

# The Aquarist

and Pondkeeper

MAY 1966



MONTHLY  
Vol. XXXI No. 2

**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  
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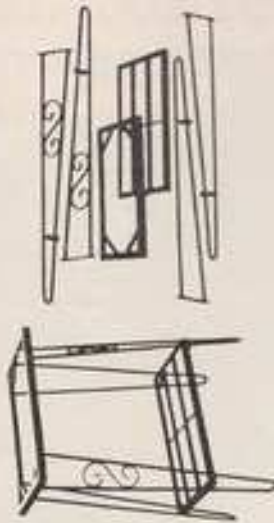
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Made of sturdy welded and flush ground wrought iron, this stand is shipped in a flat, compact carton. Finished in jet black. Assembles rigidly with only four screws. No tools necessary.

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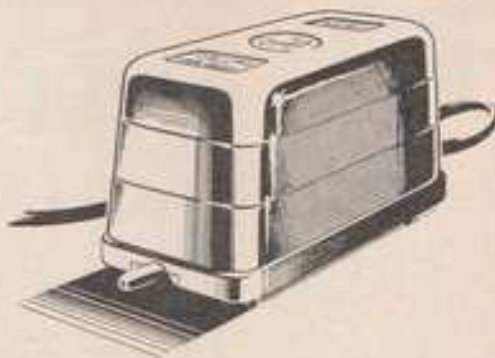
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Fibre-glass and Plastic Pool Linings. Pond Paint. Fountain and Waterfall pumps. Marginal and Bog Plants, Water Lilies, Goldfish, Golden Orfe, Tench, etc.

EVERYTHING  
A PUMP  
SHOULD BE



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**'SUPER SUMMIT'**  
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ROBUST CONSTRUCTION - ATTRACTIVE DESIGN  
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**YOUR AQUATIC NEEDS  
FROM YOUR ARM-CHAIR  
FULL RANGE OF EQUIPMENT**

**200  
VARIETIES OF TROPICAL FISH**

**Coldwater Fish and Water Garden Equipment  
by return of post (fish by rail)**

All fish guaranteed live delivery and in good disease free condition. 7% col and packing charge to be included with every order.  
All consignments of fish to be collected from nearest main-line railway station.

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

**Interesting Fish in Stock at present**

Albino Tiger Barbs	1½" 6/6 each
Indian Spiny Eel	6" 8/6 each
Roberts Tetras	1½" 12/4 each
Ember Barbs	1" 10/- each
Copenia Arnoldi	1½" 5/- each
Aphyosemon Australe	1" 15/- pair
Meegonistius Chætodon	½" 5/- each
Red eye Red Swords	1½" 4/6 each
Unidentified Catfish	1½" 7/6 each

**BREEDING PAIRS OF COLDWATER FISH**

These fish are kept outdoors, and are ready for introduction into any pond. They are just coming into condition, the females filling with spawn etc.

GOLDFISH	6-7" body 125/- pair
	8-9" " 40/- "
SHUBUNKINS	6-7" body 40/- pair
	5-6" " 25/- "
COMET-TAILS	7" body 50/- pair
	5-6" " 20/- "
GOLDEN ORFE	6" body 45/- pair

**KEITH BARRACLOUGH**

**215 GREAT HORTON ROAD - BRADFORD 7 - YORKSHIRE**

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*England's Renowned Suppliers of High Quality*

## TROPICAL FISHES

Our showrooms have been especially designed to allow visitors maximum facilities for easy viewing of our extensive range of healthy, full bodied tropical fish. There at all times, swimming in shoals, more than 100 varieties shown to perfection in beautifully decorated tanks. The tropical plants too are selected for their size and colour and are all for sale. This truly is the aquarists' paradise but whether pundit or beginner our assistants are there to offer advice and help.

OUR TANKS ARE KEPT CRYSTAL CLEAR BY THE  
MOST PERFECT AID TO EASIER FISHKEEPING: THE  
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### Biological Filter

The BIOLOGICAL FILTERS since they were put on the market have proved a most valuable asset to fishkeepers. Once installed they assure complete freedom from mulm, assist in ridding decaying food and give absolute water clarity.

18" TANK SIZE (S)	12/6
24" TANK SIZE (L)	15/-
30" TANK SIZE (L)	15/-
36" TANK 2 SIZE (S)	
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A Visit to our Showrooms is a must for all visitors to London.

If you are unable to call please write for our  
FISH, PLANT & EQUIPMENT CATALOGUES  
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AQUARISTS**

**WE ALWAYS GIVE 100% SATISFACTION**

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

INCLUDING MARINE TROPICALS

WHOLESALE ORDERS EXECUTED IMMEDIATELY



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Imported flake food

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Full 1oz pack **3/6**  
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## COLDWATER FISH NOW IN STOCK

RED FANTAILS ... ..	6/6
CALICO FANTAILS ... ..	7/6
COMETS ... ..	3/6-8/6
NYMPHS ... ..	3/6-7/6
GOLDEN ORFE ... ..	3/6
GOLDFISH AND SHUBUNKINS ... ..	1/6-7/6

## POND FISH

GOLDFISH AND SHUBUNKINS ...	5-6"	15/- pair
"	7-8"	25/- pair
"	9-10"	50/- pair
GOLDEN ORFE ... ..	6"	30/- pair
NYMPHS ... ..	5"	30/- pair
CALICO COMETS ... ..	5-6"	25/- pair
HIGOI CARP ... ..	5-6"	35/- pair

## POND PLANTS NOW IN STOCK

WATER LILIES:—	
WHITE ... ..	5/-
RED ... ..	15/-
YELLOW, PINK AND CREAM ... ..	12/6
SPATTERDOCKS ... ..	4/6

MINIMUM ORDER FOR PLANTS 5/-



MINIMUM ORDER FOR FISH £2  
PLUS 15/- CARRIAGE, PACKING, ETC.



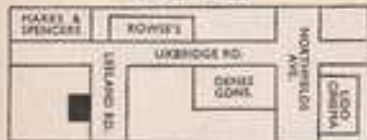
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PLANT AND LILY BASKETS	2/6 & 3/9
POLYTHENE POND LINER (7'6" x 6' x 15" deep)	35/-
STOKES FOUNTAIN ... ..	£7-19-6
OTTER FOUNTAIN KIT ... ..	£9-5-0
OTTER WATERFALL KIT ... ..	£9-5-0
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PLASTIC SPIKED ANENOMES  
(Red, Blue, Orange)—3/3 p.p.



LOBSTER POTS—7/6 p.p.



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WINGLESS FRUIT	
FLY CULTURE ... ..	7/6
GRINDAL WORM CULTURE ... ..	3/-
MICRO WORM CULTURE ... ..	2/-
WHITE WORM CULTURE ... ..	3/-
WHITE WORM, 1 oz. ... ..	6/-

Post Paid



WE NOW KEEP IN STOCK  
METAFRAME AQUARIUMS AND  
HOODS. S.A.E. FOR LIST



## INTRODUCING THE

# EHEIM

## Compact "388"

Now in addition to the highly successful "Single 386" and "Double 387" may we present the "COMPACT 388". Intended for use on aquariums up to 20 gallons capacity, precision manufactured to the high standard you have come to expect from Eheim Aquarium Accessories. As with all other units in this range the "Compact 388" combines **POWER** with **DEPTH** of filter medium and can be supplied for freshwater or seawater aquariums.

**FRESHWATER UNIT COMPLETE**

**£9-0-0**

**SEAWATER UNIT COMPLETE**

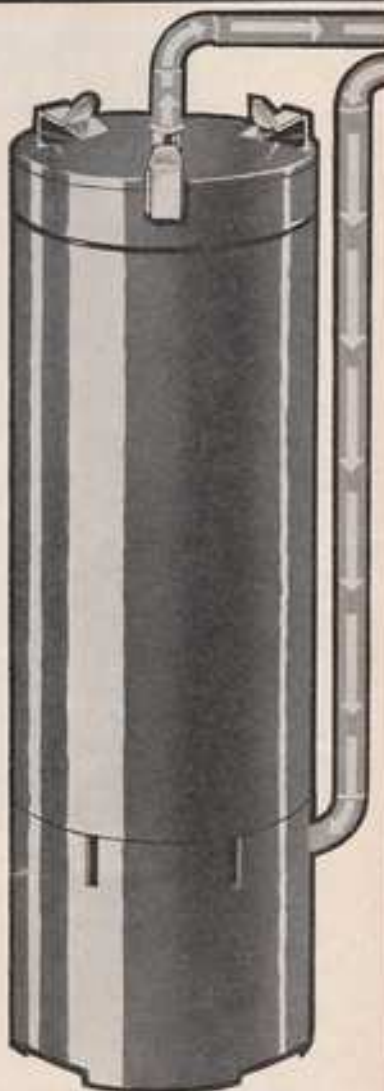
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Unit fully guaranteed for one year

Brochure from

**South Coast Aquatic Nurseries Ltd.,**

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(Regd. Trade Mark)

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Europe's best selling fishfood. Best value for money. Made in the most modern fish food factory in the world in Bremen-Ma., West Germany.

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# QUEENSBOROUGH FISHERIES

SEE OVERLEAF FOR FURTHER INFORMATION  
THOUSANDS OF POND FISH IN STOCK

## SPECIAL PLANT COLLECTIONS (post only)

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TROPICALS	
A	50 plants including Dwarf Lily <i>Crypsocoryne</i> <i>Wicaria</i> etc. £1
B	12 Vallneria 12 Myriophyllum 3 Micro Sagittaria 4 Ludwigia 4 Elodea Densa £1
C	12 Vallneria 4 Myriophyllum 4 Ludwigia 4 Elodea Densa 4 Bacopa 1 Amazon Chain Sward 1 Portion Hair Grass £1
D	1 Nymphae Stalkata 1 Glans Hydrophila 1 Apogonatum 1 Wicaria 1 Glans Sagittaria 1 Crypsocoryne 1 Indian Fern 1 Portion Hair Grass £1
E	4 Vallneria 4 Myriophyllum 4 Hydrophila 4 Elodea Densa 10/-
F	1 Portion Hair Grass 1 Portion Clover 4 Micro Sagittaria 4 Bacopa 10/-
Cultures of pure Infusoria for post Fry 5/-	

POND PLANTS	
G	50 plants including Marginalia £1
H	30 Pond Plants: 1 Cream Water Lily (Princess Alice) £1
J	2 Bull Rush 3 Iris 3 Barr Rush 3 Fergo-Ple-Nore 3 Water Mint 10/-
K	12 Marginalia 4 Organizing Plants 10/-

L	Cream and Yellow Water Lily—Princess Alice 12/6 2 for £1
M	Water Lilies 1 Pink 1 Red 1 Cream 3-year-old plants £2
N	Willow Trees Forsage 3/- 7/6
Lilies	
Dark Pink	Tuber Roses 15/-
Blush Pink	Harliana Carnes 15/-
Yellow	Harliana Canemastella 15/-
White	Nymphae Alba 12/6

AQUARIUM OR POND	
P	12 Sagittaria 4 Myriophyllum 4 Ludwigia 4 Moneywort 4 Hornwort 1 Portion Riddle 3 Portion Hair Grass £1

Q	50 Plants for your Aquarium—Value 35/- £1
R	4 Vallneria 4 Moneywort 4 Elodea Densa 3 Hornwort 3 Portion Hair Grass 10/-
TROPICAL OR COLD	
S	Giant Amazon Sward Plants 6-8 inches 7/6
T	Water Lettuce Very beautiful plants 2/6 or 3 for 10/-
W	Water Hyacinth 4-8 inches Floating Plant 7/6
X	Spatterdock 3/6
Live Daphnia 2/-	
Tubifex 1/6 2/6	
Microworm 3/-	
Whiteworm 3/-	
Seeds (Post Free) 6d. ea.	

OWING TO POPULAR REQUEST OUR WRAYSBURY BRANCH WILL BE OPEN ON SATURDAYS AS WELL AS SUNDAYS FROM 10 a.m.—4 p.m.

QUEENSBOROUGH HOUSE, FERRY LANE, HYTHE END, WRAYSBURY, N. STAINES



# Special News

See Page xi



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

VISIT OUR WRAYSBURY BRANCH ON SATURDAYS & SUNDAYS 10 a.m. to 4 p.m.

### BOW AQUARIUMS

36in. x 12in. x 15in. low-fronted aquarium with wrought iron bookcase stand £19/19/- complete.

48in. x 12in. x 15in.—29 gns.

