make the grade. These should be got rid of as they will only be taking up space and food which would be better used for the likely specimens.

The ingenious water spider

by Brenda Barnes



WE are so often concerned with life-forms which began in water and developed through evolutionary stages to a terrestrial form, that it comes as a surprise when we meet with a creature which has reversed the process. Such a one is the water spider (*Argyroneta aquatica*), the only member of the immensely large order of Araneae (spiders) which has adapted itself in this way. Very little seasonal alteration has been necessary to facilitate this change of environment. Breathing by means of lungs and an internal tracheae system like other spiders, it aquatic has to rely upon a system of oxygen storage in common with a variety of aquatic insects. Its method of achieving this, however, is unique as well as fascinating.

A thick growth of hairs cloaks the underside of the abdomen and the legs and these hairs accomplish the task of trapping air when the spider is submerged. The supply of oxygen thus generated by a visit to the water surface to make contact with the atmosphere would be insufficient for anything but a comparatively short duration of submersion so a further innovation has been adopted to ensure longer sojourns under water.

Being equipped itself with an initial air supply, the water spider descends like a diver among the foliage of submerged plants and commences to spin a web between two closely growing stems. Unlike the web of the familiar geometric spider of our gardens, this one is closely spun and contained in a horizontal plane. When completed the spider makes the first of many journeys to the surface where, protruding its abdomen through the meniscus, it traps air among its abdominal hairs and those covering its hind legs. It then descends with its air-bubble booty and creeps under the web platform releasing the cargo of air which is neatly

retained by the web. Successive journeys and an increasing supply of air beneath the web eventually result in an upward pressure being exerted upon the platform which at length becomes domed-shaped and of the size of a marble.

The spider is now able to enter this oxygen chamber from the underside and to remain there for long periods. Small creatures such as cyclops, daphnia and gnat-larvae are stalked by the spider and taken into the chamber to be consumed at leisure.

The sexes build separate air-chambers although they share the female's abode for mating purposes. She lays her eggs in the "loft" of her chamber and constructs a partition which seals them off from her quarters. When the young hatch these tiny replicas of their parents chew their way through the partition and out of their incubator to go their separate ways and to build their own little air-bells.

Widely distributed, the water spider is found in the relatively still waters of ditches, dykes and ponds. Easily housed for observation over a period, it can be kept in a small vessel such as a jam-jar and its needs are simple—one or two stems of plant such as *Asacharis* and a few water-fleas. A fitting lid of perforated zinc to preclude any terrestrial excursions completes the apparatus.

A feature common to many species of spiders concerns the larger size of the female which frequently eats her spouse after mating. In this respect the water spider again chooses to be different and the male is approximately one-and-a-half times the length of his mate and, doubtless, is able to discourage any cannibalistic designs she might entertain regarding his person.

The green toad

by Jack Hems

Bufo viridis, popularly called the green toad, or the changeable toad, ranges in the wild state over most of Europe (excepting the British Isles, France and Spain), North Africa and temperate Asia as far as the land of the Mongols. It is an inhabitant of dryish rather than wetish places but seldom strays far from easily accessible water in which it likes to bathe. This it does quite frequently during warm, dry weather.

The female attains a length of about 3½ in. and is the larger and handsomer of the two sexes. Her colours are a jumbled pattern of green and grey, or olive, or pinkish beige. The green, sometimes light and sometimes dark, is distributed over the flattened warty back and sides in irregular-sized blotches and spots. The smoother underparts are milky to creamy white.

Races of *B. viridis* occur in which the body is well marked with reddish brown and yellow as well as green. In both sexes the large eyes have lustrous jet pupils set in rims of greeny gold. The male inclines to a more uniform yellowish to olive coloration. It is to be remarked, however, that any change in the weather affecting the environment of this toad will be reflected by a darkening or a lightening of its coloration.

When removed from its natural haunts the green toad often develops an indifference to food. Fortunately for the vivarium keeper, this partial, or total, annihilation of the appetite is usually of short duration provided a wide variety of live food, from tender young gentles (anglers' maggots) to woodlice is offered daily.

Because a happy green toad is by nature a roamer and an ardent hunter—hopping, crawling, scrabbling and running after its prey—at dusk and after, it needs sufficient room to move about in comfort.

The ideal home for a green toad in captivity is an outdoor enclosure (*B. viridis* is perfectly hardy and will come through the English winter safely if it can get well down away from cold under a pile of masonry erected on top of a well-drained mound of dried leaves and gritty soil), but a vivarium with a floor measurement of, say, 24 in. long by 12 in. wide will make a comfortable home for a pair and a pair of common toads or natterjack toads, for extra company.

Nothing special in the way of furnishing is required but essential needs are a 3 in. deep layer of sandy soil mixed with some pea gravel on the bottom, a retiring place under a piece of bark or stone, and a dish of water—never allowed to dry out—for bathing.

A position near a window, but out of the way (except, perhaps, for one corner) of

direct sunlight is satisfactory. (A light bright enough to grow a potted fern or ivy, which might indeed be included in the set up, is about right). And one more point. As the green toad is an accomplished, and at times, persistent climber it is important to ensure that its vivarium is properly covered. A sheet of glass raised slightly off the top serves its purpose very well. But a better idea is to equip one half of a lipped wooden frame (to rest on the top of the vivarium) with glass or transparent plastic sheeting (to maintain the right sort of micro-climate) and the other half with mesh screen. A hole, closed by a bung, may be cut in the screen to allow for the introduction of winged livefood.

Pairing takes place soon after the green toad comes out of hibernation; that is to say, sometime in March or April. A large female may deposit upwards of ten thousand eggs in gelatinous strings which are draped intentionally, or unintentionally, around submerged vegetation or debris. The eggs incubate within a few days and the tadpoles metamorphose in about three months. A baby *B. viridis* is muddy coloured above and pale below. It feeds on the tiniest of insects. It does not make much growth in the first season of toadhood but lengthens and grows podgier in the second year. In the third or fourth year the green toad is ready to breed.



THE AQUARIST

The oranda—a fancy goldfish

by A. Boarder

THE oranda is one of the most highly developed of the fancy goldfish. It is very handsome and is the type of fish for the specialist breeder to try his skill and patience. It is difficult to believe that this fish has been bred from the ordinary common goldfish over many years. It is said to have originated in Japan and many quite good specimens find their way here today through Hong Kong. The outstanding characteristic of this fish is the head which has a large protuberance like a raspberry. This is usually known as the hood and should cover the head and the gill plates. The hood can be likened to that of a bison and the larger the hood the better is the fish. Many otherwise good specimens are spoilt for exhibition by the fact that the hood does not come down far enough and finishes about half way down the gill plates.

The general shape of the oranda is as that for the Veiltail. The body should be as near a sphere as possible with a good curve over the back with no broken line or sign of hump or snoutiness. The lower curve of the body should coincide and a good short plump body is preferred. The caudal fin or tail must be well developed and be large and flowing. It must be completely divided and fall in graceful folds. The base of the caudal fin should be as straight as possible but many of the specimens seen today have a distinctly forked tail. This will lose points at a show but as the standards of the Federation of British Aquatic Societies are not compiled with in the East it will be necessary for breeders to so choose their breeders as to improve the shape of the base of the tail in time. This will, of course take time and this is where much patience is required. It is also true that the hood does not form on very young fishes and so it may be necessary to keep young fishes for two or three years before it is possible to decide whether a fish is worth keeping or not.

The dorsal fin should be well developed and held well erect. It should curve gradually back at the front and have a good curve at the back. The anal fins must be divided and well developed, being rather long and pointed.

The pectoral and pelvic fins should also be rather long and pointed. The colour can be a rich warm red or a combination of colours. A shubunkin type is allowed but I have never seen a good shubunkin coloured Oranda. Whether such specimens exist I do not know but it is possible that the special development of the formation of the hood means



Photo by Hilmar Hansen

that a scaled fish is the only one likely to have this feature. The hood appears to be formed by cells which have gone wrong and this malformation seems to result in the presence of small spots of mucus forming on parts of the hood. I have known some aquarists suspect that the fish has a touch of fungus when such white is seen, but this is not necessarily so. I think that owing to the malformation of the cells on the head an excess excretion of mucus appears.

The Oranda appears to be fairly hardy and could be left in the garden pond for the winter. However, in the Midlands and the North of England and Scotland, it would be safer to bring such fishes indoors or under cover from severe frosts. The reason for this is that the large and rather flowing finnage is liable to fin-rot and congestion during very cold weather. Also it appears that the Orandas imported into this country lately have been reared under warm conditions and it has been found that the best way to get these fishes acclimatised is to give them a temperature of about 60°F., for a time, and then to gradually bring it down to the normal summer temperatures. It would be dangerous to buy a freshly imported fish and put it straight into a temperature of less than 40°F.

To breed these fishes it is important to get the best types possible and then to breed from those with the best de-

Continued on page 272 ▶

Nothobranchius rachovi

by Jack Hems

TO the tropical aquarist the expression annual fish signifies an oviparous cyprinodont that lives no longer than eight months to a year. This is explained by the fact that the wayside ditches and pools in which annual fishes naturally occur dwindle right away during the dry season. Yet before the fishes perish in the shrivelling heat, they deposit drought-resistant eggs in the sludge where they remain until the coming of the rains. The eggs then hatch in the refilled ditches and pools and the fry, rapid in their growth, spawn before the dry weather sets in. Thus the continuation of a species of annual fish in a particular locality is assured.

Nothobranchius rachovi is a breathtakingly handsome annual fish from East Africa south of the equator. It attains a length of about 1½ in. and, though known to tropical aquarists since the middle of the 1920s, is a species one sees only occasionally. Its main requirements in captivity are a shaded aquarium (as *N. rachovi* should be kept only among its own kind an 18 in. by 12 in. by 12 in. tank will make a fine home for a male and two females) filled with soft acid water over a peaty floor, live food such as white-worms, gnat larvae, daphnia, and the like, and a temperature in the neighbourhood of 75°F (24°C). Among the plants most suited to growing in a subdued light are *Nitella flexilis*, *Vesicularia dubyana*, *Sagittaria subulata*, and the various cryptocorynes.

The general colour of the male is a brilliant shade of green-blue, sparkling here and there with gold lights, overlaid with wine- to fire-red spots and oblique bars. The belly is yellowish tinged with pink. The well-proportioned dorsal and anal fins are blue streaked and dotted with red. The rounded caudal fin is blue and red in the base, yellow in the centre and red-brown posteriorly. The ventral fins are red; the pectoral fins are blue shading to yellow. The female seldom grows so large as the male and is of a washed-out pink to yellowish colour.

If an attempt is made to breed this species (one of the trickiest of the annual fishes to propagate) more than one small tank is required. Boiled peat moss should be spread over the floor of each tank to a depth of about 1 in. After the sexes have been placed together (the female should be segregated for a while) the temperature should be raised to about 80°F (26°C).

There is no mistaking a pair of *N. rachovi* in breeding condition because the female develops fuller sides and the male intensifies his colours. And nearly always there is a lot of chasing and displaying on the part of the male. In due course the fish take up a side-by-side position on the bottom. Then, with the dorsal fin of the excited male curving over her back, the female lays some eggs in the peat. This operation is repeated at frequent or protracted intervals. When the female is spawned out she should be removed to another tank. It is a good plan to keep her by herself for a fortnight or so. Then, rested and well-fed, she should be ready for another mating with the same male, or another male, in another prepared tank.

