

# The Aquarist

and Pondkeeper

OCTOBER 1965



MONTHLY  
Vol. XXX No. 7

**TWO SHILLINGS AND SIXPENCE**

## WALTER R. SMITH LTD.

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

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	Frames	Aquariums
24 x 15 x 12	£ 7 7 0	£ 9 9 0
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36½ x 15 x 12	£ 10 10 0	£ 13 13 0
48 x 15 x 12	£ 13 13 0	£ 21 0 0

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- FIBRE GLASS PONDS
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Angle Iron Aquariums, Frames and Stands a speciality.  
Odd sizes made to order, painted any colour, guaranteed square and free from welds. Stove enamelled Corner Bows, Bow Fronts and Wrought Iron Units.  
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Over 120 varieties including Marine Tropicals on show and for sale. We are Direct Importers of Tropical Fish. Decorate your tank with 2,000 year old wood—stocked only by us. Fish for personal shoppers only.

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Fine Grade for Tropicals and  
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Extra high in protein and rich in vitamins and minerals, Phillips Fish Food contains dried shrimp, daphnia, meat meal, white fish meal, alfalfa, milk powder, cod liver oil, wheaten cereal and yeast, scientifically blended to provide a well-balanced, nourishing food.

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\*Phillips Cold-water Fish Food contains  
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The unique liquid containing (a) particles of immediate food value to the fish and (b) substances to produce natural infusoria in the minimum possible time. The product is in liquid form to ensure the correct particle size and to give rapid dispersion throughout the tank with minimum disturbance to the delicate fry.

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**GRO-WEL**

**Bubble-Up Filter**

Filters up to 10 times as much as an ordinary filter — the answer for your large aquarium. Works off an ordinary airpump.

Price 35/-

**BIOL DRIED PLANKTON**

Special conditioning and growth food for your fish.

Recommended also for Marines and for infusoria production.

Standard size 7 grams for 2/6  
Breeder packs 28 grams for 5/3

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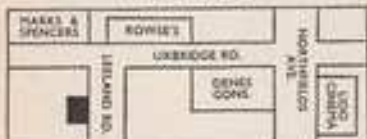
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£12 INCLUDING FILTER MATERIALS  
(SEE ARTICLE IN APRIL ISSUE OF "THE  
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LIVE FOODS	
WINGLESS FRUIT FLIES CULTURE	.. 7/6
GRINDAL WORM CULTURE	.. 2/-
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RED — YELLOW — LAVENDER — ORANGE  
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AQUARIUM FILTER**  
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EXCEPTIONALLY BEAUTIFUL FISH

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(Fully wired for heating and lighting. Heater  
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18x12 .. £5 5 0  
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24x15 .. £22 10 0  
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CARRIAGE ON AQUARIA AT COST.  
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*How many foods can you count?*

Remember that the above are just some of the foods in the extensive Wardley quality range. The range that gives you the greatest choice.

Different foods—different grades—different sized packs

To suit every need



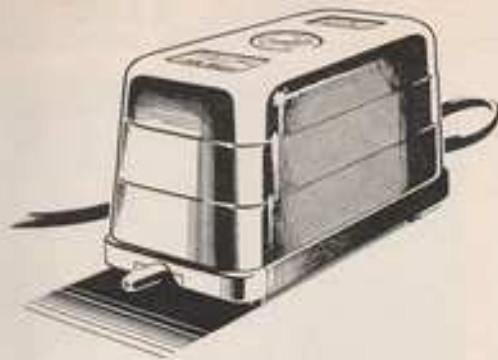
give you **QUALITY** plus **VARIETY**

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A PUMP  
SHOULD BE



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ROBUST CONSTRUCTION - ATTRACTIVE DESIGN  
FULLY RUSTPROOFED - SIMPLIFIED CONTROL  
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WITH ALL-TIME FREE REPAIRS GUARANTEE  
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IN LIVESTOCK OR EQUIPMENT  
LIVE FOODS ALWAYS IN STOCK  
**SPECIAL FISH THIS MONTH**

LARGE METYNNIS 15/- each      8" ELECTRIC CATS 30/- each      STRIPED TAIL CATS (BRAZIL) 50/- each  
LARGE NOSED TETRA 6/- each      LARGE CARDINAL TETRA 7/- each      ADULT DWARF GOURAMI 5/- each  
ADULT FESTIVUM 7/6 each      BABY RED TAIL SHARKS 3/- each      PEL/ANNECTENS 6/- each

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### NEW ARRIVALS

Golden Orfe 4"-7" 8" 10"- & 22 1/2  
3" Golden Tumb      5-  
Green Tetra      3/- & 4/-  
Large Goldfish 7"-8", 8"-10" 10"- & 15"  
Small Orfe      3-  
Medium Goldfish      5/- to 7 1/2  
Small Golden & Silver      1/- to 2 1/2

### ALL POND PLANTS STOCKED

**THERMOSTATS** each  
Procter      30/-  
Consent External      30/-  
Consent New External Type QK      30/-  
Winged External      35/-  
Inter-Pet      22/6, 23/6

### UNO

Out/Adl.      18/-  
In/Adl.      15/-  
In/Adl. "Popover"      10/-  
"Popover" with atom indicator      12/6  
Press Matic      24/6  
Wizard      18/-, 12/6, 18/-

### AERATORS

Jet      20/-, 30/6 & 38/6  
Ea. Summit      21/-  
Oxide      25/-  
Kona      48/6  
Montrose Major      24/-  
Montrose Minor      21/-  
Procter      30/-  
Dynam M.A. I. A.C./D.C.      2 8 0  
Dynam M.A. D. A.C. only      19 5 0

### GARDEN PUMPS

Ozer      19 5 0  
Stokes      27 18 6

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Hy-Bo "A"      120/-  
Hy-Bo "B"      165/-  
Hy-Bo "C"      250/-

### Thermometers

Mercury      6/6  
Blue Gem      3/-  
Dumpy      6/6

### Sandries

T Pieces      10/-  
Clamps      1/3  
Attraction      18/6  
Tubing 3/4 yd.      18/-  
Siphon      12/6, 12/-

### Filters

Gravel      12/6, 12/-  
Sedger      6/-  
Silt Jet      17/6  
Glass King      22/6  
Bottom Filter 2 1/2      17/6  
Rock Filter 1 1/2      17/6

### HEATERS 25w to 200w

Inter-Pet      19/6  
Duo & Wizard      8/6  
P.S. Standard      7/6

### PLANTS

Sagittaria      6d. each  
Valis. Torta      6d. "  
Valis. Spinale      6d. "  
Anubias      6d. "  
Ludwigia      6d. "  
Hygrophila      6d. "  
Cyperocarpus      2/- & 3/-  
Waxaria      1/6 & 2/-  
Giant Hygrophila      1/6 & 2/-