Fancy bronze, black & gold, and cream. Also plain stands

### STANDS

12 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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Springfield Int./Ext. ... 15/-  
Springfield Int./A.S. ... 10/-  
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Int./A.S. ... 15/-  
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"Popular" with sensor indicator ... 12/6  
Bona (with sensor) ... 21/-  
"E-F" Sensor ... 26/6

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Mercury each ... 4/6  
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"E-E" Denny ... 6/6

### FILTERS

"Woodmill" Plastic Outside Filter ... 19/6  
"Woodmill" Biological Aquarium Filter 12in. ... 15/-  
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Corner Filter ... 6/-  
Air Lid ... 2/6  
"Sun Inn" Outside Filter ... 17/6  
"Clear King" Outside Filter ... 22/6  
Bottom Filter ... 8/3  
Ornamental Rock Filter ... 17/6  
Use Polyfilter ... 3/6  
Gro-Well ... 35/-

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Monsters each ... 22/-  
Fairy ... 24/-  
Star ... 26/-  
Kens ... 28/-  
Zoo-bike Total ... 75/-  
Ho-Go Junior ... 107/6  
Ho-Go "B" ... 136/-  
Ho-Go "C" ... 156/-

### HEATERS

"QUEENSBOROUGH" 25w., 40w., 60w., 75w., 100w., 125w., 150w. ... 18/-  
Kens (75-200w.) ... 18/-  
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"E-E" Thermostatic Heaters, 100w. and 150w. ... 26/-  
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"Woodmill" Air Reincors each ... 10/-  
"Woodmill" Hand Reincors ... 15/-  
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Hand Type Plastic Swirl Away ... 46/6

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Fallneria Spiralis ... 1/-  
Eclode Densa ... 1/-  
Hygrophila ... 1/-  
Sagittaria ... 1/-  
Sagittaria minor ... 1/-  
Fallneria verte ... 1/-  
Ludwigia ... 1/-  
Mylodaphnia ... 1/-  
Cryptocoryne Beckettii ... 2/-  
"Walden" 2/6 and 5/-  
"Cordula" 1/6 and 5/-  
"Karristonia" 1/6 and 5/-  
Water Hyacinth ... 1/6  
Giant Hygrophila ... 2/6  
Giant Sagittaria ... 2/6  
Amazon Chain Sward Duckweed per portion 2/-  
Reticia per portion 2/-

### FOODS

Exotic Flakes ... 1/6  
Hydro Flakes ... 1/-  
Broxian 1/6 and 26  
Broxian Fryngilla 1/6  
Liquify Nosh. 1 and 2 2/6  
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Dried ... 2/- and 4/6  
Live Daphnia Out 6d.  
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Fish Food pack 1/6 in 3 sizes

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### FULLY-GLAZED AQUARIUMS

Pressed Steel Anglin Iron  
Aluminium  
Inches Tank 11 1/2 Hgt. Inches Tank 11 1/2 Hgt.  
12 x 6 x 6 18/6 — 6/6 24 x 12 x 15 57/6 22/- 8/6  
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18 x 10 x 10 22/6 15/- 48 x 12 x 15 137/6 48/6 —  
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" " Double ... 6d.  
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Dry Floating Rings ... 1/-  
" " Squares ... 1/6  
Hydro (4-in-one) Feeder ... 2/3  
Worm Floating Feeders ... 1/6  
Worm Cradle with Sucker ... 1/6  
"Woodmill" Diffuser Boxes ... 1/- to 1/6  
1" Piece ... 1/-  
Aerator Tubing ... f. 4d.  
Rubber ... f. 6d.  
Plastic ... f. 6d.  
4 Way Fines ... 1/-  
Clamps ... 1/-  
Carbon ... 1/-  
Glass Wood ... 1/2  
Nylon Wood ... 1/2  
Tasting sets 1/6 and 5/6 Post 1/2 extra  
Hydro Leak Sealer ... 2/-

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Telephone: WRAYSBURY 1881  
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16 PICTON PLACE, LONDON, W.1 (1 minute from St. James)  
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Founded in 1924 as "The Amateur Aquarist"



THE BUTTS, HALF ACRE, BRENTFORD,  
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PUBLISHED MONTHLY

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## *Nitella flexilis*

by B. FRY

*Nitella flexilis*, a plant (actually one of the higher algae) which is widely distributed in the still and slow-moving fresh waters of Europe, Asia and America, is well worthy of introduction into any tank housing a pair, or collection, of diminutive oviparous or viviparous tropicals; for apart from its delicate charm and easy cultivation, it makes a splendid depository for fishes' eggs and a fine refuge for tiny fry. Added to this, the plant is an excellent producer of oxygen.

The semi-transparent branching stems are needle-fine, attain about 12 in. in length, and usually bear six or seven forked filaments arranged in dainty whorls. These whorls are set rather widely apart and, like the stems, vary in colour, according to the quality and duration of light and the nature of the bottom, from pale to dark green.

But to come back to the cultivation of *nitella*. The aquarist should always start it off in a somewhat subdued light. If this piece of advice is ignored the plant will almost certainly suffer from the unwelcome attentions of some of its obnoxious relations, to wit, the pestiferous forms of algae, which will show up with the abruptness of Aladdin's genie and proceed to strangle it in an unloving embrace.

In the matter of temperature, *N. flexilis* has a wide range and seemingly flourishes just as well in an unheated aquarium as it does in a heated one. But be that as it may, any change of temperature should be brought about very gradually. Another point which cannot be overstressed is the importance of keeping the delicate stems from drying out between the time of purchase and subsequent replanting. The last is easily accomplished by pushing each stem or separate parts of a long, branching stem into the compost. Alternatively, stems may be kept in position with twists of lead wire.

Within the space of a month or so the anchored stems will lengthen, branch and branch again, and form a fairy underwater scene of enchanting loveliness.

# Starting with plants and fishes

by B. WHITESIDE



**I**N the normal cycle of aquatic life plants and fishes are, to a certain extent, dependent one upon the other. In trying to simulate nature in the confines of a small aquarium, the aquarist can, with a stroke of luck, hit the ideal conditions in which his particular collection of fish and plants will thrive to their mutual advantage. To repeat such a set-up is not always possible as two seemingly identical tanks may vary greatly in their ability to support given fish and plants. For the aquarist with some scientific knowledge of say botany, zoology, chemistry and perhaps horticulture, the chances of being able to establish his ideal aquarium are increased.

There are many excellent books on how to set up an aquarium but not all of them emphasize the necessity of setting up aquaria using gravel which does not contain any calcium carbonate (limestone, shell fragments etc.). Many tanks containing unhappy fish or plants are due to the presence of calcium carbonate in one or more of its forms, in the gravel or rockwork. It is not an easy matter to obtain such 'lime-free' gravel. To test if gravel does contain calcium carbonate, some dilute hydrochloric acid can be added to a sample of gravel in a jam jar. The presence of the unwanted substance can be seen by the evolution of bubbles of carbon dioxide gas from any fragments of calcium carbonate in the gravel. A lighted splinter of wood will be extinguished by carbon dioxide gas, after a quantity of it has been evolved. Ordinary vinegar (acetic acid) will also cause the release of carbon dioxide from limestone, marble chips, sea shells etc., although it will work much better with dilute hydrochloric acid. Some plants and fishes will live quite happily in an aquarium containing limestone in the gravel but as this substance slowly dissolves in slightly acid aquarium water, it would be better to discard such gravel (or rocks) and try to obtain some which do not contain any. Unsuitable gravel can be improved, if the quantity of calcium carbonate is small, by stirring into it quantities of hydrochloric acid until no more bubbles are released. The gravel then has to be washed many times until all the free acid is removed, and this is checked using litmus paper or a liquid pH indicator.

Briefly, pH gives a measure of the acidity or alkalinity

of substances. The pH scale runs from 0 to 14. Substances with a pH of 0 are concentrated acid, those with a pH of 14 are concentrated alkali. Most fish and plants thrive in water which has a pH of 7. Such water is neutral, that is, neither acid nor alkaline. Tap water is seldom neutral, but is usually slightly alkaline, about pH 7.4, unless reservoir water supplies come from an area where there is a lot of peat in the ground and where the water may be slightly acid, pH 6.8. Different plants and fish are happy in different types of water.

Another factor which influences the ability of fishes and plants to thrive is the hardness of the water in which they are kept. Water hardness depends upon the amount of dissolved minerals in the water. Hard water contains a lot of dissolved mineral salts; soft water contains few or no dissolved mineral salts. Hardness of water is measured in degrees, there being several different scales. Perhaps the most useful scale is measured in German degrees of hardness. One German degree of hardness is written: 1°DH, and represents 17.8 parts per million of calcium carbonate in one litre of water (or 17.8 p.p.m. of  $\text{CaCO}_3$  per litre). Distilled water bought from a chemist, if pure, should have a pH of 7, and a DH of 0. Such water is rather expensive and would be unsuitable for fish-keeping without any additions.

Hardness in water can be divided into two types, permanent hardness and temporary hardness. The former is difficult to change but the latter can be removed by boiling tap water and allowing it to cool. This process will also remove any chlorine which has been added to the tap water to kill bacteria, chlorine being a poison which can harm fish.

What effect does water hardness have on fish and plants? Many plants and fish are happy in water with a hardness of about 100 p.p.m. of calcium carbonate, and quite a few will exist happily in water with a hardness of up to 200 p.p.m. of calcium carbonate. Hard water can be softened by diluting it with bought distilled water or with rain water collected in a clean plastic bucket just after a heavy shower of rain has started. The first rain in the shower will contain dirt, such as soot, from the air, and should be avoided.

The pH of aquarium water can also be adjusted using



phosphoric acid. This acid will also help to lower the hardness of the water. It should be added in a very dilute form a drop at a time and the pH checked, after mixing well with the water, after each addition. Do not suddenly adjust the pH of your aquarium water greatly or you will probably end up with dead plants and fishes. A much better and safer way is to steep some pure garden peat in a bucket of water, for a few weeks and to strain off the yellow brown liquid. Small quantities of this acidic solution can be added to the aquarium water over a period of days, as should be done when using any type of acidic additions to aquarium water, and the pH checked after each addition.

How can one test the pH and hardness of aquarium water? There are on the market, from the larger aquatic dealers, small pH and hardness testing kits which are inexpensive and can be used to carry out a large number of tests. They are very simple to use and are well worth the consideration of any keen aquarist, especially those interested in breeding some of the more difficult fish.

Back to the question of obtaining gravel and rocks which are free from calcium carbonate. One large dealer supplies this commodity although it is rather expensive especially when the cost of postage is added but I think that the results obtained with such gravel are well worth the cost. Such gravel will last as long as the aquarist himself and is a good investment. Pieces of flint obtained from the sea shore and well washed, make attractive and harmless rocks for the decoration of aquaria. Rough edges which they might have had will have been worn off by the action of the tide. Suitable gravel, in the form of crushed granite chippings, can sometimes be obtained from a local stone-mason or contractor. Choose a gravel of a suitable grade and give it a number of good washings as it is likely to contain a lot of fine rock dust which will be a constant source of water clouding unless washed out. Make sure to allow for a loss in weight when this dust has been removed and order enough gravel. Nothing is more disappointing than to begin setting up an aquarium and to find that you do not have enough gravel. Such grains of crushed granite have rough edges but these do not appear to do any harm to other plants' roots or to fish. Make sure that your gravel and rocks contrast with each other. Garish contrasts can detract from the overall effect of the decorated aquarium. Do make sure that your rocks do not contain calcium carbonate or the trouble and money spent on obtaining your gravel will have been wasted.

Before setting up your aquarium it is worth while to paint the base of the tank with black paint to keep stray light from getting at the roots of the plants which will be close to the base of the aquarium. The back of the tank is better left clear so that different backgrounds can be inserted to vary the aquatic scene. Flaps of thin card can be glued along the top edges of the sides of the tank so that stray light can neither get into or out of the aquarium, while permitting the tank to be viewed from the side quite easily when required. Black paint can also be used to paint the back and sides of the glass up to the top line of the gravel. This will ensure, as with the painted base, that no light gets at the plants' roots which normally grow

away from light.

Having considered the question of water, gravel and rocks, we next come to the question of fishes and plants. Most good books on aquaria deal fully with water conditions which suit different species of fish but the question of water conditions for different plants has not received nearly as much attention as has that for fish. There are several useful books devoted to aquarium plants but generally information on water conditions is rather vague. A

request for information on growing water plants in aquaria, made by myself in a previous issue of *The Aquarist* (Nov. 1965, "Our Readers Write") did not bring forth one reply, so one would assume that either there is little interest in this facet of aquarium keeping, or the readers themselves have little exact information to impart.

Like fish, plants will grow under wide and varying aquatic conditions but each plant must surely have a given set of conditions under which optimum growth will result.

It is difficult, and perhaps unwise, to lay down any rules for the successful growing of any named plant unless a lot of information has been collected from a number of

independent sources, but it is of great use to publish any information which you may have obtained even if it does not hold true for the conditions in every aquarium. A recent article in *The Aquarist* described how easily Water Wistaria can be grown yet having tried to grow this plant under a variety of conditions I have had no success.

The following conditions are those under which I have successfully grown the plants named. At pH 6.8 and DH 7, with the aquarium situated out of direct sunlight and receiving six hours of light daily from a 40 watt bulb over a 20 in. x 10 in. x 12 in. aquarium: *Ludwigia*, *Vallisneria spiralis*, *Bacopa*, *Sagittaria*, Water Lettuce and excellent large plants of Indian fern. Under these conditions I was unable to grow several species of *Cryptocoryne*, Amazon Sword, including the chain sword, *Eloides densa*, *Hygrophila* or Water Wistaria.