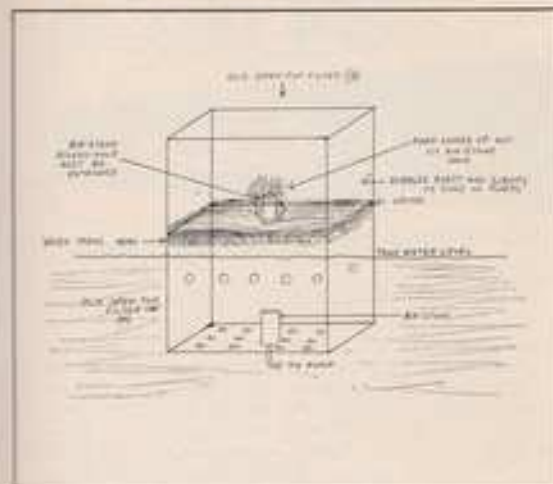
But to return to the eggs. The water covering them should be siphoned away. Then the tank itself should be put in store at a temperature of about 72°F (22°C) to 75°F (24°C) for a period of from three to five months, after which soft acid water (at about storing temperature) should be run in. Some breeders prefer to provide a tray of peat for this fish to spawn in. Alternatively, eggs deposited in a tank may be transferred in their drip-dried



Photo by A. Van Der Meer-Hoek

Waste fluids in the tropical aquarium

by T. Ravensdale



ON the British Market today we have numerous filters, cleaners, rejectors, power units etc., all capable of, and designed for, removing debris from the aquarium. Most aquarists go to great trouble not to overfeed, spend hours removing fish droppings, corpses and dead plants and spend a great deal of time and money on expensive filtering equipment all designed to help keep a tank clean and healthy. In fact, unless we are prepared to take out all these unwanted matters, troubles will result. Unfortunately, however, even though our tanks may be kept scrupulously clean, we still get our troubles so there must be something missing from our "house cleaning." We remove (or should remove) all waste solids—but what about the liquids?

More waste fluids are passed through a digestive system (especially one designed to operate under water) than solids, so what happens to them? They stay there until we change the water, they are not removed by evaporation for only pure distilled water is removed thus. Therefore, with the removal of pure water by evaporation and the topping up of clean water by hand, the urine content of the aquarium must get stronger and stronger until we change the water completely.

So, one might enquire, why don't we do something about it? The answer is probably that what the eye doesn't see—but even this is not quite true, waste fluids can be seen in most aquariums. Tank water when compared with tap

water is quite yellow—a sheet of white paper at the back of the tank will show you just how yellow your water is! This discoloration is not only unsightly, it is unwanted as it would not have been passed out of the fishes' system at all.

It is an established fact that aquatic life produces a quantity of fluid several times greater than solid matter and, as we go to great lengths to remove the latter it seems well worth a little time spent in order to rid the aquarium of unwanted fluids. As there are no commercial gadgets available yet, we must make our own "urine remover" and to do this we must first understand the basic principles of fluid separation.

Without being too technical one knows that water is a very hard fluid and this makes our job a lot easier. Take a bucket of tap water and stir vigorously; for a while nothing happens but for a few bubbles on the surface. Soften this water with a chemical and a repeat of this process will result in a dense foam on the surface of the water. If this foam is skimmed off at intervals the agent causing the water softness will be removed leaving the water quite hard again. Urine is extremely soft and will foam readily. Mixed with water and given the "soft" treatment it can be removed or separated quite easily by quick cooling which turns the foam back into liquid. A simple device for the removal of urine from an aquarium can be made from a couple of old corner filters in the following way:

Two old open top corner filters with air stone holes in the bottom are required and the upper filter (b) will need an extension fitted to the air stone access hole; an air stone and tubing completes the necessary equipment.

Filter (a) should be fixed to the inside of the tank leaving approx. 1 in. above the water level. The air stone should be adjusted to give its maximum output. Violent air bubbles agitate the water sucked in through the holes which should be drilled in the bottom. This causes foam to collect in the top 1 in. of filter (a). This foam is then forced up through the air stone access hole (which should have 2 in. of tubing attached to it) into the upper filter (b). As this filter is out of water it is slightly cooler. This temperature change, although slight, is sufficient to convert the foam into a dark green or strong yellow fluid. This fluid can be emptied by lifting off filter (b) and pouring away without disturbing the tank in any way.

When the aquarium water eventually turns white this foam disappears until it is necessary to lift the filter (a) up to within 1/8 inch of the water level. The result is a nice clean healthy looking tank and thus happier fish. One last thing—do not use your urine remover with fry, they are not amused when projected into the foam.

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

Ceratopteris thalictroides

I WOULD like to thank Mr. J. E. Howat ("Our Readers Write", Dec. issue) for pointing out the errors in an article which I wrote in a previous issue, on *Ceratopteris thalictroides*.

I must admit to having failed to check my facts, having been misled by the species name *thalictroides*, into placing the plant incorrectly in the division *Thallophyta* instead of in the division *Pteridophyta* where, as a fern, it correctly belongs. Concerning Mr. Howat's other point about plants being placed in a certain "Division", and not in a "Phylum" as I said, I would like to mention that at a recent lecture by a well qualified and experienced botanist which I attended, the lecturer said that the word "Phylum" was interchangeable with the word "Division" when applied to plants. As classifications are prone to change, especially in America, I have been able to confirm the use of phylum as applied to plants—(see "Botany", by Robbins, Weiser and Stocking).

It's much more pleasant to have one's errors pointed out and corrected in the understanding and unpretentious way in which Mr. Howat corrected mine (and I mean that sincerely) than it is to have one's writing torn to pieces in a sarcastic and caustic manner. Having made several errors in the first article which I wrote for *The Aquarist*, several years ago, I was "shot down" in no uncertain sarcastic manner by a certain gentleman's letter in this column. As an amateur writer, it is easy to make the odd mistake, and as a beginner, one can rather easily be put off writing for good by one caustic letter. One regrets making mistakes in one's writing, either through ignorance or by chance, and such errors certainly deserve to be corrected. To be corrected in a pleasant manner is certainly much less damaging to one's ego than to be humiliated by hurtful comments which are incurred by errors in perhaps one article out of many.

In reply to Mr. D. R. Hubble's letter (same issue), I would like to state that like him, I have also grown aquatic and garden plants of *Lobelia cardinalis*. I would agree that the plants differ considerably in looks but having consulted a number of reference books, the only distinction

in name that I can find (and this in only one book) is that the aquatic plant is known as *Lobelia cardinalis* var. *cardinalis*. Also like Mr. Hubble, I have grown the "water rose"—under a variety of conditions—but having met with no success I would be pleased if Mr. Hubble could let me know under which conditions he grows his plants.

B. WITTENBERG, A.C.P.,
"Wilsons", 30 Upper Cavenant Road,
Larne, Co. Antrim, N. Ireland.

Know your Show Mr. Open

NOT only have you got the wrong name, Mr. Open, you also have the wrong show. At the Kingston open show a F.B.A.S. championship class plaque was the award for the best egg-laying toothcarp, not an F.B.A.S. diploma. Also, the best fish of the class was an *F. grandis*, not *F. heterochilus* or *F. chrysomus*.

The F.B.A.S. diploma was, in fact, awarded for a very fine toothcarp at the Catford open show, the fish being *A. c. whitii* owned by Messrs. F. and K. Payne. This diploma was presented to the Payne brothers at the Birmingham show on behalf of the F.B.A.S. council by myself. An F.B.A.S. diploma cannot be nominated before or at a show. To win a diploma at least three F.B.A.S. "A" class judges, at the show, must agree to a fish being nominated to the F.B.A.S. council for a diploma. The B.K.A. did have a display at both shows and members available to identify any kills if asked.

I will agree with you that judges will have to keep up-to-date fishwise or not judge these or other fish, but the owners who go showing should keep up-to-date with fish names and not leave it to the show secretary and the judges to name a fish they may not have seen one of before.

A judge may judge a fish to the name on the sheet and if it is wrong then all hell is let loose. The most important thing so many people do forget is that judges are only amateurs and mostly judge for the love of the hobby.

An exhibitor can enter a fish under a wrong name and nothing is said to him.

When there is time to spare (not very often on one day

Perhaps these observations might be of some use to other organizers, in particular the question of pressure depending, without the host society appearing or wishing to be too officious.

K. J. HARVEY,
Show Secretary.

Assistance required

I HAVE recently acquired a cine camera and have tried to film my tropical fish. The result, however, has not been satisfactory as the lighting appears to be wrong. My equipment consists of an 8 mm. standard camera with a close-up lens, lighting by two 575 w. Photobooks, film used, Graflexpool 40 ASA.

I would be grateful for any information you can give me in this connection.

Yours faithfully,
STEWART WYLLIE,
79 Woodford Street,
Glasgow, S.1.

Brine Shrimp

A SIMPLE solution to the small-scale enthusiast's problem of hatching brine shrimp. Certain boxes of chocolate now contain a peculiar shaped one-piece moulded plastic tray. Due to their peculiar construction they are self buoyant, even when quite full of liquid. I recommend the size obtainable from the half-pound boxes; simply float on top of tank, add prepared brine and sprinkle the eggs. I have achieved my best-ever hatchings using this method. One word of warning, this reduces your water/air area by the size of the container used.

Yours faithfully,
S. MARTIN.

More about pH

H. J. VOSPER (*The Aquarist*, January, 1967) quite rightly refers to the "potential Hydrogen" theory regarding pH. In "Exotic Tropical Fishes" Dr. C. W. Lennert states that pH represents the logarithm of the concentration of hydrogen ions per litre of water.

"Introductory Chemistry" by Dr. Julian H. Meyer, Head of Dept. of Chemistry at Western Michigan University, states—"The letters pH stand for the -power of the hydrogen ion concentration. The power of a number is its exponent. In using pH, the negative sign is dropped. pH is then, the power of the hydrogen ion expressed as a positive number." Dr. Meyer continues to explain that mathematically $pH = \log \frac{[H^+]}{1}$. He expressed as moles per litre. A mole is 1 gram molecular weight.

For each increase in the pH of one, there is a tenfold decrease in the hydrogen ion concentration. A pH of 3

shows), the show secretary will do the rounds to check the names of the fish.

So before running down the judges let's make sure we know the names of the fish.

Yours sincerely,
D. W. ELLIS,
Chairman, K.D.A.S.

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J. EDWARDS,
Hon. Show Secretary, M.A.P.S.

Stone Aquarist Society—Open Table Show 1967

IT has been decided to hold our 3rd O.T.S. rather next year, namely Sunday, June 18th.

We had endeavored to establish a permanent date (mid-October each year) but found that, whilst attendance and entries were excellent, the day was so short that people were more than anxious to get away quickly in order to avoid fog and other morning hazards that are frequent at that time of the year.