### FOODS

Basic Flakes      1/6  
Hykos Flakes      1/-  
Bovium      1/6 & 2/6  
Bovis      6d. & 1/6  
Dry Daphnia      6d. to 2/6  
Liquor      2/6  
Infant      2/6  
Gilt      2/6 C.W. 2/- & 5/-  
Hobby      2/- & 7/-  
McLennan's      1/6, 2/6, 3/6, 12/6  
Brite Stripper      2/- 3/6  
Tetra Min Growth Food Hatchling      4/-  
Wanderer's      5/-, 4/6, 3/6, 2/6, 1/6  
Factory      2/-, 3/-  
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Vitalcraft      1/6 to 5/6  
Roost      2/- & 4/6

### TROPICALS

News, 9 for 1; 2/6 each

Rosconus      4/-  
Angels      2/6 & 3/6  
White Cloud      2/6  
Mollies      2/6  
Flames      2/6  
Beauties      2/6  
Black Widows      2/6  
Plays various      from 2/6  
Swordtails      various, from 3/-  
Schubert barbs      3/-  
Scoleroids      3/-  
Oryzias (gold) 1/6, 3/-  
Harlequins      3/-  
Cherry barbs      3/-  
Nigger barbs      3/-  
Chequer barbs      3/-  
Red eyed Tetra      3/-  
Think Up 2/-, dwarf or feet 3/6, Kissing 4/-, Oryzias 3/6, Guppies 4/-

### "SWIRL-AWAY"

Aquarium Vacuum Cleaner      42/6  
Super Model      36/6

### BOOK CASE

**BOW-FRONTED AQUARIUM**  
48 x 18 x 15      42 10 6  
36 x 12 x 15      28 10 6  
Standard Bow 427, 417, 413 0 0

### ADULT BARE FISHES

Prismocromis Kribbiana      7/6 & 10/- each  
Elephant Nose Fish      20/-, 25/-, 30/-  
Hershey's Lench      4/6  
Trinidadia      5/-  
South File Nigerian      7/6, 12/6  
Black Cardinal      5/- each  
Scam from      7/6 to 20/-  
Amazonian Cichlids      5/- & 7/6  
Malesian Angels      7/6 to 15/-  
Black Tail Angels      6/- & 7/6  
Tin Tail Barbs 3" - 4" - 5"      6/-, 7/6, 11/-  
Silverfish 2" - 3"      20/-, 25/-, 30/-  
Pompano      4/-  
Red Yellow Guppy      10/- & 15/- pair  
Red Tail Shark 3" - & 10"      Large 15/- each  
Bicolor Fish      5/6 & 10/-

Our minimum order for fishes is £2, a charge of 15/- is made for container. Carriage charges by fast passenger route and telegram stating time of arrival. Give phone number if possible.

### NYLON COATED AQUARIA

**STOCK SIZES**  
24 x 12 x 15      15 0 0  
19 x 10 x 12      12 0 0  
White or black covers      15/6 & 25/-  
Larger sizes on quotation

### STANDARD AQUARIUMS

(Light Gauge)      (Angle Iron)  
12 x 6 x 6      10/6      24 x 12 x 15      25/-  
12 x 8 x 6      10/6      24 x 12 x 15      60/-  
14 x 8 x 8      15/-      30 x 12 x 15      60/-  
14 x 8 x 8      17/6      30 x 12 x 15      67/6  
18 x 10 x 12      23/6      48 x 12 x 15      130/-

### COVERS

18 x 10      16/-      18 x 10 x 36      20/-  
24 x 12      22/-      24 x 12 x 36      50/-  
30 x 12      22/6      30 x 12 x 36      55/-  
36 x 12      27/6      36 x 12 x 36      60/-

Aquarium covers sent by post only at customer's risk.

# THE CENTRAL AQUARIUM

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AND SEAWATER  
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## CAPACITY

Single Unit (Illustrated)  
60 Gallons P.H.

Double Unit  
120 Gallons P.H.

All units guaranteed one year.  
Full service and spares available

Complete range of mediums to  
suit all needs

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**A/5 S.C.A.N. LTD**  
OLD BATH ROAD • COLNBROOK  
SLOUGH • BUCKS

Why not try the new "Suresynth" filter  
wool in your Eheim



# QUEENSBOROUGH FISHERIES

SEE OVERLEAF FOR FURTHER INFORMATION

## NEW SPECIAL PLANT COLLECTIONS (post only)

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

### TROPICALS

No. 1 30 plants including  
Dwarf Lily Cryptocoryne  
Wisteria etc. £1

No. 2 12 Vallneria  
12 Myriophyllum  
3 Micro Sagittaria  
6 Ludwigia  
6 Euboea Densa £1

No. 3 12 Vallneria  
6 Myriophyllum  
6 Ludwigia  
6 Euboea Densa  
6 Bacopa  
1 Amazon Chain Sword  
1 Portulan Hair Grass £1

No. 4 1 Nymphaea Spillata  
1 Giant Hygrophila  
1 Aponogonon  
1 Wisteria  
1 Giant Sagittaria  
1 Cryptocoryne  
1 Indian Fern  
1 Portulan Hair Grass. £1

No. 5 6 Vallneria  
6 Myriophyllum  
6 Hygrophila  
6 Euboea Densa 10/-

No. 6 1 Portulan Hair Grass  
1 Portulan Clover  
6 Micro Sagittaria  
6 Bacopa 10/-

No. 7 3 Vallneria  
3 Ludwigia 10/-

No. 8 3 Sagittaria  
3 Hygrophila 10/-

No. 9 6 Vallneria  
6 Hygrophila  
6 Ludwigia 10/-

No. 10 2 Water Wisteria  
6 Micro Sagittaria  
4 Bacopa 10/-

No. 11 12 Euboea  
9 Vallneria 10/-

No. 12 2 Clover  
3 Chain Swords  
4 Bacopa 10/-

### TROPICAL OR COLD

No. 14 12 Sagittaria  
6 Myriophyllum  
6 Ludwigia  
6 Moneywort  
6 Hornwort  
1 Portulan Riddle  
3 Portulan Hair Grass. £1

No. 15 50 Plants for your  
Aquarium—Value 20/- £1

No. 16 6 Vallneria  
4 Moneywort  
4 Euboea Densa  
3 Hornwort  
3 Portulan Hair Grass 10/-

No. 17 Giant Amazon Sword Plants 7/6  
6-8 inches

No. 18 Water Lilies  
Very beautiful plants  
or 3 for 10/- 2/6

No. 19 Water Hyacinth  
6-8 inches Floating Plant 7/6

No. 20 Specterstock 3/6

Lily 2/-  
Daphnia 1/6 2/6  
Tubifex 2/6  
Microworm 3/-  
Whiteworm (Fat Free) 3/-  
Snails 6d. ea.