Under conditions identical to the above except for a change in pH to 7.4, the following plants grew well: *Ludwigia*, *Bacopa*, *Sagittaria*, Water Lettuce, Indian fern, Chain Sword, *Eloides densa*, *Hygrophila* and some *Cryptocoryne* species. Under both sets of conditions, gravel and rocks were calcium carbonate free, and an under-gravel filter was in use. All aquaria were well stocked with the smaller varieties of tropical fish and kept at a temperature of 78°F.

Two more factors can now be considered. These are the addition of extra food for aiding plant growth, and the use of aquarium filters. I am quite convinced that a properly adjusted under gravel filter aids plant growth as well as keeping the water clear. The latter I have found only to be true when the aquarium is not over-populated with fishes. One advantage of such a filter is that, should it not be required, it can be disconnected and left in place without detracting from the aquatic scene, the air lift only being visible. Such filters suck fish droppings and other waste into the gravel and these are acted upon by aerobic



*Vallisneria spiralis*

continued on page 21 ▶



# Why not try marines?

by J. H. SOANES



Shore crab

THE keeping of marine creatures is a branch of his hobby that the average aquarist imagines to be beyond his scope. This attitude has come about due to so many articles about marine aquaria indicating that the maintenance of a salt water tank is both difficult and expensive. I suggest that this is not so, and hope to persuade readers that they could, without much expense, find this out for themselves.

The beautiful tropical marines capture the imagination, but many species of fish that make up for their lack of brilliant colour with bizarre shapes and unusual behaviour can be caught around our own shores. There is the interest of being able to catch them in their natural environment, and the not unimportant point that they cost nothing. When one is trying something new this last fact always bears consideration.

The ideal tank in which to keep these fish is one with which the sea water does not react. Fulfilling this condition is the all-glass or the all-plastic tank, but an iron framed one can be used providing the frame itself is not in contact with the water. If the frame is well painted I find that there is not too much corrosion. The fibre glass and nylon coated frames that are now available are excellent, but still rather expensive. With regard to the size of tank required, obviously the larger the better, but bear in mind the quantity of sea water you will need to fill a large tank. I have found that about six specimens do very well in an 18 in. x 10 in. x 10 in. aquarium, and this is not an excessive amount of sea water to collect and carry home (providing you are an amateur weight lifter).

Sea water should not be collected from the vicinity of a harbour or any other place where there is likely to be pollution. I am fortunate that, although living in Essex, I am frequently able to collect water in Devon where it is very clear and free from impurities. Water from the

North Sea is very cloudy and needs to be allowed to stand for some time before the clear water is decanted off from the sediment.

When setting up the aquarium a very thin layer of fine gravel can be used to cover the bottom. Coarse gravel should not be used as particles of uneaten food get down into it and rapidly pollute the water. The marine enthusiast is limited in the way in which he can make his set-up look attractive. Seaweeds cannot be grown under aquarium conditions, and so rocks, coral, and seashells are more or less all that is available for decoration. (Do not forget that coral and seashells should never be included in a freshwater aquarium.) With a little ingenuity, however, your set-up can be made to look most attractive.

Aeration and filtration are not, in my experience, required as often as is frequently suggested. I find that an established tank can go for long periods without needing either operation, but just to be on the safe side I do use an air stone occasionally (once a fortnight or so), and even more infrequently (no more than once a month) I put on a filter for a few hours. A filter medium that seems very successful consists of four layers; glass wool, activated charcoal, glass wool, and marble chips. The marble chips help to keep the pH value of the water high. This is an important point with marine creatures.

Now we come to the stage of introducing our specimens. One creature that I would always include is a sea-anemone. They are extremely interesting, and quite easy to keep. The commonest type in Britain is the banded anemone (*Aerolis spina*), which can be found in a variety of colours from red to green. When located in a rock pool they should be loosened carefully from their position as they can easily be damaged and even killed. Once in your tank they will pick a suitable spot and anchor themselves there, and only very occasionally will you find that they have changed

position. Feeding can be carried out about twice a week with pieces of meat, fish, garden worm, etc.

Many crustaceans seem to do well under aquarium conditions and I have successfully kept the common shrimp (*Crangon vulgaris*), small specimens of the hermit crab (*Pagurus hercynicus*), and the common shore crab (*Carcinus maenas*). Hermit crabs that have made winkie shells their current home are a good size for the average tank. One particular shore crab that I had became handsome, coming out of the water at the sight of food and taking it from my fingers. It must be remembered that these creatures can only grow by moulting their shells. At first I often despaired when I saw an empty crab shell, but then I would be delighted to see its late occupier crawling around looking slightly larger than he used to be.

Most marine molluscs browse on algae much the same as fresh water snails do, and among those that I have found suited to aquarium life are the various types of periwinkles (*Littorina* species), common dog whelks (*Nucella lapillus*), and any of the top shells (*Gibbula* species). They do not do well, however, unless there is a good supply of algae for them.

Finally, the fish that can be caught around our shores. Those that seem to be most at home in a small aquarium are the species frequently found in rock pools. Members of the goby family are easily kept, but I find that they tend to quarrel among themselves. The common or sand goby (*Gobius moro*) and the painted goby (*Gobius pictus*) are both attractive species, but I think my favourite is the two spot goby (*Gobius flavescens* or *G. rufescens*). This last species differs from the others in that it swims in the water and does not rest on the bottom. The gobies have their pelvic fins joined to form a sucking disc with which they can fix themselves to almost any surface. A species that is rather grotesque in appearance, but at the same time rather attractively marked, is the long-spined sea scorpion (*Coelus labialis*), but this is a fish that should not be put with creatures much smaller than itself. The last fish that I want to mention is one that has become a great favourite with me over the last few years. This is the common toadfish or shanny (*Blennius pholis*). It is a fish that can remain out of water for very long periods, and has developed its pelvic and pectoral fins to enable it to crawl about over rocks. My specimens will swim into my hands and sit there quite happily, they will leave the water to come and take food from my fingers, and if I hold food a few inches above the surface of the water their leaps rival those of the porpoises at Miami.

Maintenance of a marine aquarium is not difficult. Crustaceans and fish thrive on a diet of fish, earthworms, meat, liver, Tubifex worms, *Daphnia*, etc. So long as you do not overfeed, and any uneaten food is removed immediately, aeration and filtration are seldom required. As the water in the tank evaporates distilled water should be added to maintain the correct density. This needs to be kept at a value of 1.025, and you will find a hydrometer is a useful instrument to keep a check on this. Looking after your marines is largely a matter of the common sense application of fish-keeping techniques.

Breain's shores can yield a host of creatures of immense interest to aquarists, and I hope that this article will have encouraged many people to try keeping some of them. It is not as difficult to look after these marine animals as is commonly believed.

▶ continued from page 19

### Starting with plants and fishes

bacteria which thrive in the aerated water. The waste is converted into soluble salts and carbon dioxide. The instructions supplied by the makers of the filter should be followed closely as too much or too little air will not permit the filter to operate at its most efficient.

When using such a filter do not expect brilliant plant growth overnight. It takes a settling down period before the bacteria increase sufficiently in numbers to make the filter operate properly. Such filters, like peat, produce acidic water conditions. These can be useful or harmful depending upon the plants and fish kept in the aquarium. Soluble salts released by the bacteria can also cause an increase in the hardness of the water. Some of the water in the aquarium can be changed every month or so to counteract the above.

External filters can also be used to good effect in the modification of aquarium water conditions. Peat, for example, can be used as one of the media in such a filter. It will render the water slightly acid, and family brown in colour. Activated charcoal will adsorb carbon dioxide gas, and some other substances such as pigments which make aquarium water look cloudy. It is cheap and can easily be included as a filtering medium. More expensive substances in the form of filter resins can now be purchased in small quantities for aquarium use. They remove harmful chemicals which accumulate in aquarium water and which have a harmful effect on plant growth and on fishes.

The controversial problem of whether or not to add extra plant foods to aquaria often arises. This problem should be considered fully before any action is taken. Perhaps the safest substance to use is ordinary peat. Loose horticultural peat is suitable if well soaked and washed free of fine particles of dust. Even better are blocks of 'raw' peat cut from a peat bog. Soak such blocks in water for several weeks when they should be waterlogged. The blocks can then be cut into thin slices and arranged on the base of the empty tank, in the rear half. A covering of gravel is then placed over them, and the aquarium carefully filled. Plants are planted in the gravel and will later root down into the peat slices. Special aquatic plant foods may also be used.

Another method is to make a mixture of pure clay and water and to paint the dry base of the aquarium with this. The clay is allowed to dry and is covered with gravel and the tank filled in the usual way. Other methods suggested are pushing into the clean gravel, beside plants' roots, pellets of dried clay or of hamster manure. With any of the above methods the risk of polluting the water is always present.

Perhaps the last factor to influence the health and growth of fish and plants is the lighting of the aquarium. It is difficult to lay down hard and fast rules for this complicated topic. Much has been written on this subject and back numbers of *The Aquarist* contain a host of articles on it. Using these as a guide, and from personal trial and error methods, the aquarist can usually discover the correct lighting conditions for his particular aquarium.

If you are confused by all the facts which I have mentioned previously then the simplest answer is to try out a number of varieties of fish and plants. Find out which ones thrive in your own particular aquarium, and purchase more of them. Discard the ones which do not thrive or give them to another aquarist who may have in his aquarium conditions which are more suitable to the health of the ones with which you have failed. Remember that no two aquaria are the same even if they have been set up in an identical manner.



# Troubles in the pond

by A. BOARDER

**T**HE most frequent trouble with fishes in the garden pond is the complaint commonly known as Fungus disease. The correct name is *Saprolegnia*, but in some parts it is also called 'Cotton Wool' disease. Although this disease can appear at any time of the year there is no doubt that it usually attacks fishes in the early spring when they may be in a low state of health after the cold of the winter. The spores of the disease are present in most still waters but healthy fishes are not attacked unless they receive some damage to the skin. Healthy fishes have a complete covering of mucus, a slimy substance which protects the fishes from external pests and diseases. This mucus is kept in good order by glands under the skin.

When a fish is in poor health the mucus covering is disturbed and parts of it may fall off or become weak. It is then possible for any germs to enter the skin of the fish. The mucus covering can also be broken by some form of damage, either by the fish knocking itself on a rock or by the interference by a cat or bird. It is also very easy to disturb this covering by careless handling. Some fishes have a heavier coating than others and the freshwater fish, the Roach, is quite thickly covered with this mucus. When such fishes are caught and handled much of their slime is removed especially if they are handled with dry hands or a cloth. This is the main reason why Roach are rarely recommended for garden ponds for it is well known that they often suffer badly from Fungus disease because their mucus covering has been disturbed to allow the spores of *Saprolegnia* to enter. Providing great care is taken when moving Roach there is no reason why they cannot be kept like other fresh water fishes.

Although Fungus is the chief cause of the loss of many goldfish every spring it is not often that it is the primary cause. Apart from the possibility of damage to the fish in the pond it is probable that the condition of the water could also have had a bad effect on their health. Once the condition of the water deteriorates fish can become ill and then the mucus covering will be deranged, opening the door to Fungus.

The disease soon becomes apparent and will show as a white woolly substance on the fish. If any damage has been caused to the fish then the Fungus will show at that spot and for some considerable time at that spot only and not elsewhere. When the disease attacks a fish which has not received any specific damage, it is probable that the first sign of the trouble will appear at the extremities of the fins, often the caudal and dorsal fins first. Providing the disease is noticed before it has spread to a large extent on the fish, a cure can be effected. The disease does not travel very quickly and a fish can live for some considerable time before it dies.

As the disease takes a firmer hold on the fish, the fungus spreads over the whole body and when the gills are reached there is usually little chance of recovery. Sometimes a fish will have the eyes covered with a thick film of fungus causing blindness and sometimes the mouth is also affected and such a trouble is not easily cured.

One of the first signs of trouble in the garden pond is when a fish walks by itself away from the main school of fishes. Such a fish may have had a chill or be a female which is filled with eggs and whose swim bladder has been affected. The short-bodied fancy goldfish are susceptible

to this trouble during sudden cold spells. Once the dorsal fin of a fish is lowered it is a bad sign as usually any healthy fish will keep its fins erect and spread. There are one or two exceptions to this rule, and one sometimes seen is when an otherwise healthy fish has an attack of swim-bladder trouble. In such cases it is possible for the fish to keep its fins extended as its general health may be quite all right. At other times a fish may be seen with a thin covering of a greyish matter. This may not be the usual Fungus disease but another caused by a parasite which may be *Oodinium*. The actual Fungus usually shows up as tufts of cotton-wool-like substance hanging from the fish.