This created problems of debenturing; those that had not won any awards saw no reason why they couldn't take their fish and leave, which in turn had a somewhat effect on other exhibitors. This, notwithstanding a fixed debenturing opportunity for the children to play outside (a recreation ground is next door) will take some of the pressure off the Show Committee and enable a fuller programme to be presented without cramping the long-distance exhibitors, own arrangements.

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Hon. Show Secretary, M.A.P.S.

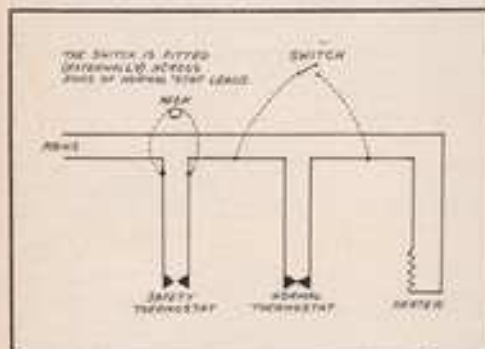
represents a hydrogen ion concentration of 10^{-4} or 0.001 mole per litre, while a pH of 4 represents 10^{-4} or 0.0001 mole per litre.

I feel sure Mr. Voepel is correct in his assumption regarding the misprint over Hydrogen and Hydroxyl ions.

Yours sincerely,
Tom Wayles,
Merseyside News Editor.

Safety Thermostat Circuit

IN reference to your article, by Joshua Allen (*Aquarist*, December, 1966) concerning the safety thermostat circuit:



After losing a tank-full of fish through overheating, I have been using this circuit (plus one switch) for the last two years and I wondered if this switch (see diagram enclosed) is worth a mention in your Magazine, as I have found it a great advantage. If the safety thermostat is set at approximately 8 deg. above normal this switch can be used for a number of different reasons:

1. To combat White Spot (a common complaint in most tanks); if the switch is closed the water will rise to the required temperature without all the usual fiddling about with adjusting screws. With Methylene Blue added, White Spot will disappear in a week.

2. In a large community tank with a number of fishes of the same species, the extra heat can be used to pair off and bring into breeding condition.

3. If for some reason the normal thermostat fails to close and the temperature drops (noted on the thermometer) the switch can be closed bridging it out until a new thermostat can be fitted. Aerators must be kept on while temperature is high. The White Spot cure alone is well worth the trouble taken in fitting this switch. The original safety circuit still operates, of course, exactly the same as before with the switch opened.

Hoping this will help fellow Aquarists.

Yours faithfully,
E. A. HODGKINS,
Wolverhampton.

Know Your Fish

IN reply to Mr. John Open's letter "Know Your Fish" (*The Aquarist*, January 1967), I should like to say that

neither his facts nor his assumptions are correct.

1. The award was the F.B.A.S. Trophy not Diploma, a completely different award altogether.
2. He hasn't even offered me the courtesy of getting my initials correct. (This could have been checked either with the Show Secretary or with F.B.A.S. Publications).
3. The fish in question was a *Fundulus heteroclitus*, not as Mr. Open states a *F. heteroclinus*, he also says without any qualification or authority that it reaches a size of 6 in. Exotic Tropical Fishes Plate 284.00 states 4½ in. Serbia Page 541 states 12 cm. or 4.724 in.

Mr. Open also assumes that I don't know the difference between *F. chrysatus* and *F. heteroclinus*, how naive can he be; if judges were to believe every fishes name that was put in front of them on the show bench they would be in a mess; no Mr. Open, that fish was judged for what it was, a *F. heteroclinus*.

I see that Mr. Open does not take me to task for placing the fish in question first, and incidently I understand that the same fish was first of 18 fish in the Egg-laying Tooth Carp Class at Hackney Open Show, entered under its correct name, and judged by another F.B.A.S. "A" Class judge; pretty consistent judging don't you think Mr. Open?

Also I was at the Kingston Show until after breaking down. This is my normal practice where possible so as to answer any questions, and to meet my friends and fellow aquarists.

It also occurred to me that there are better ways of advertising the B.K.A. than making a personal attack on myself, or do I detect sour grapes somewhere Mr. Open?

Finally I would give this advice to Mr. John Open, that it is wiser to speak quietly to the person concerned, and not to flaunt ignorance in public, just in case he happens to be wrong.

Yours faithfully,
C. A. T. BROWN,
F.B.A.S. Judge.

The Proper Channels

WE would like to point out to Mr. Open that there is a procedure for settling any dispute that may arise with F.B.A.S. judges on the show bench.

1. Speak to the judge about your query. He may have a satisfactory answer. Mr. C. A. T. Brown was at the Kingston A.S. Open Show for a considerable time after judging had finished.

2. If the judge is no longer available, raise the matter with the Show organizers.

3. If you are not satisfied after making either of the above inquiries, write to the F.B.A.S. Judges and Standards Committee, who will make a thorough investigation of the complaint.

Yours sincerely,
A. G. JESSOP,
Chairman,
F.B.A.S. Judges and
Standards Committee.

Aquaria and zoo guide

CHESHIRE

North of England Zoological Society, Zoological Gardens, Upton-by-Chester, Cheshire. Admission charge—no Gardens; Adults, 4s.; children under 14, 2s.; to Aquarium, 6d. Open daily throughout the year from 9 a.m. to dusk. Party terms (parties of 25 and over): Adults, 2s. 6d.; children under 16, 1s. 3d. Aquarium admission 6d. No reductions for parties. Description: Mainly tropical freshwater fish. 178 species of fish. Collection of fish, 2,400. Improvements have been made to the marine section and it is hoped that new stocks will be arriving soon. Some interesting reptiles have been added to the freshwater collection including *Crotomys*, *Bufo*, *Lobachia*, *H. Madras*, *Basilus*, *Cnemidophorus*, *B. Faintensis* and *B. Sordidus*.

DERBYSHIRE

Peele's Gardens—Zoological and Botanical Gardens (including an Aquarium), Ashover, Chesterfield, Derbyshire. Admission charge—Adults, 2s. 6d.; children, 1s. 3d. Open 11 a.m. to dusk every day of the year. Description: The aquarium section of the Zoo comprises 12 tanks and a floor pool, and includes coldwater, tropical and marine sections. We endeavour to exhibit rarities, such as axolotls, dwarf frogs, piranhas, paradise fish, dragon fish, sea horses etc., rather than the more common species.

DEVON

Exmouth Aquarium, Sea Front, Exmouth, Devon. Admission charge—Adults, 1s. 6d.; children, 6d. Open 10 a.m. to dusk every day, May to September; week-end during winter. Party terms on application. Description: 30 tanks ranging from 24 by 12 by 12 in. to 17 by 7 by 10 ft., housing our giant turtle measuring 5 ft. long by 3 ft. 6 in. sea horses, local fish, also tropical and coldwater exhibits. Seawater is pumped up from the sea through a 100-ft. long pipe. Aquarium's deep adjoining.

Paignton Zoological and Botanical Gardens, Paignton, Devon. Admission to Zoo, 7s.; Aquarium, 6d. Open daily at 10 a.m. Party terms: Reduced rates for parties over 30 into Zoo. Description: Tropical plant house, reptile house and aquarium. 37 fish tanks showing 339 fish of 43 species, 7 terrapin tanks and 25 reptile cages 174 reptiles of 62 species. Expected soon: *Limacina crocodina*, soft-shelled turtle, and mangrove mud. Most important exhibits: *Mastomys* terrapin, 30 ft. reticulated python, electric eel.

Paignton Seashore Aquarium, Paignton Harbour, Paignton, Devon. Admission charge—Adults, 1s. 6d.; children, 6d. Open every day including Sundays, 10 a.m. to 10 p.m. Party terms: Organized parties 6d. per head. Description: Each aquarium tank illustrated by models and information to explain facets of the living crustacea. Large number of educational exhibits explaining local seashore life. All specimens are from immediate local waters. Filming studio on premises where television (B.B.C. "Look" series) films are made about marine life.

Telgoum Aquatorium, The Docks, Telgoum, Devon. Admission charge—Adults, 1s.; children, 6d. Open every day including Sundays, 10 a.m. to 10 p.m. Party terms: Organized parties 6d. per head. Description: Each aquarium tank contains local seashore life. A large number of educational exhibits explain local marine life with special display among others.

Marine Biological Association of the United Kingdom, Citadel Hill, Plymouth, Devon. Admission charge—Adults, 1s.; children 6d. Open weekdays 10 a.m. to 6 p.m. (May to September to 8 p.m.). Party terms: Reduced rates by prior arrangement by letter to the Director. Description: Local marine fishes and invertebrates displayed exceptionally well in an aquarium of modern design. Seventeen tanks, largest approx. 36 ft. x 9 ft. x 5 ft.—42 ft. deep; smallest approx. 1 ft. x 9 in. x 15 in. x 18.

EDINBURGH

The Carnegie Aquarium, The Royal Zoological Society of Scotland, Scotland, National Zoological Park, Murrefield, Edinburgh, 12. Admission charge—Adults, 6d.; children, 3d. Open every day of the year. Summer 1) 9 a.m. to 6.45 p.m. Winter 1) 11 a.m. to 5 p.m. Party terms: none, except for Edinburgh Corporation Schools. Description: Consists of three large halls. Tank devoted to marine exhibits including green and hawk-billed turtles, orange sea, lobsters and crabs etc., and many sea fish. Freshwater specimens include electric eels, lung fish, giant salamander, giant earthworm. Large variety of brilliantly coloured fish, both coldwater and tropical.

ISLE OF MAN

Marine Biological Station (University of Liverpool), Port Erin, Isle of Man. Admission charge—Adults, 1s.; children under 14, 6d. Open Monday to Saturday, 10 a.m. to 5 p.m. all year. Party terms: Organized educational parties admitted free if prior notice given. Description: Marine, 6 large and 10 smaller tanks. Good display of sea fish and invertebrates. Floor raising.

LANCASHIRE

The Tower Aquarium, Tower Main Buildings, Blackpool. Admission charge—Adults, 8s.; children, 1s. 6d. This includes general admission which includes Tower Ballroom, Zoo, Aviaries and Ocean Room Cabaret. Open 9 a.m. to 10.30 p.m. Sunday to Saturday. Description: Aquarium founded in 1874. Consists of a central block of twelve large tanks with 58 smaller tanks on the upper walls. The total collection is 348 species of fish and 24 species of invertebrates. Latest addition, Chinese grass carp (*Ctenopharyngodon idella*), *Clarias* (*Clarias asotum*). Aquarium speciality: British marine fish.

Marine Land, Stone Jetty, Morecambe, Lancashire. Admission charge—Adults, 4s.; children, 2s. Open daily from 10 a.m. Party terms: Parties of 20 or more, 3s. and 1s. 6d. Description: Europe's first (Amenities) also wide selection of marine and freshwater tropicals. Local fish and coldwater fish, seals, sea lions, porpoises, dolphins, turtles and dolphins. Sea shows daily at 11.15 a.m., 2.15 p.m. and 4.15 p.m. with performing shows, sea lions and dolphins. Newly arrived: "Clipper," star dolphin performer from New York's World Fair.