WHY NOT PAY US A  
VISIT ON SUNDAY  
AT WRAYSBURY  
THOUSANDS OF FISH  
AND PLANTS  
FOR SALE

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



# Special News

See Page VII



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

## STAFF VACANCIES

APPLY 111 GOLDHAWK ROAD LONDON W 12.

### BOW AQUARIUMS

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

48in. x 12in. x 15in. — 29 gu.

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

### STANDS

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

### BACKING PAPERS

SEA & SHORE

BLUE SKYS

SAND & SHELLS

24in. long x 20in. high. 2/6 per sheet, or 1/3 per foot. (post free)

Please add 1/6 extra postage on appliances orders up to 10/-; 2/- up to 20/-; 1/6 up to 30/-.

### THERMOSTATS

- Conical External ... 36/-
- Springfield External ... 25/-
- Springfield Ins./Adj. ... 15/-
- Springfield Ins./Adj. ... 10/-
- UNO ...
- Ins. Adj. "Popular" ... 12/-
- Ins. Adj. "Popular" ... 10/-
- "Popular" with neon indicator ... 12/6
- Bona (with Neon) ... 21/-
- "Ea-Ea" Indicator ... 26/6

### THERMOMETERS

- Messiah ... each
- Gem ... 6/6
- Plasma Backed ... 6/6
- Spink Blue Gem ... 3/-
- "Ea-Ea" Thermo ... 6/6

### FILTERS

- "Woodhill" Plastic ... each
- Outside Filter ... 19/6
- "Woodhill" Biological Aquarium Filter 12/4 ... 13/-
- "Woodhill" Regent Inside Filter ... 10/-
- Covered Filter ... 6/-
- Air Lift ... 2/6
- "Star Jet" Outside Filter ... 17/6
- "Klear King" Outside Filter ... 22/6
- Bonson Filter ... 8/3
- Ornamental Rock Filter ... 17/6
- One Pair Filter ... 3/6
- Grass-Wall ... 35/-

### AERATORS & PISTON PUMPS

- Messiah ... each
- Fairy ... 27/6
- Star ... 36/-
- Bona ... 35/-
- Foodie's Total ... 15/-
- Hy-6a Junior ... 127/6
- Hy-6a "A" ... 138/-
- Hy-6a "B" ... 145/-
- Hy-6a "C" ... 250/-

### HEATERS

- "QUEENSBOROUGH" 27w. 30w. 40w. 75w. 100w. 120w. ... 18/-
- Rose (75-200w.) ... 18/-
- "Ea-Ea" Flexible Heaters (100w.) ... 18/-
- "Ea-Ea" Thermo-Static Heaters, 100w. and 150w. ... 24/6
- Pressomatic ... 24/6
- Insto-Pet Thermo-Static Heater 22/6 and 29/6
- Heater Holders ... 2/-

### REMEDIES, etc.

- Halazite ... 3/6
- Liquor ... 1/6
- Disinfectant ... 2/6
- Bonson White Spot Cure ... 2/-
- Sea Salts ... 1/6

### SEDIMENT REMOVERS

- "Woodhill" Air ... each
- Wetters ... 15/-
- "Woodhill" Hand ... 15/-
- Reposers ... 15/-
- Fishnet ... 3/-
- Siphon Tubing ... 32.0
- Hand Type Plastic Swirl Away ... 4/6
- Swirl Away ... 46/6

### PLANTS

- Fallowaria Spicata ... 1/-
- Eloides Densa ... 1/-
- Nygraphila ... 1/-
- Sarapa ... 1/-
- Sagittaria natans ... 1/-
- Sagittaria nitida ... 1/-
- Fallowaria nitida ... 1/-
- Ludwigia ... 1/-
- Myriophyllum ... 1/-
- Cryptocoryne Beckfordii ... 2/-
- "Willow" 2/6 and 3/-
- "Cordula" 2/6 and 3/-
- "Hortensia" 2/6 and 3/-
- Water Wisteria ... 2/6
- Giant Nygraphila ... 2/6
- Giant Sagittaria ... 2/6
- Najas Microdon ... 2/6
- Amazon Clad. Sweet Duckweed per portion ... 2/6
- Riviera per portion ... 2/-

### FOODS

- Electric Flakes ... 1/6
- Hydro Flakes ... 1/-
- Brownies 1/6 and 2/6
- Brownie Frygrain ... 2/6
- Liquidry Nos. 1 and 2 ... 2/6
- Delray ... 2/6
- Flora ... 2/6 and 4/6
- Dried Daphnia ... 4/6
- Ground Shrimp ... 1/-
- Fish Food ... 1/6
- Ants Eggs ... 4/6
- Wardley's Treat Pat. 7 kinds of food ... 5/6
- Hi-Glow ... 4/6
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## Are Prices Rising?

RISING prices and the increase in the general cost of living are subjects which have been in the forefront of the news for the past few months. Few fields have remained untouched by this trend, but how has the aquarist been affected in recent years? Prices of goods by an advertiser in *The Aquarist* of 10 years ago compared with those offered by the same advertiser in a recent issue produced an interesting result.

The first product which I compared was a famous specific for fungus and fin rot. In this case the price had remained unchanged for 10 years. From the same firm of manufacturers comes a special food for baby fish. This, too, has remained at the same price. One would assume that products which grow in popularity for at least 10 years have proven their worth. Comparisons of a popular range of thermostats showed the price to be exactly the same. A well-known thermometer had gone down in price by 1s 6d!

In the field of aerators a reduction of 8s 6d was noted in one case, whereas the cost of an air-operated aquarium cleaner had, in one case, risen by 1s 6d, and had, in another case, risen by 2s 6d. Corner filters remain at the same price whereas an outside filter increased in cost by 1s 6d. Comparisons of the prices of fish foods is difficult as the quantity sold may have varied. The cost of a 24 in. by 12 in. by 15 in. aquarium has, in one case, risen by only 2s 6d. White worms and micro worms show a rise of 6d per culture in one advertisement.

Plant prices show an increase of 3d each in *Vallisneria*, *Eelodea*, *Macropus* etc. but the commoner *Cryptocoryne* have remained unchanged. Many more varieties of plants are now available. Tropical fishes also show small changes in price, the most marked one being a reduction of 4s for a large neon tetra. White clouds and angels remain at the same price but *Corydoras aeneus* show a rise of 1s 6d.

These prices can only be taken as a very rough guide as the quality and efficiency of many products has risen. New strains of fishes of better quality certainly compensate where any price rise has occurred and in dealing with fish foods the quantity sold at certain prices may have changed, as may have the quality of the food.

In conclusion I would think that the aquarist today is better placed than he was 10 years ago. He has a much wider choice of fishes, plants and equipment, all of which have been tried, proved and improved over the years.

B. Whiteside

# Contrary Angels

by A. W. SKINNER



Photo:

Guarding the eggs

E. Lewis

**W**HAT is it that makes our angels behave so differently from what we are told they should do? For instance: we had six fairly big angels in a 36 in. by 15 in. by 15 in. tank and were so pleased one day to notice that two of them were cleaning a leaf of a *Cryptocoryne*. They cleaned this leaf well until it disintegrated, then they started on another with the same results.