If an ailing fish is discovered soon after the occurrence of the trouble it is quite possible to effect a cure. However, if the fish is not seen until the disease has a firm hold there is not much hope of curing it. Therefore it is important that the pondkeeper inspects the pond every day or so in the early spring. If a fish is found with just one patch of fungus on the body this is almost certain to have been the result of a wound of some kind. In this case the affected part can be wiped with cotton-wool dipped in equal parts glycerine and iodine. An application of salt will also often cure this bad spot. Providing such a fish can be caught easily it need not be removed from the pond. It is unlikely that the disease will spread to any of the other fishes providing they are in a good condition.

If a fish is affected badly it must be removed from the pond for treatment. A spare container should be quite clean and need not have any compost or water plants in it. Place the fish in the water and then add a tablespoonful of sea salt. Do not stir the water but let the salt gradually dissolve so that the increase in strength of the solution becomes gradual. Keep the fish in a shady place and do not feed. If no improvement is seen in three days, change the water and add extra salt, so that the solution is stronger, say half as much salt again as was given at first. It is much better to see that the container is large enough to use very shallow water. Deep water is not as easily oxygenated as shallow water. An inch clearance from the extended dorsal fin of the fish is sufficient.

If the water starts to smell it should be changed to a fresh solution of the same strength. When the disease appears to have cleared up, the water can be either changed to a fresher solution or, if it is still in good condition, some fresh water can be added. Once the fish becomes active again it can be offered small pieces of broken worm but do not return it to the pond until it is quite clear of the disease.

There are several cures on the market for this trouble. I have not used them myself but have heard of several pondkeepers who have had good results. One thing is most important when using any fresh treatment. Wash the fish well in fresh water before changing from one type of cure to another. Ordinary table salt should not be used as it has had something added to make it free-running which may harm the fish. Use sea salt if possible and if not, then block salt will be all right. Fungus of the eyes or mouth can sometimes be cleared by wiping as for an individual wound but it is a good plan to keep the affected fish in a salt solution for a few days whilst the treatment is being carried out.



# Stones from the sea

by HENRY TEGNER

I FOUND the necklace in an antique dealer's tray at Scarborough. It is a beautiful example of the 19th century lapidary's work. Each agate has been cut and polished to an even, matching shape and the graded whole makes this piece of ornamental jewellery a sheer delight to touch and see. It is, I think, the considerable amount of work and sense of artistry, which has gone into the creation of this Victorian necklace, which makes for a great part of its appeal.

The day of the small lapidary is now past, but at one time these minor jewellers were to be found in many a seaside resort and particularly at the popular seaside places like Brighton and Scarborough. Even now, in the various antique shops of these two towns, nice pieces of pebble-jewellery may be found. Harrogate too seems to have hoarded a quantity of this Victorian. Many of the stones in this jewellery may have originated along the long Yorkshire coast. The jet of Whitby was, at one time, world-famous for its lustre and quality. In the days of our great-grandfathers and mothers, jewellery consisting of jet was almost universally accepted as the most suitable ornamentation for a widow.

Before inexpensive synthetic jewellery came to the fore to supersede the less flashy natural products of our shores, foreign semi-precious stones largely ousted the British pebble. The agate of Brazil and Uruguay and sardonyx from Arabia and India began to flood the market and at Oberstein, in Germany, a considerable industry came into being for the cutting, polishing and tinting of these semi-precious stones. In spite of this foreign competition the British lapidary continued to thrive, in a small way, in a number of coastal towns. There is no doubt that some of these craftsmen were not above using imported material such as the lovely banded agates of South America. Another popular substitute used in jewellery, and supposedly culled from our British beaches was bottle-glass. Semi-precious stones like citrine, opaque quartz and carnelian have all been created, over hundreds of thousands of years, by the fretful sway of the tides on the shore, and in their formation into little balls and ovoids they have assumed a colouring such as broken glass does when left to the constant action of the sea. Bits of green bottle-glass are often to be found on the washore and much of this material used to come to the lapidary by finders who thought they had picked up such lovely pebbles as chrysopease or chrysoberyl, natural greenish stones which, in fact, are highly unlikely to be met with along Britain's coasts. Many semi-precious stones, nearly all of which consist of basic quartz, have extraordinarily attractive names—sardonyx, chrysoberyl, beryl, onyx, jasper, citrine and carnelian are some of them.

Towards the end of the last century, and the early years of this one, pebble-collecting was quite a popular pastime and beaches from Cornwall to the north-east of Scotland were combed for their stony harvests. Nearly all of Britain's variegated shoreline may produce interesting stones but where pebbles abound, as at Brighton, the

chance of picking up nice specimens is so much the greater. There is a certain art in pebble-hunting. The secret largely is to walk along the tide line when the stones are still wet with the sun behind one so that its rays can penetrate and so show up a clear stone and, at the same time, display its colour.

My own particular hunting ground has mainly been the coast of Northumberland as I live within eight miles of the sea. It is a rewarding shore and contains a wide variety of pretty stones which are being constantly washed southwards along the coast by the ever fretful North Sea. It is not easy to get pebbles cut and polished by a lapidary today and it can be an expensive business when you have found a jeweller prepared to undertake this work. However if you only require your stones for decorative, or display purposes, and not as a form of jewellery, there is a substitute and that is a clear varnish or shellac which painted with a soft brush on to a stone, scrubbed clean with soap and a stiff brush, will show up the gem in its pristine form as seen wet when the tide recedes.

We each have our favourite stones and mine is the citrine, usually a pale lemon in colour owing to the iron oxide in the pebble. Its shades are many and varied from orange to pale gold. At one time citrines were much sought after and in the jewellery trade they were frequently referred to as fake or Scotch topaz.

It would be quite misleading to suggest that the pebbles of our shores are valuable gems. They are not but they may be pretty and on occasion decorative. To call them semi-precious stones is perhaps a form of flattery for intrinsically they are mostly of little worth. Nevertheless, most of us collect something even if it be match boxes, beer mats, cigarette cards, stamps or string, and much of this material is worthless. There is no doubt that in collecting, the search or hunt for items is perhaps the most delightful part of the game and certainly in this respect the collecting of small stones can rank very high for it nearly always takes place in delightful surroundings with the ever-changing sea as one's companion.

A nice collection of pebbles should not be hidden away in some drawer or cupboard; rather it should be displayed in a glass-topped cabinet. A nice lump of carnelian may make a useful paperweight or an ornament for the mantle piece. A smooth, clear quartz ovoid is as pleasant an object as many a factory-produced piece of bric-a-brac. The sea is a great craftsman and given pretty mince it can do wonders with them.

## BRITISH AQUARISTS' FESTIVAL

Will be held this year on the 29th-30th October at Belle Vue Gardens, Manchester. Full details will be available later.

# Amphibian antics

by RICHARD GUPPY

**I**N the course of a decade or so of experimenting with amphibians as pets, I have run into some experiences which may be interesting and, I hope, in some cases helpful to others who may follow the same hobby.

Most of my amphibian pets, including all frogs and toads, have been kept in outdoor enclosures; I have had no experience with saltatorial amphibians in indoor vivaria, but it appears that there is some risk, when the accommodation is small and low, of their inflicting serious damage on themselves by jumping against the cover. I have been able to observe this type of injury in a bullfrog, *Rana catesbeiana*. This amphibian, which is not native to British Columbia, nevertheless turns up here from time to time. The most probable origin of these strays is from tadpoles sold in pet shops. While I do not believe that these could complete their metamorphosis under the usual aquarium conditions, some may be turned loose to fend for themselves before too much damage has been done by unnatural confinement and inadequate feeding.

My specimen was caught by a young boy who, having no idea of the construction of a vivarium, put the frog into a 5 gallon crock with a piece of glass over the top. In a matter of 3 or 4 days the captive had started a raw place on the tip of its snout by jumping against the glass. The boy's mother, realizing that the frog stood no chance of surviving under the circumstances, persuaded her son to make me a present of it. The injury evidently became infected, and the inflamed area spread nearly to the frog's eyes. This condition persisted for nearly 3 years; finally the end of the nose gangrened and sloughed off. Healing then proceeded quickly and the frog is now normal except for his truncated snout, which gives him a rather truculent expression.

I have several times come across written accounts of goldfish having been killed by male frogs grasping them as if they were female frogs. I can easily believe these stories though I imagine that the fish would have to be somewhat sluggish in order to allow the amphibian to take hold. I have myself observed several pairings nearly as strange: Pacific tree toad, *Hyla regilla* on red legged frog, *Rana*

*areolaris*; red legged frog on bullfrog; Pacific newt, *Taricha granulosa* on great crested newt, *Triturus cristatus*. In every case the individual which was taken for a female was actually a male. It seems that the males of amphibian species which resort to amplexus while courting, will grasp any animal approximately their own shape and size. They are not, I think, attracted to anything smaller than themselves, but will tackle those that are quite a bit larger. The males of every amphibian of this type must be equipped with some means of warning other males that they have made a mistake but they naturally do not react to the signals of a different species. It is interesting to note that this failing in nature must limit, to some extent, the variety of amphibians which can occupy the same habitat. It does not seem possible that two species prone to mistakes pairing with one another could breed in the same body of water at the same time.

As an argument against the maintenance of mixed collections of amphibians in captivity, these mismatings need not be taken very seriously. Objections come usually from the soft-hearted observer but I doubt whether the victim ever suffers much harm. One experiment which might lead to losses would be the keeping of European newts together with the American green newt, *Dismicryllus vesicolor*. The latter species uses a peculiar style of amplexus. The male grasps the female by the neck with his hind feet. It certainly looks as if he were going to choke her to death and it seems possible that she has some special adaptation to prevent this outcome. I have not had much luck in breeding these newts, so whether the *Triturus* species, which do not resort to any kind of amplexus, could survive the *Dismicryllus* treatment, is still an unanswered question—so far as I am concerned.

For quite a different reason, the keeping of bullfrogs with any but the largest of amphibians, is certain to lead to disaster. Quite by chance, I had possessed my bullfrog for several years before I learned of his cannibalistic tendencies and incredible swallowing capacity. I happened to put him into a pen, built primarily for terrapins, which was covered only with wire netting of one inch diameter



Bullfrog showing extensive infected area on snout

Red legged frog in amplexus with American Bullfrog





snub. Since most amphibians could easily squeeze through this, only the very largest went in with the terraria. Besides the latter, the bullfrog's only pen-mates were three full grown western toads, *Bufo boreas*, an amphibian much like the common European toad, *B. bufo*. These he did not manage to ingest, but I now feel sure that he was responsible for the disappearance of the smallest of the terrapins. At the time I supposed that it had escaped.

On moving to a new location, I built a 12 ft. x 6 ft. pen in which I introduced the bullfrog along with my 6 large terrapins, 5 red legged frogs and 5 western toads. The two latter species ranged in size from half-grown specimens to adult females. This was a bit more of a concentration than I would usually allow but it was necessary to make do until I got more accommodation ready. Bullfrogs are warmth-loving animals, sluggish when the water temperature is below 50 degrees F., while red legged frogs normally breed when the temperature is only a little above freezing point. These facts account for my red leg getting away with what could have been a fatal mistake in attempting to use the bullfrog as a spawning partner. Later in the spring events took a different turn. There was a good deal of cover in the pen and when I could not always spot all my pets I easily deluded myself into thinking that they were hiding. The horrible truth I learned when I saw the bullfrog squatting calmly with the hind feet of a frog protruding from his mouth. This was a large female red leg, much bigger than the small male shown in the photo. A check showed that all the frogs and toads, except the two largest *Bufo*, were gone.

One would naturally suppose that such a voracious beast would be death to goldfish. As it happens goldfish shared a pond with this bullfrog for several years with no casualties. I never saw him attempt to take food from the water but it seems that his actions while under observation may be misleading. The difficulty he experiences in seizing the larger pieces of food offered him on land certainly imparts to the observer the idea that he could never grasp and hold on to a lively, struggling victim half as large as himself. Stebbins (1951) gives an impressive list of food items taken from the stomachs of dissected bullfrogs. These include fish as well as small birds, baby alligators, and a venomous

snake 17 inches long. The frog which engulfed that last item must have been much larger than mine, since to be measured the evidence must have been complete inside him. He could not have dealt with it in the way that my bullfrog managed his larger meals, swallowing them bit by bit as the part that went down first became softened by the digestive process. All things considered, I would not advise trusting any bullfrog with pond or tank mates of lesser size than himself, whether they be fish, amphibian, or reptile.

Literature cited: Stebbins, 1951, "Amphibians of Western North America." University of California Press.



American bullfrog

## Fish diseases (24) Pox disease

by R. E. MACDONALD

**P**OX disease can be diagnosed on the appearance of hard, greasy, white spots that grow considerably in size until they finally merge with each other to cover a fairly large area of the body. On mentioning the manifestation of "white spots" it should be made quite clear that this disease has no connection with the well-known Ichthyophthiriasis (white-spot) infection; it is quite easy to recognise the difference in practice.

It may be noticed that when large areas of the body are covered with the pox, sections of the encrustation may dislodge itself; this should be taken as being part of the normal course of the disease.

Pox disease does not appear to be contagious or fatal nor does the victim appear to suffer much discomfort. The disease apparently seldom attacks anything other than cold water fishes and can be cured quite easily by (a) promoting

excellent living conditions, (b) feeding with a good varied diet, and (c) by ensuring a constant supply of clean, aerated water.