Belle Vue Zoo Park Aquarium and Reptile, Manchester, 12. Admission charge—Adults, 1s.; children, 6d. Open daily 10 a.m. to 6.30 p.m. General admission to Park: 3s.; children, 1s. 6d. Party rates (25 or more): Adults, 2s.; children, 1s. 3d. Admission to Aquarium and Reptile: Adults, 1s.; children, 6d. Description: Three beds of tanks ranging from 25 to 1,500 gallons exhibit familiar favourites of the tropical freshwater world, fishes of the coral seas and specimens from our own coastal waters, rivers and lakes. Continuing through the Reptile, a wide range of snakes, lizards, terrapins, monitors and the now world-famous breeding alligators may be viewed.

LONDON

The Aquarium of the Zoological Society of London, The London Zoo, Regent's Park, London, N.W.1. Admission charge—Adults, 2s.; children, 1s. Open throughout the year (except Christmas Day) from 10 a.m. to 4.45 minutes before closing time of main Zoo at dusk or 9 p.m., whichever is earlier. From Good Friday to September, last admission to Aquarium is 7.15 p.m., closing time 7.45 p.m. Description: Marine and freshwater: 100 tanks ranging in length from 12 inches to 30 feet. Marine Hall with fish and invertebrates from tropical and temperate waters. Tropical Hall with many primitive freshwater fish and an otocoptera over 5 feet long. Temperate Freshwater Hall with representative collection of European and other fish; also aquatic amphibians.

SURREY

Chessington Zoo Ltd., Leatherhead Road, Chessington, Surrey. Admission charge—6d., adults and children. Open week-ends in March. Easter to 31st October, 10.30 a.m. to 5.30 p.m. early season, 8.30 p.m. full season. Party terms: 3d. each adult and children for parties of 30 or more. Description: Chessington's Aquarium, although small, has a varied collection of coldwater and tropical fish (500 in 10 species) kept in 26 tanks varying in size 24 by 12 by 18 in. to 66 by 12 by 24 in. Amphibians and reptiles are also on display as at the moment there is no separate Reptile House.

SUSSEX

Brighton Aquarium, Marine Parade and Madeira Drive, Brighton, Sussex. Admission charge—Adults, 2s.; children, 1s. Open every day of the year 9 a.m. to dusk; Christmas Day 9 a.m. to 1 p.m. Party terms: Adults, 1s.; children, 6d. Description: 12 freshwater tanks, two large capacity, containing carp, orfe and bream; 10 marine tanks, specimens added as available; 12 tropical tanks. Large fish and plaques are recent arrivals. Other large tanks contain harbour tank and turtle. A sea-lion pool (great attraction to visitors).

WORCESTERSHIRE

The Dudley Zoological Society Ltd. (The Aquarium), 2, The Broadway, Dudley, Worcestershire. No admission charge to Aquarium. Open Monday to Sunday, 10 a.m. to 6 p.m. (during summer months); 10 a.m. to 4 p.m. (winter months). Party terms: 25-100: Adults or children or mixed: Adults, 3s.; children, 1s. 6d. 101-250: Adults, 2s. 6d.; children, 1s. 3d. 251-500: Adults, 2s. 3d.; children, 1s. 501 and over: Adults, 2s.; children, 6d. Description: Built in the Castle Crypt, the Aquarium contains 59 tropical tanks (one marine) and 15 coldwater. Several amphibians, as well as invertebrates, are also displayed. Heating is achieved by both gas boiler and electric tubular heaters. Interesting specimens include an electric eel, an African lungfish, and a 24 lb. black "slack."

The Java Fern—*Microsorium pteropus*

by J. Hems

AN aquatic fern which is lasting and decorative in the heated aquarium is *Microsorium pteropus*, commonly referred to as the Java fern. This interesting and little known species—so far as the writer is aware only one water plant specialist in this country stocks it—is of the easiest cultivation. All it needs, or seemingly needs, is a leamy-peaty compost, soft water giving a neutral to slightly acid reaction and a position in light or partial shade.

The lanceolate fronds—resembling those of the common hart's tongue fern—often exceed 8 in. in length and 1½ in. wide. They are borne on short stems that unroll from a creeping rhizome. *M. pteropus* is indigenous to south-east Asia, and in its natural state is equally at home under as well as out of the water. Aerial fronds tend to divide into segments.

Propagation in the aquarium is by severance of the rhizome (pieces of rhizome are best rooted with lengths of lead wire wound around them to keep them in position) or by removal of the plantlets which are produced, sooner or later, on the undersides of the fronds. As the tufty growths increase in size, they throw down reddish furry-looking roots.

It is more than a quarter of a century since the Java

fern was first introduced to aquarium plant collectors in this country. At that time it was listed under the erroneous but high-sounding 'scientific' names of *Gymnopteris variabilis* and *Osmunda royal-aquaticum*.

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Nothobranchius rachovi

pest to a tray (for storing). And as the ingenuity of the serious aquarist knows no bounds, other methods have been used with success.

Following the reintroduction of water, the fry do not take long to emerge. Large infusorians, newly-hatched brine shrimps, and micro-worms serve as first food. As the fry increase in size, whiteworms and so forth should go on the menu. What is important, when breeding this species, is to insure that the eggs and fry are protected from a strong light and a temperature above 78°F (26°C). Further, make certain that scrupulous cleanliness is maintained in the rearing tanks. The rest is up to the aquarist's own intuitive skill.

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The Oranda—a fancy goldfish

veloped hood. Other features are not quite as important as they can be bred for, once a good hood is produced among the youngsters. As good a body and caudal as possible can be included among the breeders but colour can wait for a few years. As the hood will not probably show up for a few years it is necessary to keep the best of the youngsters until this is apparent.

It is easy to make an early culling of the fry as the divided tail or caudal fin will soon show up. The fry should be placed in a white bowl and then the division of the caudal can be seen quite easily. The breeder will be able to sort out all the best of the fry by the time they are two months old and he should proceed as he would when sorting Veiltails. All the fry will appear like this for some time and any which do not look as if they will make the usual shape of a Veiltail can be dispensed with. As one must have patience and wait for the development of the hood it will be a waste of time and space to keep those which obviously cannot ever make the grade.

The standards for judging the Oranda as given by the Federation of British Aquatic Societies allows 40 points for type and colour; 20 for fins; 20 for body and 20 for condition and deportment. From this it will be seen that there are no points available to allot to the hood of the fish. Under the standards made in 1947, there were 20 points allowed

for the head alone, which of course included the hood. The body had 20; the dorsal fin 8; the caudal fin 20; pectorals and pelvic 2 each pair; anal fin 4; colour 10; condition 4 and deportment 10. These old standards did at least allow the judge to reward those features which were peculiar to the variety whilst the later ones allowed nothing for the hood except that it could only be included with the body. Also the caudal fin which is very important can only be allowed a very few points when all the fins are allowed 20 points, in the later standards, which means that four pairs of fins and the dorsal must share them and little imagination is required to see that the dorsal and caudal will get little special recognition.

My suggestions for a good pointing system for the Oranda are:—Head 20; Body 20; caudal 20; colour 20; other fins 10 and condition 10. It will be noted that I have ignored deportment as it is well known among knowledgeable aquarists that no fish can have a good deportment unless it is in good condition. Another point I would like to stress is that a fault should never be penalised twice. I have known judges to knock off points for a damaged fin and then more for condition. In conclusion may I recommend the breeding of the Oranda to all keen fancy goldfish breeders as there is great satisfaction in producing winners.

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Breeding in a limited space

should be prepared. If, as I imagine, only a few youngsters are required, the tank (which need only be 18 x 10 x 10 in.) should have a good layer of Riccia or Indian Fern at the surface, and a few plants in the compost to make the fins feel at home. It should, ideally, contain water from the community tank to which the fish are now accustomed, and be maintained at between 72° and 78°F.

When the tank is ready and settled down, the female may be introduced and fed for a week with nourishing food such as scraped beef or liver, and unfrozen frozen shrimp. With this treatment she will soon become swollen with eggs and then the male may be put in to join her. In my experience these fish almost always spawn within a few minutes of being put together. The male, quivering, presses the female upwards into the floating plants and a large adhesive single egg is laid and fertilised. This is repeated at intervals for some time, ten to twenty-five eggs being produced each day. The parents rarely eat many of their eggs—but snails do—so these should be avoided. If only a few young are required,

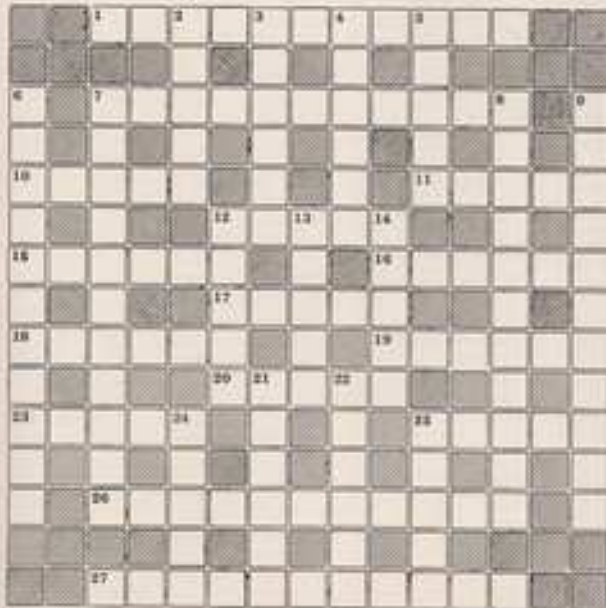
the parents may be removed the following day. The eggs will be seen mainly in the Riccia. They are twice the size of a pin-head, almost colourless but with a slight amber tint and are surprisingly hard. To avoid the danger of fungus affecting the eggs, enough methylene blue to colour the water slightly should be added.

After a week the developing fry can be clearly seen, the most noticeable feature being the eyes. They hatch from about ten days onwards; some may take three weeks or more.

The fry are strong and robust on hatching, and grow quickly if fed on such foods as brine shrimp, sifted daphnia and scraped liver. When about a fortnight old they should be introduced to a good quality dried food which they accept readily and do well on. This is necessary since if fed on mainly protein they often refuse dried foods when older.

At the age of a month the "Rivulus spot" appears on the females when the young fish will be of great value for exchanging with other aquarists.

The AQUARIST Crossword Compiled by L. BRADLEY



CLUES ACROSS

1. Swim away from 6 down or surround by weight
an aquatic plant (11).
7. *Cyprina arcuata* (5-5).
10. European country (5).
11. Makes one sit up (5).
12. Arranged to be brought before a judge (5).
13. Card game (6).
16. Command that I am to sit for the artist (6).
17. Flowers of England? (5).
18. Take a nap back behind a tree I use to take away the
rubbish (3-3).
19. Wine with harsh exterior (6).
20. 39 according to John Buchan (3).
23. Doctor goes to the rear of ship to sketch (5).
25. From which new variety of fish is bred? (5).
26. *Crossostoma leptocheilum* (4-7).
27. Riccia (11).