Some fellow aquarists called and assured us they were male and female so we didn't feel too despondent when they ruined two of the best plants in the tank, but decided to put the two fish in a tank of their own. After giving them a 36 in. by 15 in. by 12 in. tank and feeding them very heavily on *Daphnia*, whiteworm and earthworm for about 2 weeks, we were pleased to note they were cleaning a piece of slate we had hopefully placed in for them. They continued to clean the slate and numerous other things in the tank that appealed to them, but although we watched anxiously, not a single egg did we see.

They would, from time to time, lock jaws and pull one another all round the tank as described as courtship. All to no avail. Eventually, after about 3 months, we reluctantly put the fish back into their first home with the other four angels. Somehow we felt these angels were both of one sex, presumably male as we didn't get any eggs, but were told by older and wiser aquarists that this could not possibly be.

Unfortunately one of the pair got scared one day and buried its head in the grit. Although it did not die im-

mediately, sad to say it went off food and died about 2 weeks later.

Then, to our joy, two more of the angels paired up, and began to clean and after a couple of days you could see them spawning; at last we had some angel eggs. I took some water out of the tank and put it into a small glass tank and added methylene blue. Then I cut off the leaf with the eggs and put this in the small tank, being careful to weight the leaf so the eggs were facing downwards, and added aeration. This tank was floated in another tank, temperature 80°F (26°C) and covered with paper to keep the light out (all as instructed). The young fry were just trying to swim jerkily with their huge yolk sacs when we went out with our Aquarist Society to visit London Zoo. Arriving home about 12.00 p.m., we fled into the fish house to look at our precious babies only to find them all dead. The aeration had stopped owing to one of the tubes jumping off, and we presumed the lack of oxygen had killed them.

What a blow! Still we had a pair of angels and we would have to try again next time they spawned.

We said our angels were awkward! They must have had a tiff and the male chose another friend. These two acted exactly as the first couple we had paired: they locked jaws and pulled each other around the tank, then settled to cleaning. They chose a piece of slate and cleaned it constantly for a couple of days, only stopping when food was put in the tank. Then at last they started spawning, but although they went up that slate for an hour or more not one single egg was there. Oh well, this was proof that two males had paired up.

A friend asked if we would like to purchase a large black lace angel, and thinking perhaps it would split these two males up, we agreed. He said we could also have a female angel that he had, although she was only tiny. In due course the two newcomers were put into the tank with the rest of the angels and settled quite quickly. The fish were fed with plenty of *Daphnia*, whiteworm and earthworm and all seemed in good condition. The large black lace angel did not seem at all interested in the others but the little female tried to attach herself to the males. Would this split the two males up? Oh dear no, all they did was drive her away. Then the males started cleaning the slate again and, as previously, tried to spawn. Then to our amazement the little female darted under them and laid a lovely row of eggs up the slate. The males chased her off and proceeded to both fertilise the eggs, or so we hoped. This went on for a couple of hours and we decided to take the slate with the eggs and put it into the small tank, which was already prepared with methylene blue added.

Quite a lot of the eggs started to grow fungus and by the end of a week I decided it was hopeless, as the tank seemed a mass of fungus; I started to throw the water away, when suddenly I noticed a few fry wriggling at the bottom of the tank. I quickly put in some more water from the tank it had been floating in and to our relief in another couple of days there were 14 little fry swimming round. We fed them on brine shrimp and micro worm for a few days and as soon as they looked big enough, on Grindal worm and sifted *Daphnia*. After this we moved them into a larger tank.

In the meantime, one of the male angels paired up with a black lace angel that had been in the tank about 3 years. They actually turned out to be a true pair and spawned. This time all went well and there was a nice batch of young angels. After this we took all the angels out of the big tank and just left the pair in, and I'm pleased to say they spawned several times and we were able to raise some lovely batches of young angels.

Are our angels now behaving normally? Afraid not! These two decided to stop spawning and although we gave them all the live food we could, it would not induce them to spawn.

As we had grown some of our second batch of youngsters

up to quite a good size we put four of these in with the pair, thinking they might settle down again. Up to the time of writing the old male has spawned with two of the youngsters with good results. So now we are prepared to expect anything.

Therefore, if your angels are not acting according to what you have been told, don't give up hope, as you never know.

It is well worth any trouble you have to take to see a tank full of young angels that you have managed to rear. It's a real thrill for a couple of hundred youngsters to come and greet you as you walk into the fish house. Ever ready for anything you may have to eat.

## *Phenacogrammus interruptus*

by JACK HEMS



*PHENACOGRAMMUS interruptus* is a peaceful and an active member of the family Characidae from the Congo. In soft, acid water over a dark-bedded aquarium, well-stocked with plants and lighted from above, it is of striking appearance, and averages, when fully grown, about 3 in. in length.

The male, the larger of the two sexes, has an olive-brown back overlaid with a blue to green sheen, lemon-yellow lower parts, and a broad gold stripe along the middle of the flattened sides. These are further adorned with a wealth of mother-of-pearl and rainbow tints reflecting off the scales. The fins, with the exception of the colourless pectorals, are grey, with an overtone of pink, shading to white at the margins. The black-tipped centre rays of the ragged-ended caudal fin, and the leading rays of the backward-sweeping dorsal fin, are much extended. The female lacks the vivid splendour of the male, and her fins are smaller and shorter pointed.

The species, popularly referred to as the Congo tetra, Congo characin, feather-fin or feather-tail, was known to science (under its old name of *Micralestes interruptus*) more than 60 years ago; but it was not until the early 1950s that specimens first appeared in dealers' tanks in Europe and America. That it was well received by discerning tropical aquarists is not hard to understand; for, apart from its beautiful, shimmering colours and gentle disposition, which qualify it for a place in any community tank holding upwards of 12 gallons of water, it is easy to feed on any food normally given to omnivorous fishes and, despite its strictly tropical origin, is seemingly quite comfortable at a temperature range of 68°F (20°C) to 75°F (24°C).

As has been mentioned above, *P. interruptus* looks its most brilliant best in soft, acid water. Soft, acid water also increases its powers of resistance against mince ailments or more serious disease. For the benefit of the novice fishkeeper, let me say that water straight from the tap can be improved, that is, softened and acidified, by boiling it first and then passing it through about three

handfuls of soggy peat. If the peat is placed in a large flower pot with its drainage hole covered by a pad of close-woven nylon fabric, water poured in at the top will emerge free from all sediment at the bottom. But here let me interpolate a word of warning: as no fishes take kindly to a rapid change (chemically speaking) in the quality of the water in which they are living, it is recommended that any addition of peat-water to an established aquarium should be made in pints rather than quarts over a period of 1-2 weeks.