Illustration showing advanced stage of pox disease



# A table for 50

by P. K. BLACKWOOD

HAVING read with interest the recent articles published in "The Aquarist" about Home Breeding and on the "inch of fish" permitted in the average sized tank, I felt readers might be interested in my experiences while trying to stabilise a strain of Guppies.

Since Guppies are such enthusiastic breeders, and the males are sexually mature at an early age and before exhibiting all their potential colouration, I was faced with the dual problems of the need for numerous tanks coupled with severe lack of space.

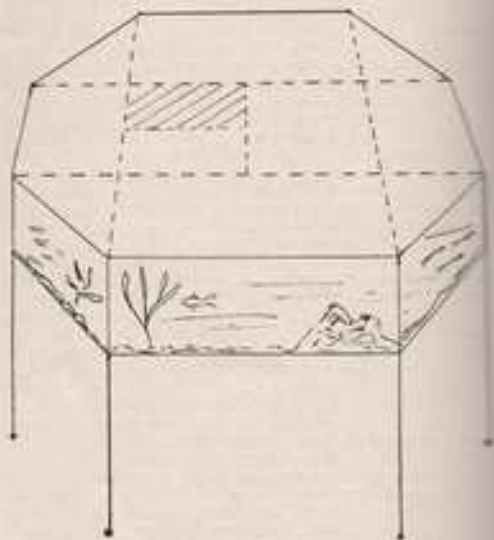
Working on the assumption that, given sufficient aeration, Guppies could survive quite happily although considerably overcrowded, I duly purchased a fairly powerful air-pump and a number of diffuser stones. My single fish-tank was by this time filled with an alarming array of floating coffee-jars (stunned with fish of various ages and sex).

Alas, the diffuser stones, far from improving the situation, merely swirled the accumulated bottom sediment transforming the previously clear water into a thick soup-like consistency. The resulting picture was rather grim as can be imagined, and obviously not beloved either by the unfortunate fishes or by my landlady.

After racking my brains to think up a suitable filtering system and a means of making the whole ensemble a bit more presentable, I hit upon the following idea. After purchasing a few lengths of angle iron I persuaded a friend to weld them together for me into the shape illustrated in the diagrams.

The whole structure was arranged on legs thus giving a convenient and attractive central table for coffee, telephone, plants, etc.

The central portion I divided in two merely to make the whole unit completely self contained. In one side of this (which was *not* filled with water!) I placed the air pump and in the other the filtering unit, heater, thermostat and diffuser stone. The four panes bordering on this central unit should be glazed with a non-transparent material, in my case green frosted glass, but several other things would serve equally well, e.g., acrylic sheet or, alternatively, some material such as black polythene may be placed against the back glass. When experimenting with this I found, rather to my surprise, that the water pressure alone seemed to keep it in



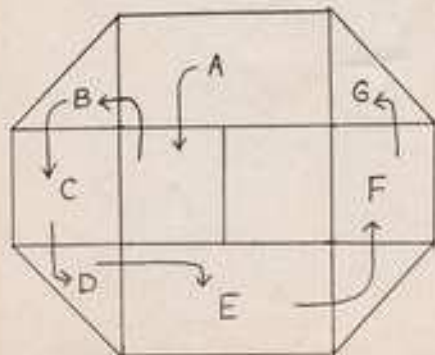
place quite satisfactorily, but I daresay a spot or two of Bostic might be safer.

The other panes were glazed normally. An economy point perhaps worth noting is that since the panes between sections holding water have the same pressure on each side, very thin glass is in fact all that is strictly necessary. This, however, does present problems should you ever wish to drain a single section.

Water is carried by means of a simple air lift from (a) through the carbon/glasswool filter into the central tank where it is heated and further aerated after which it is carried by siphons to section (b) and thence to (c) (d) (e) (f) (g) and back again to (a).

For the top of the table I used veneered chipboard covered with a good coat of Polyurethane varnish. Formica might be better. This lid is surrounded by a rim wide enough to enable the lighting mechanism to be contained under the roof (say 6" or so depending upon the type of equipment used—a fluorescent tube was my personal choice).

And that is all there is to it, apart from stocking the tanks themselves which is again purely a matter of personal preference. Since the set up is designed to be the centerpiece of a room it is better to cover the floor of the tanks with something a little more showy than the usual drab gravel—well washed chips of coal for example. I am sure that these tanks can be adapted to fulfil many uses; marines for example where many of the occupants, e.g., sea anemones, small fishes and crabs might not live together amicably and could thus be easily separated.



# The X-ray fish

by STEPHEN F. LANGTON

THIS brilliant little fish has had a very chequered history at the hands of the taxonomist for it seems that no one really knew where to place it within the broad confines of the characin family. Earlier workers put it near *Aphyocharax*, and later ones with the tetras (*Hemigrammus* spp.) which it certainly does resemble but from which it may be distinguished by its possession of an upper jaw which is toothed along almost the whole of its free edge (hence the scientific name *Pristella*, a little saw). It is now placed for convenience in the sub-family *Characodontinae* of the family *Characidae*.

It is called the 'water goldfish' (although this name seems to be rarer than it was) and the 'X-ray fish' because the bone-structure is easily seen through the transparent tissues although, in truth, it is no more transparent than many another tropical.

First imported into Europe in 1924, *P. riddlei* soon won favour because of its liveliness and bright, almost cheerful, demeanour. Its native habitat is the clear swift streams of Guiana, Venezuela and the Lower Amazon generally so the aquarium in which it is kept needs to be as clean and clear as possible if the fish is to keep its natural vivacity.

The body-shape is short and deep, especially in the female, getting more slender towards the deeply-forked tail characteristic of the swift swimmer. The ground-colour of a healthy fish is bright silver-grey with a yellowy-brown sheen. There is a dark spot behind the opercle and a black spot on the dorsal, anal and pelvic fins. The anal and dorsal fins are yellow with white tips and the caudal fin should be red-tipped in a healthy fish, the upper parts being an even deeper red. The smaller, or adipose, dorsal fin is colourless.

Males grow up to 1½ inches long and females to 1¼ inches as a rule. Sexing these fish should present little difficulty even to the beginner. The male, besides being generally slimmer, shows a pointed hinder end to its abdominal cavity, the females being more rounded. Here the transparent qualities of the tissues allow the abdominal cavity to be seen without the necessity of getting the fish between the observer and a light-source as would be the case in a more densely-fleshed fish. Young males, in addition, show an even more distinct reddish colouration of the tail as well as having a white border to the anal fin.

The prime essential for breeding *Pristella riddlei* and one which cannot be stressed too strongly, is a well-matched pair. Mismatching for size is, in the author's opinion, perhaps the commonest cause of failure with this fish. A 5-gallon tank, well-planted with *Ambulia* and *Myriophyllum* and well-lighted, with the temperature kept rigorously within a degree or two of 78°F. (26°C.), I have found to be the best equipment for the job. The strict maintenance of temperature will be conducive not only to successful breeding but also to the survival of the fry which, of all the fish I know, are amongst the most susceptible to the evils of temperature fluctuation.

Keep the prospective partners apart for a while feeding them up well, then put the female in first followed by the male after she has had time to accustom herself to the new tank. What little of the spawning I have been able to observe (mine always seem to spawn at about 3.30 a.m.) is as follows: the male chivvies the female about the tank swimming ever closer to her until eventually they seem to move as one fish, twisting and turning about the tank for some time before gyrating up to a level just below the surface but above the plants. There they spawn, the

eggs dropping on to the plant leaves, hence the importance of having plenty of them. In a matter of 3 hours or so several hundred eggs may be dropped, the exact number being difficult to ascertain as the eggs are clear and glassy and thus hard to see against the plants. If the tank has been kept faithfully at the optimum temperature quoted above, hatching should have taken place in about 36-40 hours.

A very necessary word of warning here: net and remove the parents immediately after spawning as they are avid egg-eaters.

The fry at this very early stage are greyish in colour and vulnerable in the extreme to shocks of practically any kind. I have lost innumerable fish through allowing visitors close enough to what appears to be an empty tank to be able to knock on the glass. The tank looks empty because the fry are very good at taking advantage of absolutely any kind of cover. They must feed at this stage of their lives on the very smallest of *infusoria* since their mouths are too tiny for anything else. Dr. Axelrod recommends that they be fed on newly-hatched brine-shrimp as soon as they begin to swim and this certainly seems like a good idea. After 10 days smaller *daphnia* may be fed to them as well as micro-worms if available.

The bigger, faster growers will have begun to eat the smaller fry by this time and some keepers remove them for this reason but I prefer to leave them keeping a careful watch, of course, to ensure that things do not get out of hand. One will naturally get fewer fish this way but they will be the liveliest and most vigorous of the brood and, after all, this is what attracted me to the fish in the first place and I think that in the long run stock will be improved in this way.

If all goes well and you have kept the essentials in mind viz. a well-matched pair, optimum temperature, and the correct food for those vital early fry-stages as well as protecting the young from shocks, then you should end up with about a hundred and fifty or so of these vastly interesting and vivacious fishes. Above all, have the patience to try again if you do not bring it off the first time.



The X-ray fish, *Pristella riddlei*



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

I have just purchased a dozen young *Parachanna obscura*. How long will it take for these fish—they average about 2 in. in length—to reach breeding size?

At a rough guess, about six months provided you give them plenty of swimming-space in clean, well aerated water and a diet rich in chopped earthworms and scraped raw beef.

Could I keep and breed tropical fish in a tank heated by oil? If so, say comments based on practical experience, with special emphasis on the type of apparatus required, would be appreciated.

Tropical fishes can be kept and bred just as well in a tank heated by oil as in one heated by gas or electricity. The chief points to observe are: adequate ventilation without draught; the provision of a thin metal screen just below the bottom of the tank to spread the heat and prevent the glass cracking; and the use of a top-grade paraffin oil in a lamp designed for trouble-free burning. The chimneyless lamp made by the firm of P. J. Bryant, the greenhouse heating specialists, of Fishponds, Bristol, is ideally suited to aquarium heating. This lamp can be supplied with either a  $\frac{1}{2}$  in. or 1 in. wick, and its strongly constructed copper reservoir holds enough oil to burn for a fortnight without refilling.

A few months ago I introduced some very fine specimens of the red ramshorn snail into my tropical aquarium. Yesterday I noticed that the shells of these snails have developed whitish fissures and depressions. Please tell me what has caused, or is causing, this trouble?

When the shells of snails start to show ugly fissures and depressions it is a sign that corrosive acids are at work. It follows, therefore, that the best way of guarding the shells of snails against erosion is to keep the molluscs in neutral to alkaline water with no acid-forming debris (decaying plants etc.) left to accumulate on the bottom.

Recently I installed a 24 in. by 12 in. by 12 in. tropical aquarium in my lounge, but although I set two dozen *Salvinia* plants along the back of the tank the water has not stayed clear. What has gone wrong?

Firstly, you need more plants in your aquarium than you have at the present time to trap some of the waste products of the fish and use them as food. Secondly, check up on the behaviour of the fish. If you find you have several bottom-grubbers among them remove all but four; for too many species forever turning over the compost are not conducive to clear water. Thirdly, do not overfeed the fish. Nothing clouds still water faster than un eaten food left to go bad on the bottom. Finally, if the plants and fish are obscured by what looks like a green haze, the best thing you can do is to shade the aquarium slightly, so that the free-swimming algae which cause this discoloration will be deprived of bright light and die down of their own accord.

Will the meat maggots used by anglers as bait make a good food for tropicals?

Meat maggots, or gentles, make a very useful food for tropical fish large enough to swallow them whole or chew them into swallowable pieces. But you would be wise not to feed these fattening worms too generously in case they lead to minor or major intestinal complaints.

I have just bought two black sharks (*Megachasma pelagios*). Will these fish prove suitable occupants of a community tank and about how large will they grow?

The black shark does not molest other fishes and is quite suitable for a community tank. In the wild state it attains

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 to that a direct reply can be given.

about 2 ft. in length, but most aquarium specimens appear to stop growing when they reach about a third of this size.

I have been given a glass-sided tank with a galvanised iron bottom. What can I do to make this bottom harmless to tropical fish?

For a permanent sealer spread a creamy mixture of one part of cement to two parts of washed sand to a depth of about 1 in. over the metal floor. After this has set hard give it a good scrubbing and soaking under several changes of water to remove the free lime. Alternatively, you could give the bottom two or three applications of bituminous paint. But you must bear in mind that a painted bottom is only as long-lasting as the paint.

The guppies I keep introducing into my community tank never live more than six months or so. Yet according to the books the guppy has a life-span of about two years. Please may I have your comments.

In all probability the guppies introduced into your community tank do not get their proper share of food and/or go in constant fear of molestation. Ideally this species should be kept only with its own kind in a brightly lighted and well planted tank. Given these conditions it will usually stay alive for eighteen months or more.

What information can you give me about a fish called the swamp-barb?