CLUES DOWN

2. Metallic properties shown in real loyalty (5).
3. Rusted (Anag. 6).
4. Type of snake a baby plays with? (6).
5. See that there is nothing but physical training for
99 (5).
6. Makes the fish an upright citizen of the aquarium
(4-7).
7. Clasp 18 across (Anag. 7-4).
8. South American weapon used in aquarium
illustration (6-3).
9. Nuts my nerve (Anag. 5-6).
12. Sea birds causing a set back about the Royal Navy
(3).
13. Is a girl put into circulation? (5).
14. Records (5).
21. Perhaps the giraffe one from next door (6).
22. All wrapped up usually (6).
24. Wine that is alright in the river (5).
25. Five also arranges a salute (5).

Solution on page 277

THE results of the table show of the Willenden and District A.S. held recently were as follows: Fishbowl: 1, 3 and 4, Mrs. I. R. Brown; 2, W. R. Sherwin. Angels: 1 and 2, T. W. Glass; 3 and 4, C. Coffey. Dandelion, Redbones and W.C.M.M.: 1 and 2, Mrs. I. R. Brown; 3 and 4, T. W. Glass. A.O.V. Livebearers: 1, T. W. Glass; 2, Mrs. I. R. Brown; 3 and 4, F. Glöckel. The show was judged by R. Bign, F.R.A.S., who complimented the competitors on their entries. A general discussion also took place on the merits of various dried foods. Meetings are held on the second and fourth Wednesdays of each month at Aston Hall, Churchside Road, N.W.2 commencing 8 p.m.

AT the annual general meeting of the Walthamstow and District A.S. the following officers were elected: Chairman: D. Goodbody; vice-chairman: H. Davis; secretary: D. Smailey; treasurer: T. Neeldham; committee members: W. Patrick and J. Howard. The Society meets at 8 p.m. on the first Friday and third Wednesday in each month at Wims Avenue, School (near Palace Station). All correspondence should be addressed to Mr. D. Smailey, 7 Thorpe Hall Road, Hale End Road, E.17, who will also be pleased to provide further details.

THE following officers were elected at Middlesbrough and District A.S. annual meeting: Chairman: Mr. G. Fourty; treasurer: Mr. J. Allan; show secretary: Mr. M. P. Brunt; secretary: Mr. R. Jackson, 78 Penrith Road, Parkwood, Middlesbrough. It was decided to hold the Society's Seventh annual Open Show on Sunday 16th April at the Berwick Hills Community Centre, Middlesbrough.

AT the annual general meeting of the Tadcaster and District A.S. the following officers were elected: Chairman: Mr. Jeremy Pascliffe; secretary and treasurer: Mr. Lancaster Greenfield, 95 Station Road, Tadcaster; show secretary: Mr. William Carroll.

AT the January meeting members of the Featherston and District A.S. were entertained recently with a slide show entitled "The British Scene". A tape recording from Mr. R. E. Harrison who kindly judged the Table show, the winners being as follows: Barbis: 1, R. Cohen; 2, G. Nash; 3, A. Town. A.O.V.: 1, T. Poper; 2, D. Cohen; 3, R. Cohen. Furnished Jaws: 1, B. Cohen; 2, G. Capley; 3, T. Treason. Ten new members were welcomed into the Society.

THE Hasledean & District A.S. recently held their annual general meeting when the following officers were duly elected: President: Mr. A. J. Le Bouthillier; chairman: Mr. G. Pickett; secretary: Mr. H. Furness, 22 Brempsons, Hasledean, Essex; treasurer: Mr. D. Smith; show secretary: Mr. G. Clark; representative: Mr. E. Lupton, F.R.A.S.; Librarian: Mr. K. Brown; Librarian: Mr. R. Lovy; Lay Members: Mr. D. Duffley, Mr. B. Young, Mr. R. Davison. The Society welcomes new members and meetings are held fortnightly on Monday evenings at 8 p.m. at the Laidon Community Centre, Aston Road, Laidon. The secretary can be contacted for further information at the above address.

AT the first meeting of the Thorne A.S. this year the Table show for Barbis was won by Mr. T. Dickens. There was quite a good discussion on future activities. Thorne Open Show was arranged to be held on 11th June with a "Bring and Buy" to follow on the three weeks later, date to be confirmed. The night ended with a "Tropical Fish Quiz" which was quite a

success and very interesting. This was won by the Team captained by Mr. J. Gony. Two teams completed.

IN December the Newcastle Guppy and Livebearers Society held their annual general meeting when the following members were appointed to serve on the committee: Chairman: Mr. D. Ransom; vice-chairman: Mr. D. Ransom; treasurer: Mr. W. G. Cummings; re-elected; minutes secretary: Mr. W. E. Macfarlane (re-elected); Librarian: Mr. R. Skyles; Host: Mrs. Ransom.

The society enjoyed a fairly successful year and the retiring committee members' efforts in directing activities in the past year were much appreciated. It is hoped to extend the activities during this year and to further this ambition visitors and prospective members are invited to attend meetings. Members of other societies who may be visiting the Newcastle area are also invited to visit the Newcastle area are also invited to visit. For further information please contact Mr. Stanley Fox, 120 West Farm Avenue, Longbenton, Newcastle upon Tyne 12.

THE Mansfield and District A.S. elected at their annual general meeting the following officers: President: Mr. G. L. A. Wilson; chairman: Mr. R. Wignall; secretary: Mr. M. T. McClary; 3 Leinster Road, Mansfield; show secretary: Mr. T. Brownlow, 19 Jamaica Street, Mansfield; Note: treasurer: Mrs. E. McGarry; Mr. R. V. Dyson is the other committee member. Meetings are held at "The Old Ranges Inn", Church Street, Mansfield, Mondays, fortnightly at 8 p.m. Arrangements are now being made to hold Sunday morning meetings in order that staff workers will be able to attend meetings.

THE officers and committee elected at the Bradford & District A.S. were as follows: President: Mr. D. Carr; vice-president: Mr. A. Firth; secretary: Mr. G. Goodison; 3 Stowell Rise, Alton, Bradford; treasurer: Mr. D. Parker; Social and Publicity Officer: Mr. H. Fletcher; equipment officer: Mr. L. Hally; Committee: Mr. C. Bines, Mr. F. Moorhouse, Mr. J. Hooley, Mr. J. R. Smith, Mr. C. Hildesworth, Mr. J. Hodgkinson, Mr. R. Winterton. The Open Table Shows for this year will be held on 2nd April and 17th September. The Show in April will be held at Unity Hall, Rawson Square, Bradford, and the September venue will be notified later.

THE Riverside Aquarium Society held its Annual General Meeting on the 16th January. Mr. C. P. Buckland (4 Flora Gardens, Hamersmith, W.8, RTV 9381) was re-elected as secretary and Mr. R. Gibbons was elected as show secretary.

THE March programme for the Tipton and District A.S. will include a show for Barbis, Catfish and Anabantids to be followed by a tape recorded lecture on Foods and Feeding. This will be held on the 1st March. On the 15th March Mr. Walker and Mr. Heywood will give a talk on Wood-Framed Aquariums as opposed to Steel Angle. The last meeting was a social evening in celebration of the society's one hundred meetings.

WE have recently received the Dudley and District A.S. newsletter which, bearing in mind the size of the Society, is a very good production. Results given (results of table production): Results given (results of table production): Goldfish: 1 and 3, R. Richardson; 2, J. Visher. Native British: 1, N. Newman.

THE committee elected at the Annual General Meeting of the Brighton and Southern Aquarists' Society held at the new head-

quarters "The Prince George", Trafalgar Street, Brighton, was as follows: J. Pulliam, Chairman; B. Shotton, Secretary; Pam Carr, Treasurer; R. Brunning, Show Secretary; P. Woodham, Assistant Show Secretary; A. Riley and B. Diley, Committee members. The society is looking forward to a full year of interesting activities. The highlight will be the Annual Open Show to be held at The Raffle Hall, Hove, on the 17th June, which it is hoped will attract aquarists from far and wide.

The secretary, Mr. Bert Shotton, 48 Century Street, Brighton, will welcome enquiries. Show details are available from Mr. Ray Brunning, 34 Rowan Close, Portside, Sussex.

WE have received from the Aireborough & District Aquarists Society the first of a series of books written by Mr. W. L. Whitem of Canada. This one is devoted to "Water Spots". These books, along with the Tape Library are available to any British Society who would like to hire them for a small fee, and in this book is a neat replica of the lecture on the Tape.

At the February meeting 43 members were present. Entertainment for the evening included a very interesting "Take your Pick" quiz, which was enjoyed by everyone. Awards for the Table Show were as follows: Specified Class: 1, Mr. J. Whitley; 2, Mr. P. Iyerton; 3, Mr. R. Loner, A.O.V.; 4, Mr. J. Whitley; 5, Mr. R. Loner. Native: 1, Mrs. Iverson; 2 and 3, Mr. R. Loner; 4, Mr. G. Coleman; Junior: 2, Mrs. Burroughs; 3, Mr. G. Coleman; 4, Mr. R. Loner; 5, Mr. G. Coleman. The award for the Best Fish in Show went to Mr. J. Whitley. The Secretary is Mrs. B. Helm, 1 The Crescent, Hall Lane, Hoorforth, nr. Leeds.

THE table shows at the January meeting of the Dundee Aquarium Society were for Scott Trophy—Characins and the placings were as follows: Characins (A): 1, R. Brown; 2, W. Garscott; 3, G. Ridd; Characins (B): 1, A. Inosh; 2, B. Hill; 3, W. Garscott. Characins (C): 1, L. Bead; 2, Andy Inosh, and the latest positions in the Scott Trophy Competition are as follows: S. D. Gould Trophy, G. Ridd 17 points, B. Hill 14 points, G. Kirkcaldy 10 points. Junior Trophy (Characins (A): 1 and 2, points; Characins (B): 5 entries); G. Kirkcaldy. The current placings in the Junior Trophy competition are: S. D. Gould 46 points; G. Kirkcaldy, 24 points; D. Ferris, 19 points; B. Montgomery 10 points.

The programme which followed at this meeting which was attended by 54 members, was a film, Film Show and comprised a travel film by courtesy of Norman Brown & Coy., "The Lonely Places" from the March Brown Azars. The programme at the March Meeting will be on Fish Photography illustrated by slides and conducted by fellow members W. Corbham and F. McNaughton.

AT the Annual General Meeting of the Midland Association of Aquarists' Societies, held in Birmingham, the following were elected as officers for 1961: Chairman: T. L. Dodger; Secretary: A. E. Allcock, 50 Cahler Road, Hall Green, Birmingham 28; Treasurer: Mrs. W. Edden; Services Secretary: Mr. W. Edden, 19 Coppice Road, Whitnash, Leamington Spa; Judges' Panel Convenor: Mr. D. Emery, 61 Cobham Road, Halesowen.

The date of the Annual Convention of the Association was confirmed as Sunday, 14th May. The event will be staged at Lockhead Hydraulic Ltd, Works' Catterick, Leamington Spa, with the Lockhead Aquarists Society as Host Society. A Judges' Instruction Class will also be arranged for the early summer as a venue to be notified in due course.

THE Ocean Aquarists' Society are again holding their Open Table Show on Sunday, 7th May, and the Annual two-day Show on Saturday and Sunday, 26th and 27th August. Mr. J. R. Short, 93 Rudge Street, Shore, Oldham, Lancs., has undertaken the duties as secretary.