It is of supreme importance, of course, that soft, acid water should be used for breeding. Unfortunately, all too often, propagating this species is no easy task. Even if the fish themselves can be persuaded to perform, at a recommended temperature of 72° (22°C) to 75°F (24°C), the large eggs deposited among the plants, which should be weighted down to the bottom, may come to nothing; for experience has shown that they are easily killed by certain micro-organisms, or by moulds spreading among them, or by too bright a light. But it is perhaps just these difficulties to be overcome that make attempts at breeding this fish so interesting. Obviously, a well-scrubbed tank (before filling and furnishing) greatly assists to keep harmful bacteria at bay. To this precaution must be added a thoroughly washed compost, and thoroughly washed plants.

The fish spawn in typical characin fashion. That is, the eggs are scattered every now and again as the fish chase about in the lower levels of the water. When diving is over, the parent fish must be removed from the tank; for if given the chance they will eat the eggs. The eggs incubate in about 6 days, and on the seventh the fry should be free-swimming and taking food. Among the most acceptable first foods to give them are freshly hatched brine shrimps, micro worms and large infusorians. About this time, too, the lighting should be very gradually restored to normal. With no overcrowding in clean, well-aerated water, and the right sort of food (live in preference to dried), the fry of *P. interruptus* should attain full size in the space of 9 months to a year.

## Attractive New Display at Shirley



Sales counter in Shirley Aquatics Ltd. new showroom. The door leads to a service passage behind the display tanks.

AN extension incorporating novel ideas for display of fishes and plants has been opened at the well-known water plant nurseries and fish hatcheries of Shirley Aquatics Ltd. An area of 12,000 square feet incorporates an attractively decorated sales area, for apparatus and aquaria, from which leads a long central passage. Here customers can view the fishes and plants in tanks set into the walls and picked out by wooden frames. The display includes four large marine tropical tanks, and one particularly pleasing exhibit is a tank housing angels and discus fish above which can be seen a naturally arranged 'jungle' of terrestrial plants. Twenty-four smaller aquaria are placed at right angles to the wall so that they are each viewed through an end panel. Fish are netted for customers in the service gangways behind the display tanks, where additional stock tanks are situated. Mr. Colin Roe, proprietor of Shirley Aquatics Ltd., has announced that he is now importing marine tropical fishes through the German firm Tropicarium Frankfurt.



Mrs. Colin Roe feeds the giant hi-goi carp in a large outdoor pond at Shirley, watched by Mr. Roe (centre) and a group of visitors on opening day.



Herr Hans Schmidt, director of Tropicarium Frankfurt, discusses a plant with Herr A. Blass, of Munich, behind the display tanks at Shirley's new extension.

# Fish Foods and Feeding

by A. JENNO

**A**LMOST every action or function performed by any living creature is dependent on a constant supply to the body of nutritional substances. Without nutrition, no living creature can continue to exist and unless adequate nutrition of the right type can be obtained, the vital functions cannot be performed.

All life on earth is maintained by energy from the sun, but only plants and certain bacteria are able to use this energy directly to convert inorganic substances into organic ones, and thus feed directly from the sun. Living things which do this are said to be autotrophic and are thus self-feeding. All other living creatures are directly or indirectly dependent on green plants for their nutrition and are said to be heterotrophic. Heterotrophic beings fall into two main classes: herbivores, which feed on either live or dead plants, and carnivores, which feed on other creatures which on their part have previously fed on plants.

As far as fishes are concerned, they may be herbivorous, carnivorous or both, and, of course, there are differences between the methods of feeding of aquatic and terrestrial creatures because aquatic animals and plants live in an environment which is a solution of many dissolved salts and gases, with the required substances fairly evenly distributed. These substances are continually finding their way into the fishes' body through the skin and the respiratory organs and this is why fishes are apparently able to go without food for long periods of time. It is a fact that the amount of energy used by aquatic creatures in finding food is far less than that used by terrestrial creatures, because the terrestrial animal is constantly using extra energy in finding sufficient water to compensate for its increased needs, due to evaporation. A fish, of course, does not need to go looking for water.

## Diet

The main substances required to form the basis of a balanced diet for our aquarium fishes are proteins, carbohydrates, fats and oils, minerals and vitamins.

Proteins are the basic and most essential item in the diet. They are manufactured exclusively by living body cells and are used to promote growth and the replacement of worn-out tissues. They consist essentially of compounds of oxygen, hydrogen, carbon and nitrogen. Animal proteins are in meats and live foods. Vegetable proteins are also used in the diet.

Carbohydrates give energy and can form food stores. In general they are the starches and sugars formed by plants.

Fats and oils also promote energy and in addition, form parts of living tissues. They are stored in the body as a reserve supply of food for times of shortage.

Mineral salts are present in most foods in the form of calcium, phosphorus, iron etc. They are necessary for the development of bones and keep the nervous system, circulation and muscles in healthy condition.

Vitamins are active substances which are most essential to promote health and protect the body against disease. Two of the several important vitamins are vitamin A and



vitamin B<sub>12</sub>. The basic substance required for the formation of vitamin A in the body is called carotene and is obtained from plants. Fishes get carotene by eating algae, or creatures which feed on algae, and are dependent on it for the development of the colour pigments in the skin, and hence for the brilliance of their colouring. Vitamin B<sub>12</sub> is also obtained by fishes from green plants and is important for health, growth and the correct functioning of the digestive organs. The fact that vegetable foods are the primary supplies of vitamins shows the importance of allowing fishes more of an opportunity of feeding on green foods than is usually provided.

Each species of fish has its own manner of acquiring its food, and in its natural habitat it will hunt for the food which yields the best results for it. In captivity, however, the fishes are dependent entirely on the food supplied by their owner, and this is why in some cases they fare worse than in nature, because their dietary requirements are not understood.

If the aquarist wishes to keep specimens of a particular species of fish, and to maintain their health and encourage them to live in the manner typical of that species, then he must first study their food requirements, and unless he can obtain certain foods, or types of food, which are essential to that fish, he should not entertain keeping them.

It is useless to expect large cichlids, for instance, to thrive mainly on a diet of dry foods. They may exist, certainly, but they will neither grow nor give their owner any satisfaction from their keeping. Similarly, the feeding of the same live food or other foods is not recommended to be carried on for long periods of time without variation. Each food has its own characteristics, some of which are beneficial to the fishes and others which are not, and it

is therefore important to provide as wide a variety of required foods as possible.

Rules to be followed to keep a particular species at its best are first, find out what are the best possible foods for the fish concerned, and then organise a supply of as many varieties of these as is possible. Many aquarists seem to think that if they keep one easily obtainable live food, such as white worm, then their fishes should grow as well as the chap's whose fish have several different live foods regularly. Secondly, do not overfeed and pollute the aquarium in your eagerness to grow fishes on fast. With a little trial and error, the amount needed to keep the fishes well fed can soon be found. Thirdly, offer all the fishes which are not completely carnivorous plenty of green food. Algae and cooked peas are two easy ways of providing this.