The swamp-barb, formally known as *Barbus shufeldti*, is a member of the family Cyprinidae. It is indigenous to eastern India and attains a length of about 3 in. to 4 in. It has one pair of barbels on the mouth. In coloration it is silvery-olive to green, darker on the back and lighter below. The base of the tail is adorned with a bold black spot outlined with gold. This fish will eat anything alive or dried and is hardy enough to stand a temperature in the middle sixties (°F). In addition to these merits, it is a peaceful and reasonably easy to breed.

Would a cutting from the common water hyacinth, which is very common in the canal near my home, grow in a heated tank?

A cutting taken from our native water hyacinth or spatterdock (*Nephris lacustris*) seldom lasts long in any sort of indoor aquarium. But a seedling plant dug out of the mud and transferred to an aquarium maintained at room temperature may continue to grow provided it is given a good light.

I have been told that *Apistogramma nana* is absolutely trustworthy in a community tank, but as this fish is a fairly large-growing cichlid I have my doubts. I would be glad of your observations.

What you have been told is perfectly correct. Even fully grown specimens of this charming fish rarely, if ever, take any notice of other fishes, small ones included.

My young son has been trying to keep goldfish quite unsuccessfully in a 18 in. by 12 in. by 12 in. tank. The proprietor of a local aquarium shop has suggested that we change over to tropicals which, he says, are far easier to look after and keep alive than coldwater species. Is this true?

Yes, tropical fishes are easier to care for and keep alive in a restricted space than most coldwater species. We think that you would be well advised to take your dealer's advice.



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

I wish to raise frogs and tadpoles and keep the mature creatures. Is there a book on the subject?

The book *Reptiles and Amphibia*, as advertised in *The Aquarist*, will help you and you might find the book, *The Freshwater Life of the British Isles*, by John Clegg, published by Wares, very interesting. It is easy enough to rear tadpoles of both amphibians until they leave the water but clear that the difficulty in rearing them arises when you have to feed them. They take small types of live foods and these may not be easy to come by. Try fruit flies, small maggots and white worms until they are large enough to take small garden worms, etc.

Last year I got an old bath-tub and made a pond with it in the garden. I planted it with a water lily and several other plants. I added nine fishes and some red ramshorn snails. The water has never been really clear and scum is forming round the edges. What is wrong with the set-up?

It is always very difficult to keep a small pool such as yours in a healthy condition. I find that the smaller it is the more difficult it is to keep in good order. You may have over-stocked it and it is better to try to stock and maintain a very small pool in the same manner that you would keep a small fish tank. Try cutting down the feeding and the snails may not be still living, usually red ramshorn snails are bred in a tropical tank and soon die in cold water out of doors.

My fishes in the back garden pond have become infested with anchor worms and they appear to be round the edges of the pond at night. Is there anything I can put in the water to kill them without harming the fishes?

There is nothing strong enough to add to the water which will kill the anchor worms (*Lernaea*), which will not also kill the fishes. You will have to remove the fish from the pond and then try a strong solution of household ammonia. Increase the strength until all the worms are dead and then empty, clean out and refill. You will have to remove the worms from the fishes with tweezers or by dabbing them with Dettol on cotton wool. A bath in a solution of a quarter teaspoonful of Dettol to a gallon of water should also clear the fishes of the parasites, but do not leave the fishes in the solution for more than a few minutes; watch them whilst in this and remove at once to fresh water if they turn over.

I have a pipe dripping water into my fish pond at the end of which is about three feet of copper tube. Is this enough to harm the fishes?

Copper is deadly to fishes in a concentration of a fifth part to a million of water. If the water is soft the danger can be greater than if it was hard or limey. The latter water soon forms a scale of lime inside the pipe and then the copper may not be able to give off as much poison. However I have had so many cases of losses of fishes through the use of copper in the water in any form that I would treat as very dangerous the use of it in any way where fishes are concerned.

I have a large shallow zinc tank that I wish to use for fish or reptiles. Will it be safe or what treatment would you recommend?

The tank should be safe for reptiles but for fishes it depends on whether the tank is a new one or fairly old. New zinc can be dangerous to fishes, as it contains copper.

You could paint it with a bituminous paint, wash it out and it should then be safe for fishes.

I would like some information on the care and breeding habits of golden orfs?

You will find references to these handsome fishes in the book, *Coldwater Fishkeeping*, as advertised in *The Aquarist*. They breed in a manner similar to that of goldfish but like a very well oxygenated water and plenty of swimming space. They may not breed until they are about a foot long and must have plenty of live foods to condition them. They will spawn on tree roots or fine water plant leaves and the eggs are similar to those of goldfish, laid singly and adhering to plants etc.

Do shubunkin males show the tubercles on the gill plates when in breeding condition the same as ordinary goldfish?

Shubunkins will show the white tubercles like ordinary goldfish. However it must be realised that all males may not show these marks even when breeding; and a better way of sexing them is to notice the thickness of the body. When in breeding condition the females are usually much fatter than the males.

I have a tank 18x12x12 inches with six fishes in it. Recently I noticed that the tail of one of the goldfish appeared to have been nipped off. What is the reason for this?

It is probable that the fish had an attack of fungus or fin-rot. Ordinary goldfish are not likely to bite other goldfish. You may have too many fishes in your tank, it depends on their sizes. The tank should not have more than nine inches of fish, and more than that the inhabitants can soon become ill and be subject to fungus or other diseases.

I would like to attempt to breed bitterling, and wonder how I can be sure that the painters mussels will get enough zooplankton?

The mussels will not thrive in a well functioning clear tank. They must have plenty of muck or mud at the bottom in which to move about and feed, without plenty of this they would soon die.



Pair of bitterling inspecting mussel

# *Aphyosemion cognatum*

## Some experiments conducted on this egg-laying tooth carp

by THE BRITISH AQUARIST STUDY SOCIETY

TO carry out all the work needed on the "egg-laying tooth carps" is probably a life time's work for all the members of B.A.S.S. because there are many questions, to which no answers are known, on this family of fishes. Some species are not clearly defined, cross breeding takes place between different "species" and in our tanks colour variations appear which have been given the names of different species in the books. Much of this work needs careful observation and properly documenting. It is regrettable that relatively little professional research work is done on fish, unless they are "food fish" with a commercial value.

Some interesting questions on tooth carps are—

- How long do these fish live?
- What is their total egg production during their lifetime?
- What are the sex ratios in each spawning? Do these vary much from spawning to spawning?
- What is the effect of temperature on the incubation period of the eggs?

Tooth carps can be roughly divided into two groups: (1) Those fish which lay their eggs on the roots of floating vegetation or the leaves of plants, and these are known as the egg-hangers. These eggs have a relatively short incubation period. The most frequently quoted time in the books is 14 days. (2) Those which lay their eggs in the mud at the bottom of the pond—these eggs have an incubation period of 3-4 months and often need to be "died out." These fish are known as the bottom-spawners or "buryers."

It was thought by the Technical Committee of B.A.S.S. that some observations on the "hangers" would be useful. It seemed to us that the following factors could influence the incubation period of the eggs.

### (a) Constitutional factors.

These are factors inherent in the egg, dependent on the species and perhaps even on individual parent fish. In this *Aphyosemion cognatum* experiment all the eggs came from one pair of fish which themselves had been line-bred for four generations.

### (b) Environmental factors.

1. Water, pH and mineral content could affect the incubation period of the egg and there is evidence to suggest this.
2. The oxygen or carbon dioxide tension in the water. This may be dependent to some extent on the volume of water in which the eggs are kept, its depth and its surface area, and the number of eggs present in the water. These factors may be more important when eggs are kept in 10 ml. of water in small vials which is the way in which we have conducted our experiments.
3. Temperature. The level of the temperature is obviously important; but can the fluctuation of the temperature influence the incubation period of the eggs?

4. Mechanical agitation may help the eggs to hatch. We have all had experiences of where eggs have refused to hatch and then shaking them has stimulated or helped the fish out of the eggs.
5. The amount of light which the eggs receive may be important.
6. The presence of protozoa or bacteria in the water.

In order to test the experimental procedure we decided to carry out an experiment on the eggs of *Aphyosemion cognatum*.

### Method

G. Cost acted as supplier of eggs. The eggs were laid by one pair of *Aphyosemion cognatum*. The pair were kept separated for 4-5 days and then placed in the breeding tank. The fish were allowed to spawn for 12 hours during which time between 10 and 50 eggs were laid. It is interesting to note that the eggs were laid on any part of the spawning mop and these eggs are more sticky than *Aphyosemion variiflor*, *A. brittanian* or *A. calliarum*.

Ten eggs from the same spawning were placed in a vial containing 10 ml. of water. The vial was wrapped in polystyrene and sent through the post to the experimenter. Each experimenter was sent a sheet of instructions and an observation sheet. The supplier put batch number, name of species, number of eggs, date of spawning, temperature of water in the vial when the eggs were put in. Each experimenter had to make a daily observation on temperature, number of eggs hatched and any other comments. When all the eggs hatched or after 50 days the observation sheet was returned to the Chairman.

### Results

The observations covered 243 eggs of which 77 (30%)



*Aphyosemion cognatum*



became fungused and did not hatch. Of the 73 fungused eggs 78.6% went so within 4 days of being laid, probably showing that these were infertile eggs.

The shortest incubation period was 9 days, the longest 27 days; the mean length of the incubation period was 18.1 days.

In no case did all the eggs in the vial hatch on one day; in some cases they hatched over 2 days, the shortest spread, and over 10 days, the largest spread.

The effects of temperature were most interesting. Many aquarist books lead one to expect that the higher the temperature above 70°F, the larger the incubation period. The results of our observations are shown below.

Batch No.	Average Temperature	Mean length of Incubation Period (Days)
G.C.3	78.1	13.7
G.C.4	77.2	10.2
G.C.18	76.3	11.6
G.C.23	76.1	16.6
G.C.21	74.6	13.4
G.C.2	73.7	19.4
G.C.6	73.3	12.0
G.C.15	72.7	17.3
G.C.8	72.4	12.9
G.C.7	71.7	13.3
G.C.19	71.4	25.7
G.C.11	69.9	18.5
G.C.10	69.8	18.6
G.C.13	69.5	20.1
G.C.17	67.7	22.4
G.C.16	67.6	27.0
G.C.12	67.5	19.5
G.C.22	67.4	23.0

The average length of incubation period was 18.1 days. Eggs with an average temperature above 70°F.—length of incubation period 15.5 days. Eggs with an average temperature below 70°F.—length of incubation period 20.8 days.

If the three vials at each extreme end of the temperature range are compared, i.e. G.C.3, G.C.4 and G.C.18 (average temperature 77.2, average incubation period 11.8 days) with batches G.C.16, G.C.12, G.C.22 (average temperature 67.5, average incubation period 23.2 days), it will be seen that the incubation period in these extremes is twice as long at the lower temperatures. The numbers here are too small however to make any valid statistical comparison.

#### Conclusions

1. This is a practical method of carrying out experiments on tooth carp eggs.
2. 30% of all eggs were infertile.
3. The incubation period of these *Aphysanion cogueatum* eggs varied from 9 to 27 days, the average incubation period 18.1 days.
4. Temperature appears to affect the length of the incubation period; eggs incubated at temperatures above 70°F. had an average incubation period of 15.5 days; those incubated below 70°F. was 20.8 days.
5. These results must be tentative as they are only based on 170 observations but we can now go on and test the following hypothesis: "The length of the incubation period with *Aphysanion cogueatum* eggs is inversely proportional to the temperature of incubation at temperatures in the range 67-79°F."

The pilot experiment was launched in September, 1964. The following members took part: H. J. Aylton, P. L. Bird, J. Cook, D. M. Crowther, A.M.I.S.P., A.R.S.H., G. Cust, M.B., Ch.B., D.P.H., D. Dunford, T. Glass, M. R. Thomas, F. C. Tomkins, J. H. Turner, P. B. Utton, M.P.S., D.B.A. (Chairman).

This account was prepared on behalf of the Committee by Dr. G. Cust.

## Insect individualists: Gerris and the surface film

by FRED WILMOTT

THE well-known Pond Skater or Water Strider (*Gerris*) is a good example of an aquatic insect which makes use of the condition, common to all water, which is known as "surface film".

At first glance it might seem that this little insect can run and jump upon the surface of the water, without even its feet becoming immersed, because of its lack of weight, but further consideration shows that this is not so. For it is a well-known law that a floating body displaces its own weight of water and one would therefore expect the tiny feet and spindly legs of the Pond Skater to be pushed below the surface by the weight of the whole of its body.

The answer to the puzzle is that all water, both indoors and out, has surface film. This is not a film formed by dust, oil, or any other substance, but is caused by a special property of the surface water itself. The effect is that of a very thin, rubbery covering which can be seen, when examined under a magnifying glass, to give slightly under the weight of the insect without actually letting its feet through.

If pushed beneath the surface of the water the Pond Skater will immediately, because of its low specific gravity, rise to the surface but will often have some difficulty in forcing its way back through the surface film. It will sometimes even run along the underside of the film like a fly on a ceiling, and close observation through a lens shows that as it does so its feet make dents in the film which appear as small bumps on the topside.