A NEW secretary was elected at the annual general meeting of the **East London Aquarist & Pondkeepers' Association**. She is Mrs. P. Harris of 96 Leigh Road, East Ham, E.6. The following officers were elected also for the coming year, President, Mr. F. Campbell; Vice-Presidents, Mr. R. A. Taylor and Mr. F. Arnold; Chairman, Mr. R. Emery; Vice-Chairman, Mr. F. Vicker; Treasurer, Mr. A. Harris; Show Organisers and Secretary, Messrs. W. Dorby and G. Green; Social Secretary, Mr. J. Voss; Librarian, Mr. A. Field; Bulletin Editor, Mr. R. Dublin; Press and Programme Secretary, Mr. F. Vicker; Committee: Messrs. J. Peacock, W. Sweeting and G. Green; Auditors, Mr. and Mrs. F. Arnold. The Society which was formed in 1952 holds its meetings every first and third Friday of each month at the Ripple Road School, Becking, at 8 p.m. New members are welcome and any further information concerning the society may be obtained from the secretary.

THE **Reigate & Redhill A.S.** elected the following officers at their recently held annual meeting: Chairman, W. Leach; Vice-chairman, H. Collier; Secretary, Mrs. P. Whittington; The Grange, Coach House, Harley, Surrey; Show Secretary, G. Best, 2 Cavalry House, Ream Road, Redhill, Surrey. The first ever Open Show will be held in Sander, 3rd September.

AT the **Wynnamode A.S.** first table show held on the second Tuesday in January the class exhibited was Livebearers. The fish were bred and judged by two club members, namely, Mr. Perry and Mr. Sweeney, the crucial winners being first Mr. Robinson (Molly), second Mr. McDowell (Guppy) and third Mr. Richardson with a Platy. The judges answered the many questions the members asked them.

At the second January meeting the members were entertained by a slide and tape show which was very kindly loaned by Rugby A.S. and was enjoyed by all as was the following discussion.

THE club officials elected at the annual general meeting of the **Blackpool & Fylde A.S.** were as follows: President, Mr. C. Cross; Vice-Presidents, Mr. V. Fletcher, Mr. G. N. Hadley and Mr. J. Eborington; Chairman, Mr. W. K. Pearson; Vice-Chairman, Mr. B. R. Simmonds; Secretary, Mr. L. G. Howard; Assistant Secretary, Mr. J. E. Taylor; Treasurer, Mr. J. Sawicki; Librarian, Mr. I. Howlett; Publicity Officer, Mr. B. Turner; Equipment Officer, Mr. G. N. Hadley. The following members were elected to the Executive Committee: Messrs. J. Cross, E. Crowther, I. Howlett, B. R. Simmonds, J. E. Taylor, P. C. Williams. 32 members attended.

Reports were heard from the retiring Chairman, Secretary, Show Secretary and Treasurer, which showed that 1966 had been yet another successful year for the Society, both in achievements and financially. The chief event of the club's activities in the past year was the open show which had been a great success, and plans to hold the next one at the same venue have been completed. Exhibitors are requested to note that the 1967 Show will be held at the Harrogate, Selarum, South. Wynnamode, Blackpool on Sunday, 14th September.

Club meetings are held every second and fourth Wednesday in the month at the Vevers Arms Hotel and new members will be most welcome. All details can be obtained from the Secretary, Mr. G. Howard, 56, Standard Avenue, Blackpool; telephone 42676.

A GOOD attendance was present at the annual general meeting of the **Chappeltown and District A.S.** to hear the interesting and satisfactory reports (especially the Treasurer's) which were presented. The following officers were elected: S. Eastman (Chairman); A. Hirst (Vice-Chairman); R. Cofts (Secretary); E. Simmonds (Treasurer); Committee: Messrs. L. Wren, H. Mitchell, L. Worthington, W. Wiggins, P. Adams, J.

Atson (Show Secretary), H. J. Crowcroft, Mrs. H. J. Crowcroft (Public Relations Officer) and Mrs. W. Wiggins (together with two Junior Delegates, Miss Linda Adams and Master J. Atson).

The last meeting in January was again well attended and a very pleasing table show was held. Results were as follows: Livebearers: 1, Mr. W. Wiggins (Black Sword); 2, Master J. Atson (Lyrical Molly); 3, Mrs. D. Sidis (Lionia Vittata). Guppies: 1, Mr. E. Fernsbrough; 2 and 3, Master J. Atson. A full programme of lectures, table shows, aquarium, film shows, etc., is now being prepared for the coming year. Although meetings of the Society are usually held on the last Friday in each month, members meet socially at the Midland Hotel, Chappeltown, and anyone wishing to come along will be given a hearty welcome.

THE officials elected at the annual general meeting of the **Sheffield and District A.S.** were as follows: President, Mr. K. Colton; secretary, Mrs. M. Knowles, 171 Woodhouse Road, Sheffield; treasurer, Mr. R. Middlewood; show secretary, Mr. G. Green, 38 Driver Street, Woodhouse Mill, Sheffield, 13; social secretary, Mr. E. Fisher; vice-president, Mr. J. Mitchell; Mr. R. Walker, committee members: Mr. J. Bagley, Mr. D. Richardson; auditors: Mr. D. Slater, Mr. P. Nott; raffie organiser, Mr. Gray; librarians: Master J. Vernon, Master S. Clarke.

On 16th January the society held the annual dinner and 60 people attended. The guest of honour was Mrs. E. Chapman who presented the annual trophies gained at table shows during 1966. The winners were as follows: Guppies: J. Hudson; Plaies: J. Hudson; Toothcarps: D. Craven; Cichlids and Anabantids: R. Walker; A. S. Coldwater: S. Clarke; Rainbow: D. Craven; W. Cloud: N. Brown; D. Bagley; Fishers: R. Walker; Characins: W. Bradford; Molluscs: S. Swindale, A.O.V.; Livebearers: W. Bradford; Breeder: D. Craven; Barber: A. Watson; A. S. Single fish: R. Walker; A. S. Small Pairs: D. Bagley; Trophy for Highest pointed Fish of Year: W. Bradford; Gup Guppies: Trophy for Highest Junior Table show: D. Bagley; Award for most cards in Open Show: W. Bradford; Home furnished aquaria competition: J. Bagley; Table show Special 1966: J. R. E. Galloway; 2, R. Walker; 3, J. J. J. Hudson and W. Bradford. The Aquarist of the Year trophy was won jointly by two junior members Master J. Vernon and Master S. Clarke. This was won not only for their general enthusiasm but also because these two lads who are only fourteen have gathered together cards, plants and fish and have created furnished aquaria in the local Old Police Hospital and have maintained these tanks regularly.

The highlight of the presentation was the award of "The Edgar Chapman Memorial Trophy" which is presented for the highest achievement gained in the previous year. For 1966 it was awarded to the president, Ken Colton, who after twenty years service with the Society, in which time he has occupied every position in the committee affairs, and achieved one of his aims when in October he was invited to assist in the judging at the British Aquarist Festival.

AT **Lytham Aquatic Society's** January meeting, Jim Kelly was the guest speaker and he gave an informative and enthralling talk, well illustrated with beautiful colour slides of his "Tour of America", to an audience of 65 members and friends from visiting societies. He showed the aspects of fish keeping, fish houses and the way of the American attitude towards the hobby in general. After the talk, question time provoked many interesting discussions. He stressed to the audience that any society was only as strong as its members and it was up to all members to take an active part and not leave it all to the officers. The audience warmly applauded "Jim" at the end of the meeting.

The table show was for "Guppies" (male), and "Rainbow" and these again attracted a good entry. The judge was Brian Simmonds of the Blackpool Society, who gave a short talk on the quality of the entries. The results were: Guppies: 1, Eric Smith; 2 and 3, Colin Langridge; Rainbows: 1, Colin Langridge; 2, Shirley Matthews; 3, William C. Matthews. The open show will be held on the 11th June. New members will be made most welcome at any of the meetings. These are held on the first and third Wednesdays at the Church Hall, Albert Street, Lytham, at 7.30 p.m. and usually should be made through Mr. William C. Matthews, 42 Dodney Drive, Lea, near Preston. Tel. Preston 26549.

THE annual general meeting of the **Kingston & District A.S.** was held on 19th January and the following officers were elected: chairman, D. W. Ellis; vice-chairman, G. Wood; secretary, Miss P. Greenhalgh, 99 North Close, Morden, Surrey (GD8 6AU); show secretary, H. Towell, 11 Belmont Terrace,

To Club Secretaries

It is the intention of the Proprietors of "The Aquarist" to make awards for both the Best Coldwater and Best Tropical Fish at the Open Shows this year.

In order to put this Scheme into operation and to include as many Clubs as possible, it would be appreciated if Secretaries would send info to the date of their show by return of post. Open table shows and inter-club shows are not eligible and further details with rules will be published shortly.

AT the last meeting of the **High Wycombe A.S.** a very informative talk on Coldwater fish was given by Club member Mr. E. Charfield. The Chairman, Mr. R. Baynes, followed with a short talk on pond construction. Under the new joint Show Secretaries there will be several classes to each table show and for the last meeting there were A.V. Coldwater and A.V. Tropical Adult Pairs. The results of the A.V. Coldwater Class were: 1, Mr. E. Charfield (Bicolor Shubunkin) 81 pts; 2, Mrs. A. Reed (Bicolor Shubunkin) 77 pts; 3, Mrs. V. Bevis (Parrot) 75 pts. The A.V. Adult Pairs competition resulted as follows: 1, Mr. C. Pike (Schubert barbs) 79 pts; 2, Mr. L. Zarneside (Sail Fin Mollies) 78 pts; 3, Mrs. P. Baynes (Black Platies) 72 pts. The judge for both classes was Mr. J. Wilkison.

Meetings are held on the second and fourth Wednesdays of each month at the Saxoness Head, High Wycombe, and anyone interested in the hobby will be welcome to join. The Secretary is Mrs. V. Pate, 16 Ashley Drive, Tylers Green, Penn, Bucks.

THE **Derby Regent Society** held their annual general meeting recently and the following officers were elected for the coming year: President, Mr. K. Hall; Chairman, Mr. T. Hopper; Vice-Chairman, Mr. Wixey; Secretary, Mr. T. Jerram; Assistant Secretary, Mr. P. Kenderick; Treasurer, Mrs. B. Hallam; Show Secretary, Mr. A. Whitlow; Librarian, Mr. Moore; Committee: Mr. Stanton, Mr. Hambleton, Mrs. Elliott. The meetings are held the last Thursday in each month at the Engineer's Club, Ouseburn Road, and any new members are welcome.

Chiswick, W.A. (CHI. 1330); treasurer: G. Greenhall; press officers: R. Riggs, G. Aylard.

The presentation of the past year's major awards was made as follows: Tropical Table Show Shield: G. E. Greenhall; Coldwater Table Show Shield: Mrs. B. Aylard; Whitford Cup (Landscape Breeder): F. R. Cooper; Prince Cup (Livestock Breeder): G. E. Greenhall; Kingston Shield (Coldwater Breeder): D. W. Ellis; Member of The Year Cup: G. E. Greenhall; Aquatic Plant Cup: G. E. Greenhall; White Trophy (A. V. L. Breeder): G. E. Greenhall; Home Furnished Aquaria Cup: Mrs. A. Barber; Miniature Furnished Aquaria Cup: Miss P. Greenhall; A.S.L.A.S. Highest Point Penn. Aquaria: Miss P. Greenhall; Kingston Trophy Open Show Award: G. E. Greenhall; K.A.D.A.S. The Club holds its meetings on the first and third Thursdays of the month. All are welcomed at these meetings.