Luckily, most of our common tropical fishes are both carnivorous and herbivorous and the range of foods which can be offered to them is quite large. For simplicity they can be divided into four classes: natural foods, cultured foods, table foods and commercially prepared dry foods.

#### Natural Foods

Natural foods are probably the most difficult to obtain but are almost certainly the best and are well worth the trouble. One of the most valuable of these is the common earthworm. Larger fishes will take them whole, but for most they must be chopped or mashed. To make the meat as clean as possible the worm should be washed, chopped, and then washed again, otherwise the dirt and slime which comes with them will cloud the aquarium. Earthworms are particularly recommended for growing-on young fish and for bringing adults into breeding condition.

They may be encouraged to a particular spot in the garden by digging a shallow hole and covering it with tea leaves, peelings and other kitchen scraps.

Various kinds of insects are suitable as food, particularly for larger fishes, but they are difficult to catch and may be affected by garden spray or insecticide which might be dangerous. Some care should therefore be taken if insects are used.

Live foods from ponds form the majority of natural foods collected by aquarists.

*Daphnia*, *Cyclops* and the rotifers can be considered together as they are usually caught together and very often the use of the name *Daphnia* (water fleas) covers a mixture of all three. They are all crustaceans and are related to the crabs. They have a hard outer shell, which is actually an external skeleton, and a soft interior which is the valuable part as far as the fishes are concerned. The shells do provide excellent roughage in the diet, however. One of the few things which an experienced aquarist will not usually tell a beginner is the location of his own favourite *Daphnia* pond. Information on what they look like and their possible whereabouts is freely given, but to get to know of a particular pond without hunting it down is like trying to spawn neons in lemonade.

*Daphnia* usually live in fairly shallow water in ponds whose situation enables minute animal and vegetable organisms, on which the crustaceans feed, to flourish in large numbers. Ponds frequented by cattle are particularly good as their droppings encourage rich development of small organisms. Ponds tend to be seasonal in their production of *Daphnia*, and are usually at their best in mid-summer when the sun turns the water green. There are several varieties of *Daphnia* with colouring varying from green to red, usually depending on the type of water they have been living in, and the type of organism they have fed on.

Collection of *Daphnia* requires a large net of fine mesh, such as butter muslin. It is important to see that none

of the larger pond animals are put in the aquarium with the *Daphnia* as these may attack the fishes. It is also recommended that as little pond water as possible is placed in the aquarium. *Daphnia* in any quantity require a large amount of oxygen to continue to live and it is therefore unwise to bring home more than will be used immediately, unless a pond or other large vessel is available for storage. It can be cultured by seeding a pond with live *Daphnia* in the first place and then tipping in kitchen scraps, cow dung etc., which will encourage the growth of the organisms on which the *Daphnia* feed. Small *Daphnia*, *Cyclops* and rotifers are excellent fry foods and can be separated from large ones by placing a quantity in a nylon stocking and shaking this in the aquarium, when the smaller crustaceans will pass through the mesh.

*Tubifex* worms are found in the filthiest ponds where they live in the mud and slime on the bottom. They also thrive in large quantities in the estuaries of tidal rivers used to discharge sewage. Collection is unpleasant and long-winded as it entails sieving vast quantities of what we will politely call mud through a fine mesh which traps the worms. The easiest way to obtain *Tubifex* nowadays is to buy them in bulk by post, but it is necessary that they be fresh on arrival. They must be thoroughly washed before feeding to the fishes and if stored must be kept in cold, shallow, running water. The use of *Tubifex* as a food for aquarium fishes is not recommended unless the aquarist is absolutely sure of his method of cleaning and storing them. Fishes fed on unclean *Tubifex* have been known to develop boils and other disorders and the worms can strangle a fish by becoming entwined in the gills. Worms which reach the bottom of the aquarium will quickly dig in, and it will be found that only certain fishes can dislodge them. If allowed to dig in in large numbers they may die, decompose in the gravel and thus foul the tank.

The insect larvae commonly called "glass worms" are often found in ponds containing a surplus of decaying vegetable matter. They are usually about a quarter-to-half an inch long, and should not be put with very small fishes as they can catch and eat small creatures. Otherwise, they are an excellent food for adult fishes and have the advantage that they do not need as much oxygen as *Daphnia* and will stand crowding for some time. They can very often be found in ponds in winter when *Daphnia* is unobtainable.

Various other foods are obtainable from ponds, but usually only *Daphnia* and glass worms will be found regularly in any quantity. When introducing other pond animals as food, make sure that the fishes are large enough to take them and that they are of a type that the fishes will eat, otherwise it may be a tricky job to get them out again before they flourish and cause harm. Tadpoles, water spiders and the larvae of various water beetles will all be eaten by larger fishes, but they can be dangerous to small fishes and fry.

Aquarium snails often breed so much that the aquarium is eventually over-run with them. Don't throw them out. Crush them up and feed to the fishes. A tank containing large fishes seldom has any snails, because the fishes kill them themselves, but in fry tanks snails often abound, and these can thus be used as an occasional change in the diet.

Soft algae is the last of the natural foods to be considered. A certain amount can usually be grown in the aquarium and will often be enough for the needs of the fishes. If, however, the fishes are not getting enough algae, then the use of substitute green food such as cooked peas is recommended. The peas should be free from grease and the transparent skin should be removed, otherwise the fishes will have difficulty in eating them.

*To be continued*



## Around the Aquariums

with MIKE SHEEDY

THE Aquarium at Llanerch Deer Park and Gardens is to be extended. Built in the unique fifteenth century wine cellars of Llanerch Hall, the Aquarium was opened earlier this year and will be extended in the coming winter months to include a further two cellars.

Designed by Mr. Douglas Petrie, formerly Superintendent at Flamingo Park Zoo and now General Manager and Zoological Director of Llanerch Zoo, the 20 tanks that at present make up the Aquarium and Reptilium are set into the original wine racks, some of which are partly constructed with hand-made bricks.

Plans for next season include the introduction of marine tropicals as well as freshwater tropical and coldwater fishes, including a selection of fishes from local rivers. The Zoo itself is situated on the banks of the River Clwyd, famous for its salmon and sea trout.

Adjacent to the Aquarium is a small Reptilium which houses Mr. Petrie's personal collection of snakes and turtles etc. This collection would have been considerably larger had it not been for an un-noticed power failure during the winter, which resulted in the loss of some 40 turtles and terrapins, many of them very rare specimens.

The two manatees and turtles, certainly the largest of their kind in the country, have proved most popular. When they first arrived at Llanerch Zoo early in the year they refused to eat, and, when after 6 months Mr. Petrie was beginning to despair, they were offered some dead goldfish from stock purchased for ponds, these were readily accepted from the hand. Since then they have never looked back and continue to feed readily on herring and mackerel fed by hand, a sight that astonishes many of the visitors to the Zoo.