Many other aquatic insects make use in one way or another of the surface film, but I have always had a soft spot for little *Gerris* which can often be seen skating merrily about the pond on mild days in winter . . . days when all other pond creatures appear to be hidden or dormant.





## 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

### Brine Shrimp Eggs—A Correction

IN my article "Food for Tropical Fish," March issue, it was stated, regarding the hatching of brine shrimp eggs, that a "brine solution made by dissolving about four tablespoons of salt in a pint of warm water," should be used. This should, of course, have been one tablespoon of salt per pint of water.

B. WHITESIDE,  
"Wilecca,"  
91 Glenarm Road,  
Larne, Co. Antrim,  
N. Ireland.

### That Biting Catfish

THE albino catfish described in the March issue is *Clarias polycephalus*. The wound described is inflicted by the barbed pectoral fins.

I have been "pricked" three times whilst trying to catch my specimens which are nine inches long. The pain caused is out of all proportion to the size of the puncture; therefore I believe that the fish is equipped with some sort of venom or electric shocking equipment.

These fish should be caught in a large-meshed net as when they are captured in the normal nylon type their barbed fins pierce the fine material and are impossible to remove without ruining the net. Another interesting feature of this fish is its walking ability. One of mine escaped from a tank when the cover glass was left off and was found walking around the floor on its pectoral fins.

The fish can live for a long time out of water.

K. PARRY,  
Uxbridge, Middx.

### Fishes of India and Pakistan

CAN you recommend a book or other source which describes the fishes of the Indo-Pakistan Subcontinent? I have a copy of *Freshwater Fishes of the World* and while this describes a number of fishes to be found here there are many it does not.

In the last year or so I have collected many different types of fishes from the lakes, rivers and canals within sixty miles of Karachi and I am unable to identify them.

J. N. S. CRAMER,  
Karachi.

*Fishes of the Ganges* by Buchanan (published by Hamilton).

All available papers and works by S. I. Hora.  
See bibliography in *Freshwater Fishes of the World* by G. Stead (published by Vista Books Ltd.).

—EDITOR.

### Bags of White Worms

HAVING had great difficulty in keeping white worms, I tried keeping them in a large plastic bag (18 by 12 ins.) filled with equal parts leaf mould, peat and sand. I bought a jar of white worm (approximately 1 oz. weight) which I emptied into the bag after first moistening the mixture of leaf mould etc.

After one month, the white worms have considerably multiplied and are as fresh as the day I set up the culture.

M. STROBERT,  
142 New Road,  
Staircross,  
Nr. Barnsley.

### The Biting Catfish: Further Notes

IN reply to W. Bowman, Stockton-on-Tees, in your March issue, he obviously has a *Clarias batrachus*. I have seen two varieties of this fish, the difference being the Albino has pink eyes.

I was once the proud owner of an albino which is now in the Regents Park Zoo, as it rapidly outgrew my three-foot tank. I, too, purchased mine when it was about two inches long and inside three months it had reached six inches, eating anything that was dropped in the tank. Its favourite meal was earth worms shredded at first, then taken whole after about two months.

Although it lived in a community tank along with neon, glow lights and small guppies, it showed no signs of troubling the other fish, his worst fault being that if a plant was in his way he would just uproot it rather than go around it, so after a short while the whole tank was one hell of a mess.

He also would stand on his nose and burrow down into the gravel, sending up great clouds of gravel and dirt and leaving big holes everywhere.

One piece of advice to Mr. W. Bowman: Keep your tank well covered as the fish is liable to jump out of the tank. Although a gentleman in America says his *clarias* has lived out of water for about three hours I feel this is a big chance to take.

A. DAVY,  
12a Risboro Close,  
Murwell Hill,  
London, N.10.

### Characins and the Like

IN furtherance to the question I posed in my article "Fishes of the Characin Family" (*Aquarist*, March), as to whether the giant pencil fish (*Anostomus anostomus*) was in fact a member of the *Characidae* family, or the

apparently separate *Acanthoides* group, I raised the matter with the Judging and Standards Committee of the Federation of British Aquatic Societies, from whose chairman, Mr. A. G. Jessopp, I received the following reply.

"The *Characidae* (*Characini*) family covers fishes of a great many various types and shapes, which in older classification justified the formation of a series of sub-families, one of these being *Acanthoides* in which is the genus *Acanthox*.

In modern classification because of marked differences, some of these sub-families have been separated off as families by themselves, but they are also still referred to as *Characini*-like fishes and for this reason we feel they should still be included in the *Characini* class on the show bench.

For your further information, the Americans are now examining all the genera of the *Characidae* to reclassify them into sub-families and families, and their information should be published in about six weeks."

The above extract, therefore, denotes the view of one of the governing bodies of the aquatic hobby in Great Britain. Whilst not necessarily disagreeing with their views, I would still be very grateful and interested to hear from any aquarist with similar or, indeed, opposing views, explaining how his/her conclusions are reached.

M. J. PARRY,  
45 Western Drive,  
Goswells, Cardiff.

#### Ozone Releasing Air Stone

IN the February issue of *The Aquarist*, in the article "A Start with Marines," by T. Hirst, he mentions an "ozone releasing air stone". I should be pleased if you can give me any information on this item, where it can be obtained, etc.

J. ENTW,  
Barnoldswick, Lancs.

#### Longer Life for Light Bulbs

AS most aquarists know, light-bulbs "blow" remarkably quickly in tropical aquariums. This is caused when cold water drops on to the hot bulb when the lid is raised, perhaps for feeding. The water then rapidly cools the outside of the glass of the bulb and due to uneven contraction the glass breaks. This loss can work out at several pounds worth of bulbs in a year.

I decided that the best way of treating the problem was somehow to separate the condensed water from the bulb. I first thought of using a plastic bag over the bulb, but the bag was soon melted. I then came across some transparent plastic material which had been used for "double-glazing" windows. I cut out a piece which fitted the inside of the lid then, pulling it taught, stuck it with sellotape in position. A hole can then be cut where required for aeration tubes and heater wires, depending on the type of lid.

A variation of the above is to stretch the material loosely over the whole of the "open end" of the lid and then stick it on the outside. When the lid is pushed down it bends the plastic round the corners.

I thought at first that it was going to get very hot in the lid, but the aeration holes in the lid and the heat loss through the metal surface provided adequate cooling. Air was able to pass over the surface of the water through the holes cut in the plastic for the aeration tubes and electrical wires. An unforeseen advantage was that the metal of the lid was not rusted because water could not come into contact with it.

I hope that the above idea will be useful and economical to anybody who uses it.

I. S. MacKROON,  
31 Emsayd,  
Chippenham, Wilts.

#### Daphnia Cultures

HAVING been a regular reader of your magazine for a number of years, I notice that from time to time articles appear on the breeding of *Daphnia* cultures.

I have been breeding *Daphnia* with very little trouble for some time, and as we are at the beginning of a new season, I would like to pass on my method to others.

I use at present an old porcelain sink, though I have used polythene bowls and baths.

The sink is put in a sunny position and filled with tap water and into this is put cut grass (clippings). I introduce the *Daphnia* as soon as the container is set up, and for a few days I feed them on tubed fry-food as used for egg-layers.

After about ten days, I add fresh grass clippings and/or dead oak leaves, bits of pond plants (some of the latter have taken root) and a small amount of garden soil. I do not use potato peelings, banana skins or the like. The container is then left alone for the *Daphnia* to breed.

I set up such a culture last year, and to start my *Daphnia* culture, I only had one solitary *Daphnia*. I usually collect them from a small natural pond near my home, but last year I was unlucky, I caught a number of Cyclops and *Bosmina*, but only one *Daphnia*. A few days later the pond was filled in by the farmer on whose land it was. Despite the lack of "breeding stock," when the frosts came, the one had multiplied to several hundred, along with the Cyclops, *Bosmina*.

I left this culture alone through the winter, not bothering to remove dead oak leaves that had blown into the culture, nor to remove ice that formed on the water during the winter. On Wednesday, 16th March, 1966, I noticed fourteen *Daphnia* in the water of the container. The water itself is clear and slightly brown in colour.

I have used the same method, with varying degrees of success in the raising of Brine Shrimp to maturity. The differences are salt water instead of fresh, and the almost continuous feeding of tubed fishfoods. First, that used for egg-layers, then as they grow larger, tubed food for livebearers throughout the summer. I have not yet attempted to bring the Brine Shrimp through a winter.

G. NORT,  
61, Merridale Road,  
Wolverhampton,  
Staffordshire.

#### Could You Help Us Please

WE in Malta are soon forming a Society of TROPICAL FISHES and we are in need of material of how to run such a Society such as the publication of Newsletters, magazines etc., which are printed by Societies and what they contain.

Could you give our address to different Societies, so that they could give us all the help we need to run such a Society?

J. J. MELL,  
"Pat House," Church Street,  
Paceville, St. Julian's,  
Malta.

RE the "tuning catfish" of Mr. W. Bowman. Could this fish be one of the *Malapteruridae* family of electric catfish such as *Malapterurus electricus* (ref. p. 231 *Fresh-water Tropical Aquarium Fishes* by G. F. Hervey and J. Hens).

The fish can apparently give a good electric shock and grow to 6 in. in an aquarium or up to 3 ft. in the wild. The "bite" received by Mr. Bowman could well have been an electric shock.

R. H. MORRIS,  
Connah's Quay, Chester.



# Botia hymenophysa

by JACK HEMS

THIS loach was first introduced to tropical aquarists about thirty years ago. It appears to be quite common over large areas of Thailand, Indonesia, and Malaya. In the wild state it reaches a length of about 9 in., but aquarium specimens rarely exceed half that size. So far as the writer knows, it has not been bred in captivity, and externally there is nothing to distinguish the sexes. It keeps itself to itself, and does not molest other fishes.

The body is longish with a slightly arched back and rather compressed sides. There are three pairs of barbels on the thick-lipped mouth, and an erectile spine below each eye. The coloration is greyish brown on the back, shading through gradations of slatey-blue to whitish on the belly. About thirteen grey-green bars with dusky edges adorn the body between the tail and the tapering head and continue onto the yellow dorsal fin. The bars are almost, if not quite, horizontal anteriorly, and vertical posteriorly. The pectoral, ventral, and dark-spotted caudal fin are, like the dorsal fin, coloured yellow.

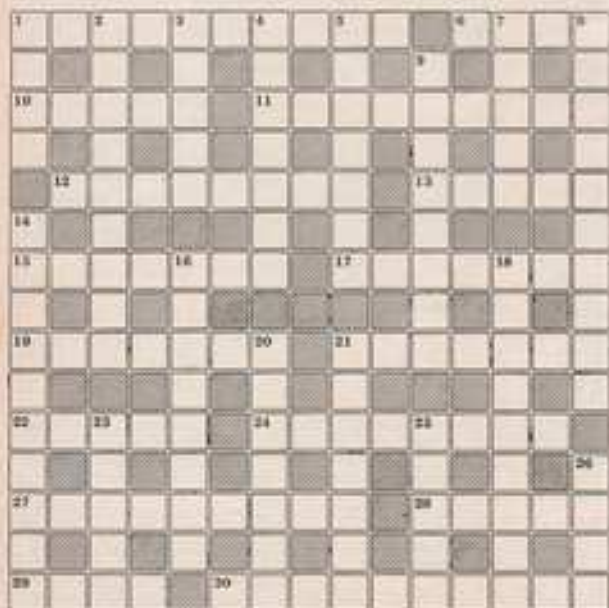
Two or more of the fish rather than a single specimen, that seldom stays alive very long deprived of the company of its own kind, will flourish well in any thickly planted aquarium maintained at a temperature of 75°F (24°C), but a variation of a few degrees (F°) either way does no harm. The fish likes to live in a group beneath a low-lying

canopy of submerged vegetation, or under an overhanging or propped-up ledge of rock. But it should be noted that, although the fish is of a retiring nature, it likes to flit about the aquarium every now and again. As soon as dusk closes in or the tank lights are switched off these flittings are most purposeful and more prolonged, for the search for food ranks high in this loach's nocturnal ramblings. All the regular live and dried foods, and lean meat scraps, are taken from the bottom and, as will be readily realised, scavenging ranks high on the list of this fish's merits.



Botia hymenophysa

## The AQUARIST Crossword Compiled by L. BRADLEY



### CLUES ACROSS

1. *Ponticola antiprotica* (6, 4).
4. Powder found in a metal carbonate (8).
10. Weed (5).
11. Live food for fry (3).
12. Light open carriage (8).
13. Home of the blue galarin (7).
15. Inscription on a tomb (7).
17. *Perfolia*: Simplest class of multicellular green algae (7).
19. .... . . . . . maculata (7).
21. Strike in this manner to become inimical (3, 4).
22. Australian dog (5).
24. Legible (6).
27. Trust none (anag) (4, 5).
28. It angled it is 90° (3).
29. Usually six ball (4).
30. Not use for marine aquariums (10).