THE annual dinner of the Hull A.S. was a great success. The presentation of awards after dinner was made by the president Mr. D. Robinson to the following successful exhibitors: Mr. W. A. H. Hall, Fish of the Year; Mr. W. S. H. Hall, Home Breeder; Mr. J. Tock, Table Breeder; Mrs. E. Chapman, Furnished Aquaria; Mr. A. Pascock, Aquaria of the Year. The junior awards were as follows: Master F. Wiggins, Furnished Aquaria; Miss M. Douglas, Aquaria of the Year, and it is satisfying to report that the junior membership has shown a marked increase.

At the annual general meeting in January the committee for the year were elected as follows: President: Mr. D. Robinson; vice-presidents: Mr. W. A. H. Hall, Mr. B. H. Revell; chairman: Mr. S. R. Chapman; vice-chairman: Mr. S. Douglas; treasurer and secretary: Mr. E. Storey; show secretary: Mrs. E. Chapman; assistant secretary and assistant show secretary: Mr. J. Watney. Any enquiries or correspondence to the Society should be addressed to Mr. E. Storey, 141 College Grove, Preston Road, Hull.

THE proceedings of the January meeting of the Rugby and District A.S. were taken up by the retiring Secretary, Mr. R. Deacon, who said that last year they had the highest number of paid up members in the history of the Society, but only about 30 per cent. regularly attended meetings. He hoped that there would be much better attendance in the coming year.

The following members were elected as officials for the coming year: Chairman: Mr. D. Bramley; Vice-Chairman: Mr. F. Pearson; Secretary: Mr. K. Brown; Treasurer: Mrs. O. Fox; Show Secretary: Mrs. J. Pearson; Minute Secretary: Mr. D. Green; Committee members in addition to the above (with the exception of Vice-Chairman): Mr. J. Clark; Mr. M. Bowditch; Mr. B. Fox; Mr. A. Whittam; News Editor: Mr. K. Russell; Junior Editor: Mr. N. Brown; M.A.A.S. Delegates: Messrs. Green, Denton and Russell; M.A.L. Delegates: Mr. E. Brown, Mrs. J. Pearson; Librarian: Mr. Wood; Auditors: Mr. B. V. Woodham; Mr. K. Russell; Society Host: Mr. B. V. Woodham.

THE January meeting of the Chislehurst & District Aquarist Society was an inter-club table show, with members of Bethnal Green, Chislehurst, Tottenham and Walthamstow Aquarist Societies taking part. The judge for this show of the Essex, North and East London Aquarist Association was Mr. Towkins. Results were as follows: Mullion: 1. Mr. J. A. Day (Bethnal Green); 2. Mr. T. Pryce (Walthamstow); 3. Mr. V. Pinner (Chislehurst); 4. Mr. S. Mowsey (Tottenham); Liberty: 1. Mr. W. Collins (Walthamstow); 2. Mr. S. Mowsey (Tottenham); 3. Mr. R. Knack (Bethnal Green); 4. Mr. A. Davis (Bethnal Green); Fishers: 1. Mr. T. South (Bethnal Green); 2 and 3. Mr. E. Nutt (Tottenham); 4. Mr. W. Patrick (Walthamstow); Plants: 1 and 3. Mr. T. Gillman (Bethnal Green); 2. Mr. R. Reed (Bethnal Green); 4. Mr. B. Mather (Walthamstow).

AMONG recent events is the programme of the Bedford District Aquarist & Pond-keepers' Society has been a year from Mr. Skilton of Chislehurst who gave an extremely informative talk on the breeding and management of various species of pondfish. Members have also enjoyed a programme of excellent documentary coloured films put on by a representative from the British Railway Film Library. The films in question were entitled "Between the Tides", "Awakening of Spring", and "Where Broad-land meets the sea", and the last two in particular had many sequences which were of interest to aquarists and pondkeepers.

At the first meeting this year the Show Secretary, Mr. H. Berger, gave a report on the Society's various activities during the previous year. The awards won by members during that year were presented and the winners were as follows: Pond Competition: 1. Mr. Cook; 2. Mr. Dunn; 3. Mr. Nutt; 4. Mr. Hartley; Home Aquaria Competition: 1 and 2. Mr. Bennett; 3. Mr. Smith; 4. Mr. Hill; All Classes Table Show: Best Bagleyer-Vetball Goldfish, Mr. Berger; Best Livebearer-Plant Variator, Mr. Hartman; Best Junior Entry—Common Goldfish, Mr. Bergmann.

Meetings of the Society are held on the second Monday evening of each month at St. Lawrence's Church Hall, Fosseway Avenue, Barkingside, Ilford, at 8 p.m. and anyone interested in fishkeeping will be welcome. Programmes planned for future meetings are:—March: Sale of fish, plants and equipment to members; Table Show; April: Programme on cold-water fish and ponds; Table Show; May: Visit of well-known naturalist; Table Show. Further information may be obtained from the Secretary, Mr. R. Roth, 13 Drankfield Road, Daglington, Essex.

THE 60th annual general meeting of the Newport A.S. was held in January, when the following were elected to office: chairman: Jack Burgess; secretary: Ivor Phillips (24 Brangwyn Crescent, St. Julian's, Newport, Mon.); treasurer: Philip Tidball; show secretary: Michael Perry; (4) Warran Drive, Gwynedd, Cardiff; junior representative: Colin Lewis; and Misses Terry, Wals, J. Glyn Jones and Les Ransome. The President, Mr. Ralph Harris, had kindly consented to continue in office during 1967, a new vice-president having been appointed, Mr. A. B. G. Pook, O.S.L. Preserving his annual report the retiring secretary, Mr. Ivor Phillips, spoke of the many and varied subjects that had been provided for members during 1966, and the show secretary, Mr. Michael Perry, in his report spoke on two main points, table shows and open shows. Although the table shows had been disappointing the open shows had attracted a record entry.

Participating table shows are: Match "Knockout Competition" (six plaques presented by show secretary, Michael Perry); May: Characins and Swordtails, Terns, Anabantids and Gouramis; July: Catfish and Cichlids; August: A.O.V. Egg-layers and Mollies; September: Swordtails, egg-layers and brooders; livebearers; October: "Knockout Competition"; November: Grand Championship; Night. The date of the home aquaria competition has been provisionally set for Sunday, 6th October.

AN innovation of interest to Tropical Fish enthusiasts took place in Ashton-under-Lyme on the 17th January when T.A.B. (Tropical Aquarium Breeders) became for the first time an Open Society. Mr. C. Walker, F.R.A.S., F.N.A.S., proposed this revolutionary step assuming that it was unfair to the fish world generally for T.A.B. members to keep their accumulated knowledge and expertise confined to a small select number. All present unanimously agreed and it was decided that meetings be held fortnightly on Wednesday evenings and an open invitation be extended to all interested to attend any meeting.

THE officers elected at the recent annual general meeting of the Tropical Aquarium Breeders were as follows: President: Mr. J. L. Kelly; vice-president: Mr. C. Walker; chairman: Mr. B. Fowler; treasurer: Mr. W. W. Hughes;

secretary: Mr. S. A. Collings, c/o 258 Great Western Street, Rusholme, Manchester 14; show secretary: Mr. W. Booth. The Society now meets bi-monthly every fourth Wednesday at 254 Great Western Street, Rusholme, Manchester 14, and informally in between at the Junction and Bath Hotel, Portland Street, Ashton under Lyne.

IT is anticipated that the second Annual Open Show of the Hutton Grammar School Aquarist Society will be held on Saturday, 10 July. This show is open to anyone under the age of 18 and is held at school. Enquiries are especially invited from Junior Sections of Aquarist Societies and from School Aquarist Societies. Enquiries should be addressed to the Show Secretary, D. J. Radcliffe, "Kilnlea", Todd Lane South, Lottock Hall, Preston, Lancs. Show schedules will be available later.

NEARLY twenty members of the Worthing Tropical Fish Club met for the first meeting of the year in January. An auction was held and a fish quiz which followed was very successful. Nearly all learned something new. From the quiz were many questions which were answered by Mr. A. Riley.

THE last meeting of the Valley A.S. was taken up mainly with preliminary arrangements for the first Open Show. This will be held at the Civic Hall, Barnhampton, on 2nd April. The result of the Table show held during the evening was as follows: Anguis and Cichlids: 1. Mr. W. Armstrong; 2. Mr. M. Goodchild; 3. Mr. F. Taylor; A.O.V. Female: 1. Mr. M. Jones; 2. Mr. and Mrs. Isherwood; 3. Mr. A. Chapman.

AT the Open Day Show held by the Leeds A.S. the exhibitors were as follows: Furnished Table: 1. K. Swales (Swillington); 2. and 3. Mrs. Springer (Swillington); Group: 1. B. Wiggins (White Rose); 2. Mr. Cohen (Pontefract); 3. T. Haigh (Pontefract); A.O.V. Livebearers: 1. A. B. White (Keighley); 2. G. Hodgkinson (Gorton); 3. J. Whitley (Airedale); Burbs under 3-inches: 1. Mrs. S. Bray (Swillington); 2. Mr. Langhorne (Moxenden); 3. K. How (Chapelton); Burbs over 3-inches: 1. Mr. Kennedy (Leeds); 2. K. Glover (Swillington); 3. W. Parkin (Tadcaster); Characins under 4-inches: 1. D. Bowley (Airedale); 2. Mrs. Cohen (Pontefract); 3. W. Booth (Tadcaster); Characins over 3-inches: 1. W. Parkin (Tadcaster); 2. Mrs. Dickinson (Airedale); 3. R. Harrison (Airedale); Siamese Fishers: 1. P. Reynolds (Swillington); 2. Mr. Cohen (Pontefract); 3. E. Whitlock (Tadcaster); A.O.V. Livebearers: 1. B. Shephard (Bradford); 2. Mr. Helm (Airedale); 3. W. Parkin (Tadcaster); Dwarf Cichlids: 1 and 3. Mr. Barrett (Bradford); 2. Mr. Kennedy (Leeds); Cichlids over 3-inches: 1. Mr. Helm (Airedale); 2. Mr. Millburn (Swillington); 3. P. Isaac; Brooder Egg-layers: 1. L. McCourt (Gorton); 2. E. Earnshaw (Chapelton); 3. P. Bradley (Pontefract); Brooder Livebearers: 1. T. Haigh (Pontefract); 2. A. B. White (Keighley); 3. P. McCourt (Leeds); Catfish and Loach: 1. W. Booth (Tadcaster); 2. K. Swales (Swillington); 3. L. Kaye (Huddersfield); Toothcarps: 1. L. Greenall (Tadcaster); 2. L. Hodgkinson (Bradford); 3. H. Hall (Dewsbury); Barbours, Danios, Minnows: 1. P. Wales (White Rose); 2. Master Bennett (Swillington); 3. Mr. Cohen (Pontefract); A. O. V. Egg-layers: 1. A. White (Hilltop); 2. D. Carr (Bradford); 3. Mrs. Cohen (Pontefract); Best Fish in Show: Greenall (Tadcaster). At the December annual general meeting Mr. K. J. Bennett was re-elected as Secretary, his address being 58, Copple Wood Crescent, Yeadon, near Leeds. Mr. T. South was elected as President and Mr. G. Boothroyd was re-elected as treasurer.