From the Bronx Zoological Society, New York, comes very interesting news of their Aquarium. Overlooking the sea at Coney Island (just minutes from Manhattan by subway and the new expressways), the Zoological Society and the City have jointly created the New York Aquarium.

There are great pools for white whales, walrus and seals, tanks that 'bloom' with sea anemones from tropic reefs and a large collection of sharks and sea horses. There is also an hourly electric eel demonstration. Labels identify everything in the Aquarium and give information about habits etc. Talking storybooks broadcast anecdotal and informative talks about the Aquarium and Curator-conducted tours take Members and special groups "behind the scenes". A quarter of a million schoolchildren visit the Bronx Zoo and Aquarium every year in organised groups. The Zoo's Question House is the place to visit if anyone has a question about animal life. The Education Department also answers questions by mail.

The beautiful Reptile House is one of the finest in the world and visitors can see reptiles of every description. Expert planning by the Society's staff and architects makes

safe, comfortable and attractive homes for the many species which are on display in the Aquarium and Reptile House. The cost of new buildings is usually shared by the Society and the City of New York, and in the past 10 years the Zoological Society has spent more than 2,500,000 dollars of its own money for new buildings and improvements in the Bronx Zoo and Aquarium.

Many readers of *The Aquarist* have written to me saying how much they enjoyed my review of the Belle Vue Aquarium and also my notes "Around the Aquariums". Well it's nice to know that readers like what I write, and to the two writers who ask for some more reviews on Aquariums, I would like to say that I will do my best to review the Aquariums as best I can in future issues of *The Aquarist*. Thank you for your letters; I am always glad to supply information to any readers of *The Aquarist*.

When a 'patient' is off colour and looks jaded at the Bristol Zoo, a doctor will be called and he will sometimes recommend a complete change. Even, perhaps, a stay in the country. That is what the animal specialists ordered for Tessie, Bristol Zoo's giant tortoise. For Tessie was looking a trifle jaded. Instead of wading into her daily diet of a dozen lettucees, several turnips and carrots, with orange dessert, Tessie toyed fastidiously with her food.

So a complete change of air was recommended. But sending a giant tortoise weighing a hundredweight and a half off for a holiday in the country poses problems. However, these were all solved when a friend of Bristol Zoo offered to have Tessie, the tortoise, as his guest at his country home.

Tessie was lifted by her keepers into a van, securely packed round with straw and left Bristol for her first ever holiday. Since then she has had the freedom of a large paddock with as much grass and fresh greenstuff as she could desire. Latest reports indicate that the change of air and scene are having the desired effect.

From reports received from various Zoos and Aquariums, I am glad to note that more and more people are taking great interest in the many fishes etc. on view in aquariums throughout the British Isles.

Bristol Zoo, Belle Vue Zoo, Flamingo Park Zoo, London Zoo and Llanerch Deer Park (who, on August Bank Monday, had over 6,000 visitors) all report good summer attendances.

## A Visit to Chester

by L. BRADLEY

FOR anyone living within easy reach of Chester or finding themselves in the near vicinity a visit to Chester Zoo will be extremely enjoyable. The area covered by the Zoo is so great that to get the full benefit and to see everything a full day, if possible, is necessary.

This up-to-date Zoo has ample car parking facilities.

Please turn to page 126

a store which does not either specialise in fish, or have a specific aquarium section. The single tank in a corn store, or shop that otherwise stocks only puppy biscuits and kittens, will never be as satisfactory as a reputable aquarium specialist. The Buyers' Guide in *The Aquarist* is a fair guide when in doubt, although I would hasten to add that there are thoroughly satisfactory stores which do not appear in this list.

Perhaps more perplexing than anything else in the letter was the statement in reference to dealers' stock, that nearly all of them were 'hump-backed'. At first I could not understand what was meant by this, but I think it must refer to spinal concretion, a condition which occasionally afflicts fish as the result of excessive inbreeding. As this is a purely hereditary complaint, and has nothing to do with environment at all, I cannot conceive that there can possibly be more such fish in dealers' shops than in fairs, because, as I revealed earlier, the fish frequently come from the same source. Can it possibly be that the 'misshapen' fish Mr. Bloomfield has seen, indeed ordered from a "well-known firm", are fantails, veiltails, or similar fancy goldfish which to the inexperienced eye could possibly appear to be "stunted", because foreshortening of the body is a characteristic feature? Certainly that would explain the absence of such specimens at fairsgrounds!

As in everything else one just can't expect something for nothing in buying goldfish. Just as one can't expect to get fine specimens by gambling for them at a fair, nor can one expect to buy them for a few pence at a pet-shop. A high quality goldfish in fine breeding condition, can cost as much as £20, although of course, there are very few fanciers who would pay as much as this. It is far better to pay about 5s. for your fish than always to go for the lowest grade. Fancy goldfish, and large pond fish, will, of course, cost far more.

I think it is high time this ill-informed slanging of pet-shops ceased. I hope I have shown conclusively that whereas there are individual instances in which Mr. Bloomfield's observations may be true, there are numerous pet-shops of the best quality up and down the country. They deserve all our support and praise. By far the best way to foil the bad dealer is simply to take your custom elsewhere; a very unfair image has been created by adverse criticism which should be directed at particular shops, and which is usually taken as referring to the trade as a whole, and it is about time we started to realise that the average standard of our pet-shops is probably the best in Europe.

I have seen pet-stores in France, Italy, Switzerland, Germany and Turkey. In many other countries they don't even exist in any recognisable form at all (e.g. Greece). None of them match up to the standard prevailing in England, and I suggest we appreciate this extremely difficult trade for its true worth.

I remember, some years ago, reading an item by a former Notebook contributor in *The Aquarist*, in which he condemned "The unnecessary cruelty" shown in a film in which there were shots of the smashing of an aquarium, and the crushing of terrapins under an actor's foot. Even the subsequent revelation that the terrapins in question were merely plastic substitutes did not abate the aquarist's anger: "Be that as it may, the intention is still there and the suggestion to the teddy-boy type obvious". In *The Flight from the Bushmaster*, a book by the extremely popular Irish novelist, Iris Murdoch, she describes how a frustrated brother persuades his sister to throw a paper-weight at an aquarium to forestall what he believes to be an attempt at

blackmail by diverting the attention of the guests at a party. The account of the subsequent chaos is vivid in the extreme:

"Suddenly fish seemed to be everywhere, gasping upon the carpet, clinging to the lamp-shades, sliding across polished tables, and wriggling upon chairs and settees. Helplessly, people began to pick them up and run about the room looking for somewhere to put them. Flowers were tossed away, and fishes snatched from cushions or plucked from under stampeding feet were hurled into the vases. One was dropped by mistake into a decanter of gin. Hands reached out and every hand clutched its coloured fish. Under the tables and chairs they scrambled to gather them up, and the room was full of cries".