### CLUES DOWN

1. English bird (4).
2. *Aphroscione auctalis* (9).
3. The Atlantic, for example (9).
4. Huge, extinct elephant (7).
5. Antisomers of position (7).
7. Lengthen (3).
8. Consisting of the commander in chief and a number of Parliament getting together to raise a ruck (10).
9. This aquatic plant, when cultivated, leaves a musical instrument (9).
14. *Brachydanio albimanus* (3, 5).
16. Pond insects (6).
18. *Hemigrammus erythrozonus* (9).
20. Supplies all the air needed in the aquarium (7).
21. Marine fish found in the 3-down (3, 4).
23. Jump back to the fast for a trace (5).
25. Type of aquatic grass found in a bow-fronted aquarium? (7).
26. MIX (4).

Solution on page 37



Catfish: 1, R. Bean (Smith); 2, K. Glover (Swillington); 3, K. Hirt (Chapelton). Large Catfish: 1, H. W. Hughes (T.A.B.); 2, P. Mulla (Mansfield); 3, A. E. Goshner (Stratford). Trout: 1, P. Taylor (South); 2, B. Bradford (Sheffield); 3, W. Gattrell (Tadcaster). Breeders, Livebearers: 1, R. Wilkinson (Halifax); 2, D. Cohen (Swadlow); 3, A. B. Wilkie (Stratford). Breeders, Egg-layers: 1, Mrs. K. Hirt (Chapelton); 2 and 3, K. Wilkinson (Oswestry). Pairs, Livebearers: 1, P. A. Nickolls (Oswestry); 2, J. T. Sisson (Oswestry); 3, Mrs. M. Wilder (Stratford). Pairs, Egg-layers: 1, H. W. Hughes (T.A.B.); 2, Mrs. H. Pratt (Huddersfield); 3, G. Hodgkinson (Oswestry). A.O.V.: 1, P. Moorhouse (Bradford); 2, P. Taylor (South); 3, H. W. Hughes (T.A.B.). Goldfish: 1, A. B. Wilkie (Stratford); 2 and 3, D. Priestley (Middles). Jewels: 1, L. Brown (Huddersfield); 2, Miss L. Pratt (Huddersfield); 3, G. Hodgkinson (Oswestry). Ladies: 1, Mrs. E. Wilkinson (Halifax); 2, Miss A. Wilkinson (Halifax); 3, Mrs. B. Hirt (Chapelton). Best fish in the show, Tuffin Park, Mr. X. Park (Merrivale).

**THE** March meeting of the **Worthing Tropical Fish Club** turned out to be one of the most interesting meetings that the club has had. The main programme was a talk and film show about Oceanography and Marine Biology by Mr. K. Andrews of the National Institute of Oceanography. Despite the impressive title, the talk proved to be extremely interesting. Mr. Andrews, who is a member of the British marine exploration team, showed in some representative photographs of his marine specimens and the equipment used to catch them. The informal talk held after the film show proved extremely successful, and it was noted that Mr. Andrews was still answering questions outside the Education Centre, after the meeting had finished.

This lecture is recommended to any club in the south London area. Details can be obtained from—Hon. Secretary, British Association for the Advancement of Science, Science Area, Brighton College of Technology, Moulsecoomb, Brighton, 7.

**AT** the last meeting of **Salford A.S.** a most interesting and informative lecture illustrated by a slide show was given by Mr. J. Kelly, the well-known importer and judge. He spoke of his recent tour of America and also American methods of fish keeping.

Among other events there has been a Club Table Show. A Ring and Drip Bath, and a Hot Pot Social Evening.

New members will be welcomed and should contact the Secretary, Mrs. S. McGookin, 15, Eliza Street, Lower Broughton, Salford, 7.

**MEMBERS** of the **Rugby & District A.S.** had the pleasure of listening to a talk given by a member of the Society, Mr. B. Fox, on "The Decorated House Aquarium", which was illustrated by slides. This covered the setting up of a small beginners aquarium step by step, and which would be equally suitable for setting a decorated aquaria competition. Choice of plants, suitable ornamental rockwork and selection of fish were discussed and the talk proved of great assistance to new members.

Subjects of interest in the coming months for Aquarists include a visit to London Zoo Aquarium on 9th June, where members will be taken behind the scenes and instructed on the maintenance of the fish stock. New Zealand will be having about the Rugby Society when members of the New Plymouth Pond and Aquarium Society exchange a taped quiz with Rugby. Extracts from the Rugby News letter are already printed from time to time in New Zealand, and various other countries including Rhodesia, Czechoslovakia, United States and Canada regularly receive various publications.

At the April meeting of the Society, members were instructed on the art of "Aquarium Photography" by Mr. L. Dodge of the Midland Association of Aquarists.

**THE** results of the **Bradford and District A.S.** open table show were as follows: Livebearers: 1, Mr. Paves (Hartlepool); 2, Mr.

Pattison (Hartlepool); 3, Mr. P. Moorhouse (Bradford). Burbs: 1, Mr. A. Firth (Bradford); 2, Mrs. M. Firth (Bradford); 3, Mr. Riley (Notts). Characins: 1, Mr. Purley (Stockport); 2, Mr. Williamson (Halifax); 3, Mr. D. Carr (Bradford). Carps and minnows: 1, Mr. D. Carr (Bradford); 2, Mr. Riley (Notts); 3, Mr. Morris (Sheffield). Anabantids: 1, Mr. Purley (Bradford); 2, Mr. A. Firth (Bradford); 3, Mr. L. Holey (Bradford). Fishers: 1, Mr. and Mrs. Drury (Workshop A.Z.S.); 2, Mr. Bacon (Tadcaster); 3, Mrs. P. Reynolds (Swillington). Goldfish: 1, Mr. Jones (Merrivale); 2, Mr. and Mrs. Drury (Workshop A.Z.S.); 3, Mr. Maltby (Oswestry). Catfish and loaches: 1, Mr. C. Hollisworth (Bradford); 2, Mr. Maltby (Oswestry); 3, Mr. Gardner (Stratford). Foodstuffs: 1, Mr. Gattrell (Tadcaster); 2, Mr. & Mrs. Drury (Workshop); 3, Mr. Sheppard (Bradford). A.O.V.: 1, Mr. Taylor (South); 2, Mr. P. Moorhouse (Bradford); 3, Mr. Bean (South). Breeders (livebearers): 1, Mrs. M. Firth (Bradford); 2, Mr. Hemmings (Swillington); 3, Mr. C. H. Wilson (Bradford). Breeders (egg-layers): 1, Mr. Williamson (Oswestry); 2, Mr. Partridge (Tadcaster); 3, Mr. Drury (South). Livebearer pairs: 1, Mr. Marston (Workshop); 2, Mr. and Mrs. Drury (Workshop); 3, Mr. P. Reynolds (Swillington). Egg-layers: pairs: 1, Mr. and Mrs. Drury (Workshop); 2, Mr. Whitlock (Tadcaster); 3, Mrs. M. Firth (Bradford). Goldwater: 1, Mr. Gardner (Stratford); 2 and 3, Mr. L. Booth (Bradford). The Best Fish in the Show award was won by Mr. W. Paves with a speckled minnow.

**AT** a recent gathering of the **Southend, Leigh and District A.S.** members were entertained by Mr. S. C. Halsey who gave a talk on cold-water fishes. Besides being an aquatic Mr. Halsey is also a keen angler and so was able to cover fishes that are native to this country as well as the numerous varieties of goldfish. Most pondkeepers prefer crystal clear water but Mr. Halsey stated that fishes, in particular stonefishes, attain a better colour if kept in green water. To prevent green water he suggested the use of water lilies as the largest floating mass of these plants cut down the amount of sunlight entering the water, sunlight being a major factor in causing green water.

Included in the evening was a table show for sticklebacks and the result was as follows: 1, A. J. Mann (Grinstead); 2, M. J. White (Mile cross); 3, J. Barron (Grinstead). The club meets on the first and second Fridays in each month at the Liberal Hall, Clarence Road, Southend. Enquiries should be sent to the secretary, M. J. White, 17, Arundel Gardens, Westcliff.

**THE** March meeting of the **Glossop and Cheshire A.S.** consisted of a talk by fellow member Mike Brighman on the subject, "The deep sea bed and its inhabitants." This was well received by an appreciative audience. The table show was for best coldwater fish, the winner being Mr. V. Howes.

**AT** the March meeting of the **Hford and District Aquarists' and Pondkeepers' Society**, members enjoyed a most interesting talk given by Mr. Alfred Lumsden, F.Z.S., on amphibians and reptiles of the British Isles. Mr. Lumsden accompanied his talk with a series of very fine coloured slides comprising photographs taken by himself on this subject in parts of Epping Forest as well as in his own home.

The March table show, the first of the year, attracted a large number of entries and the winners in this competition were as follows: Any variety livebearer: 1 and 2, Mr. Hartman (male guppy); 3, Mr. Robinson (black mollie); 4, Mr. Sargent (red platy). Any variety egg-layer: 1, Mr. Hartman (black faced angel fish); 2, Mr. Birch (brown acan); 3, Mr. Roth (angel fish); 4, Mr. Roth (opaline gessami). Two large Elaeine eggs were yielded, the first being won by Mr. B. James, and the second by Mr. J. Sanders.

**THE** annual general meeting of the **Wigan and District Aquarium Society** was held on the 17th March when the following officials were elected: Chairman, Mr. D. Pennington; vice-

chairman, Mr. T. Whalley; secretary, Mr. K. Birch; treasurer, Mr. E. Warren; show organisers, Mr. D. Stanton; librarian, Master D. Collins; instrument officer, Mr. D. Collins. Meetings are held at the Vine Inn, Capheaton Road, Wigan, on the last Thursday of each month. Anyone interested are cordially invited to attend or contact the secretary at 49, Minster Avenue, Wembley Moors, Wigan.

**AT** their recent meeting members of the **Southampton and District A.S.** were entertained and instructed by an illustrated lecture given by Mr. J. Stillwell on the various of some fish kept by him. Many discussions ensued as to living and breeding conditions required by species whose habitats were as far apart as the River Amazon and the Atlantic, the latter being perhaps better known as the moment for the lighting going on along its banks.

The accompanying table show for characins was well appreciated in spite of the well known fact that Southampton water is too hard for the species and had to be specially treated by dechlorinated fish. Results were as follows: 1, Mr. Paves; 2, Mrs. Gilbert; 3, Mr. Jones; 4, Mr. Paves.

The Chairman, Mr. L. Hastings, welcomed as a guest a friend of the Society, Capt. J. E. Edwards, F.Z.S., who was staying in Southampton for a few days. He mentioned that Capt. Edwards was now lecturing for the British Preservation Society as well as the British Association for the Advancement of Science and had recently returned from a trip to New York where he appeared on television.

The Society's programme for the next few months includes meetings in members' homes, a trip to a trading establishment at well as working parties to prepare equipment for the "Bottle" show to be held in June.

**AT** the March meeting of the **Accrington and District A.S.** the lecture was given by Mr. Jack Hodgkins, the well-known British angler. His talk was entitled "Fish I have kept and lost." He showed a number of slides and explained the wise and the best way to breed and rear such fish. He also mentioned the price he used to pay for fish years ago which was almost three times the price they are now. At the end of his lecture he described how he had photographed his fish. Mr. Hodgkins and Mr. P. Taylor judged the table show which was catfish and loaches and any livebearer. As there were only three catfish, one class of fourteen entries was made: 1, Mr. Moss with a femora; 2, in the platy variety class (led by Mr. Mann); 3, Mr. Whitney, zebrafish; 4, Mr. Tattersall, red eyed red sword tail (female).

**THE** April meeting of the **Newport A.S.** was the first to be held at the Society's new-occupied club room at the R.A.O.B. Club, Harlock Street, Snow Hill, Newport, and was attended by over 40 members.

The main item of the evening was a slide show on "Pondkeeping and Water Gardens" presented by Messrs. Highland Water Gardens of Blandford, Dorset. The presentation was by Mr. Jack Sargent. In addition a table show for the class was held (a) Any variety characins, the best variety being the judge being Mr. Richard Wigg, the chairman of the South Wales Tropical Fish Study Group. Results were as follows: Characins: 1, Mr. E. Hartley; 2, Mrs. M. Sargent; 3, Mrs. M. Moore. Livebearers: 1, Mr. E. Hartley; 2, Mr. F. Glynn James; 3, Mr. C. Sarge.

Plans for the fourth annual open show at the Society to be held on Saturday, 17th September, are now well advanced. Judges for the event being Messrs. Ken Ferrand, R. Durrant James, Doug. Southgate and Richard Wigg. The show schedule should be available by 10th June from the show secretary, Mr. M. J. Perry, 45, Wrenn Drive, Gabaith, Cardiff.

**AT** the March meeting of the **Georfborth and District A.S.** Mr. S. Witzmann, of Bradford gave a most interesting and informative lecture on plants. He had many slides to illustrate the lecture which proved to be of interest to both experienced and inexperienced members alike. The result of the table show was as follows: The Moss Trophy for Livebearers: 1, Mrs. M.

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continued on page 64

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