Recently Stockton-on-Tees A.S. held a home aquaria competition which was very well supported. Results as follows: 1. Mr. M. Watson; 2. Mr. W. Payer; 3. Mr. E. Grammes;

4. Mr. L. Collins. The judges were Mr. J. Williamson and Mr. J. Chamberlain.
Two table shows were held for (1) Breeding fish egg-layers and (2) Swedfish, results: Egg-layers: 1. Mr. W. Bowman; 2. Mr. E. Greenaway; 3. Mr. J. Chamberlain; 4. Mr. and Mrs. F. Patterson. Swedfish: 1. Mr. L. Collins; 2. Mr. J. Chamberlain; 3. Mr. T. Stephens. A talk was given by Mr. L. Collins on "Keweenaw fish". This was very well received and extremely informative. A vote was taken for a Show Secretary and Mr. W. Bowman was appointed. Further information can be obtained by applying to the Secretary, Mr. J. Williamson, 30 Greys Road, Norton, Buckinghamshire.

A TOTAL of 79 members heard Mr. Denis Murphy, who is in charge of the Chester Zoo Aquaria, give a most interesting and enlightening talk to the **Warrington A.S.** This covered many points of interest and in particular about feeding. He also brought along some preserved specimens of the fish he had and other large fish. The fish of the month was Swedfish and the result was as follows: 1 and 3, Jim Higham; 2, A. Durr. Raffle prizes were won by Peter Morris, Joyce Warrall, Mr. Naffis, Ted Clarke, Roger Henson and Elsie Higham. There was also an auction for fish and plants. At the conclusion of another excellent meeting the speaker asked if he could have the last word and complimented the club on the large attendance, slick organization and good work not previously encountered. The club was very pleased to accept this compliment.

The Secretary would like local clubs to take note that on Tuesday, 11th April, Mr. Norman Mason-Smith from Cambridge is giving his famous **Anglian Fish Show** which promises to be the event of the year. The Society has held a room at the local **Railway Social Club** for the occasion. Duration will be 24, but will work in 10. Tickets and programmes are now available and clubs interested are invited to contact Ron Trench, 208 Manchester Road, Warrington or telephone Warrington 31615. Attendance will be restricted to 350 so please book early.

THE officials elected for the **Leamington and District A.S.** for this year are: Chairman, Mrs. J. E. Smith; Secretary, Mrs. A. D. Underwood, 21 Westside Road, Leamington; Treasurer, P. Thomas, Show Secretary, F. Underwood, 27 Wandle Road, Leamington; News Editor, D. G. D. Lucas; member Mrs. C. Board. The trophy winners were as follows: **Members of the Year:** 1. F. Underwood 32 pts; 2. T. Dobson 30 pts; 3. D. Lucas 27 pts; **Show Trophy:** 1. T. Dobson 128 pts; 2. F. Underwood 110 pts; 3. D. Lucas 94 pts; **Breeders' Trophy:** Mrs. F. Edden 38 pts; F. Underwood 15 pts; J. Board 6 pts; **Furnished Room Aquaria:** Mrs. J. E. Smith, Breeder's Enquiries, K. Waisell, Breeder's Enquiries, F. Underwood, Furnished Jar: F. Underwood.

IN January the annual general meeting of the **Mixeden T.F.S.** was held and the new officers were elected. Mr. S. Leadham, Chairman; Mr. J. H. Brown, Secretary; Mr. B. Warren, Treasurer. The **Malden Trophy** was presented to Mrs. J. Thompson who with 41 points gained most points of the fortnightly meetings over the past year.

Any person interested in fishkeeping in general should contact Mr. J. Brown, Mixeden Tropical Fish Society, 9 Clough Bank, Mixeden, Halifax. The meetings are held every two weeks on a Tuesday evening at 8 p.m. The second annual Open Show is to be held on the 21st May. Schedules will be sent to all Clubs or may be sent on application to the secretary. A Challenge match with the **Kidlington Society** was held recently and the winners of the first leg were Mixeden with 38 points, Kidlington 32 points. Mr. M. Gray took Best in Show with a Red Tailed Black Shark for Mixeden.

RECENTLY the **Harlow A.S.** held their first Social and Dinner. During the interval the prizes were presented to the following

winners: **Hime Furnished Aquaria Cup,** Mr. J. Scause; **Silver medal for second,** Mrs. V. Duncan; **Bronze medal for third,** Mr. G. Lavelle; **Bronze medal for fourth,** Mr. M. Pugh. The **Table Show Trophy** went to Mr. H. Kerridge. **Silver medal for second,** Mr. J. Scause; **Bronze medal for third,** Mr. M. Pugh. The **Breeders Cup** was won by Mr. J. Scause and the **Black Widow trophy** by Mr. R. Kerridge. The prizes were presented by Mr. J. Coleman, chairman of T.F.S.A.S. At the annual general meeting the following officers were elected: Chairman, Mr. J. Scause; Vice-chairman, Mr. R. O'Neil; Secretary, Mr. J. Durran, 29 Long Horse, Bush Fair, Harlow; Treasurer, Mrs. V. Duncan; Show Secretary, Mr. R. Kerridge; auditor, Mr. J. Shaw; Public Relations Officer, Mr. J. Jarvis.

ONLY one committee change was made at the annual general meeting of the **Merseyside A.S.**, the election of Mr. Tom Wyles for to the post of Vice-Chairman. All other officers were re-elected unanimously, the Secretary remaining as Mr. Bob Moorcroft of 24 Frankby Road, Liverpool, 4.

The first general meeting of the year was a judging competition, members forming into groups and judging the quality of various classes of fish. It was pleasing to see the results of the junior members coming very close to those of the "experts".

February's first meeting was in the hands of a well known local lecturer Mr. Alan Blood, who made everyone anxious when describing the new issues he is having back, incorporating a large centrally heated fish house.

It has been reported that the Open Show is to be held on May 14th. This is not correct. It is hoped to hold it on 21st May, but this date has still to be confirmed by the F.N.A.S.

This Society has now started a Corresponding Membership, at 15s. per year. Membership will entitle a person to a half year's issue of *Mersey News* (the Society's Journal) and participation in two competitions which are to be announced. Full details may be obtained, including Order Form, Subscription Rates, by writing to the News Editor, Mr. Tom Wyles Jnr., 31 Newton Park Road, Norton, West Kirby, Cheshire.

NEW SOCIETIES

A NEW Society has been formed in North Devon and is to be known as the **North Devon Aquarist and Pondkeeper Society.** The officers elected were as follows: Chairman, Mr. T. Hatfield; hon. secretary, Mr. V. Drayton; hon. treasurer, Mr. D. Pitt. It was decided that the society should meet once a month at St. John's House, Hart Street, Bideford, and it is hoped that as the membership increases to have meetings in various towns in North Devon from which the members come. Any information from other societies would be appreciated. The secretary is Mr. V. O. Drayton, 46 High Street, Bideford.

On 3rd February, an **Aquarist's Society** was formed under the title **Bangor and District A.S.** There was a very encouraging attendance at the opening meeting when the following officers were elected: Chairman, P. T. Gordon; Vice-Chairman, K. Williams; Treasurer, S. C. Antwanziti; Secretary, L. J. Thomas. It was decided that meetings should be held on the last Wednesday of each month at the **Purgate Cafe** 360 High Street, Bangor at 8.0 p.m. Any person interested is invited to attend any of the meetings or contact Mr. L. E. Thomas, 111 High Street, Bangor, North Wales.

AQUARIST'S CALENDAR

4th March: **Torquay** and **District A.S.** Tropical and Marine Show, Torquay Army Drill Hall, Priory Road, Torquay, Devon, S.S. Schedules from Show Secretary, T.D.A.S., 42 Orchard Road, Enfield, HDW 5934.

12th March: **Huddersfield Tropical Fish Society.** Fourth Open Show.

2nd April: **Bradford and District A.S.** Open Table Show, Unity Hall, Rawson Square, Bradford.

2nd April: **Valley A.S.** First Open Show, Civic Hall, Ransbottom.

16th April: **Middlebrough and District A.S.** Open Show, **Berwick Hills Community Centre,** Middlebrough.

23rd April: (**Provisional Date**) **Sheffield and District A.S.** Open Show at the **Merbrook Ventry Hall,** Merbrook Park Road, Heeley, Sheffield.

7th May: **Oram A.S.** Open Table Show.

7th May: **Lalgh A.S.** Open Show, **Lalgh Rugby Union Club.**

12th May: **Fordham A.S.** Second Open Show at the **London School of Printing, Elephant and Castle, London, S.E.1.** Schedules available from Show Secretary, Mr. A. Lewis, 26 Robens Street, Clifton, London, S.E.8.

18th May: **Annual Convention of the Midland Association of Aquarist Societies, Lockhead Hydrostatics Ltd., Works Garton, Leamington Spa.**

21st May: **Mixeden T.F.S.** Second Annual Open Show. Schedules available from Mr. J. H. Brown, 9 Clough Bank, Mixeden, Halifax.

3rd June: **Carlton A.S.** Open Show. Full details from Show Secretary, Mr. E. D. Owen, 42, Elmer Road, Carlton, London, S.E.6.

10th June: **Lyrham A.S.** Open Show in **Lower Pavilion, Lyrham.**

17th June: **Brighton and Southern A.S.** Annual Open Show at **The Baller Hall, Hove, Inquiries to Mr. Roy Rowling, 34 Reson Close, Portlano, Sussex.**

18th June: **Glossop A.S.** Open Show. Secretary, Mr. John Ingram, 37 Charlton Road, Glossop, Derbyshire.

25th June: **Skipton and District A.S.** Open Show.

1st July: **Horton Grammar School A.S.** Annual Open Show. Enquiries especially invited from Junior Sections and School Aquarist Societies. Show Secretary, Mr. D. J. Radcliffe, "Kings," Todd Lane South, Looe, Cornwall, Devon.

2nd July: **Leamington and District A.S.** Second Open Show.

7th-12th August: **Pennine A.S.** Open Show.

25th-27th August: **Oram A.S.** Annual two-day Show.

2nd September: **High Wycombe A.D.** Annual Open Show at the **Rye, High Wycombe.** This will include a **Guppy Show** staged by the **Three Counties section of the P.O.S.S.** to be judged under these rules. Details for both systems from Mr. C. Piles, 18 Ashley Drive, Tyler Green, Penn, Bucks.

2nd September: **Rugby and Radlett A.S.** First Open Show. Secretary (Show) Mr. E. Ross, 2 Canham House, Ross Road, Radlett, Surrey.

Crossword Solution

B	L	A	D	D	E	R	W	O	R	T	H
S	L	U	A	P							
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Chelmsford
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