The moral here seems to be "Don't have a party in a room where you have an aquarium", but it's a moral I, for one, won't take much notice of, because there are few more tasteful party decorations than a tank of fish!

The story of St. Francis of Assisi preaching to the birds is well known; perhaps not so popular is the story of St. Antony preaching to the fishes. On one occasion he had gone to Rimini in Venetia to try and show some heretics the error of their ways. Nobody listened to him. "Since you show yourselves unworthy to hear the word of God, behold I turn to the fishes in order to put your unbelief to shame". Rimini is situated on a river estuary, and so St. Antony turned seawards to deliver his sermon. Much to the astonishment of onlookers, the fishes rose to the surface "with bowed heads and open mouths" to hear his words. Aquarists who know the work of the painter Bosch will be aware of the fish symbols the artist uses in connection with this saint. Perhaps he should be made the patron saint of aquarists!

## Can Goldfish be Bred for a Living?

*continued from page 120*

surprising what a small percentage of the fry turn out to be good specimens. Strains vary, I know, but the prize-winning fish is only about one in a hundred, with many fair specimens. The best fish will fetch a good price, if the right buyer comes along. However, the usual buyer wants a first-class winner for a few shillings. From a fancy goldfish strain it is probable that many of the fish which should have a double tail, have either a web-tail or a tri-tail. Then some may not have the desired paired anal fin. Even when these fins are all right it is possible for the dorsal fin to be misshapen and the body may not conform to the desired standard.

Added to all these possibilities is the fact that many of the fry may take a long time to change colour. This is when the breeder of shubunkins scores over the breeder of visibly scaled fish. The former can change colour at a very early age whereas the scaled types can be up to 2 or 3 years in doing so. The young shubunkins, being coloured, will sell easily but few people will pay much for an uncoloured goldfish, no matter of which variety. The breeder of orandas and lionheads is also up against the fact that it may take a year or two for the hood to develop properly, and so he is forced to keep his youngsters much longer than the breeder of shubunkins.

To the would-be commercial breeder I would say that it is grand to breed some fish as a hobby and to sell a few spare fish to help pay for food etc., but do not think that you can make your fortune at breeding goldfish in this country. Even the experts cannot do it here so what chance has the amateur?

## Aquarium Plants of the Water-Plantain Family

by ARIE DE GRAAF



Fruit of *Echinodorus* plant (Photo by the author)



Above: Fruit of *Sagittaria* (Photo by Doornberg, Botanisch Laboratorium van Herbarium Botanicum Leiden)

Left: Typical floral diagram (vertical section) for flower of the Alismaceae

THE water-plantain family is the Alismaceae, and in particular the varieties of *Echinodorus*, *Alisma* and *Sagittaria* have received some publicity lately among the aquatic plants. One reason for this is that in recent years more tropical plants of this family have been imported into Europe; another is simply that more attention has lately been paid to these plants. There are, however, widespread misunderstandings about the naming of these plants which I hope to eliminate in the course of a series of articles.

Members of this family are to be found in the tropical and temperate fresh waters over the whole world. Submerged, marsh and floating plants are included in the genera of the family: *Alisma*, *Burmannia*, *Caldesia*, *Danthonia*, *Echinodorus*, *Limnophyton*, *Lophocarpus*, *Luronium*, *Ranalisma*, *Rostkumia*, *Sagittaria* and *Wissneria*, which in turn consist of approximately 60 varieties.

### Botanical Notes

Here are some botanical notes on the characteristics of these plants, necessary to be studied for their recognition and identification. Their leaves have stalks which are, as a rule, distributed over the stem. The roots are fragrant. The flowers occur in strongly branched types of inflorescence, and are bisexual or unisexual, with a clear distinction between the three-lobed persistent calyx and a three-

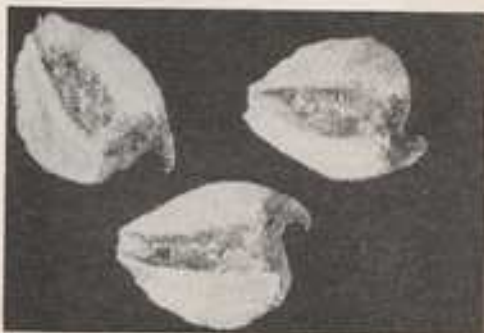


Photo:

H. W. E. van Bruggen

Nuts of *Sagittaria* (magnified)

lobed deciduous corolla. Flowers are said to be actinomorphic, that is, if they are cut through vertically, the left-hand side of the section would be of the same appearance as the right-hand side. The number of stamens is six, those on the extreme outside being sterile. Ovaries of the flowers are superior and are frequently intergrown at the base. Ova may be single or numerous. The fruit is mostly contained in a many-seeded capsule, or it is a one-seeded nut. The seeds have no endosperm.

I want to thank Professor H. C. D. de Wit, who identified a number of plants for me, and Mr. H. W. F. van Bruggen of S. A. van der Gaag, and Mrs. Doornberg, who have helped me with photographs in my investigation of the Alismaceae.

Right: Nuts of the plant *Lophotocarpus*  
Photo by H. W. F. van Bruggen



## Know Your Rocks — 2

### SEDIMENTARY ROCKS

by H. J. VOSPER

(Photographs by the author)



Beneath the sandstone lip of the Upper Cillepste Falls (Beconshire). A geological fault has resulted in the stream flowing off the hard sandstone on to soft shales, the erosion of a band of black shale producing a deep recess that can be used to pass under the falls from one side of the river to the other.

**I**N Part I we considered the nature and form taken by the igneous rocks, produced by the solidification of molten magma. Two further groups are those composed of the debris of previous materials and those resulting from either the activities of or the remains of living organisms.

#### Sedimentary Rocks

This group is composed of those rocks which are derived from previously existing materials and they are classified according to the nature of their origins: (1) mechanical origins; (2) chemical origins.

The rocks from which the mechanical sediments are derived may have been of an igneous nature, they may have been earlier sediments or they may have been metamorphic (changed) rocks. This last division will be discussed in due course. The breakdown and deposit of the material concerned may have been part of a long history of such actions, dating back to the earliest rocks ever formed. Rocks such as sodium chloride or rock-salt have been ignored for the purposes of this discussion.

#### Mechanical Sediments

Water, dehydration, heat, cold—these are the primary factors which cause a rock to break up into small particles. Once the initial fracture has occurred the pieces are moved along, in a stream for instance, and they are ground smaller and smaller and are carried further and further until at last they may be deposited far away as tiny grains on the bottom of the ocean or lake, where they form the layers or beds which are eventually consolidated into a hard rock. Depending upon the size to which the particles have been ground and the intermixture with more finely ground or larger particles, so the character and classification of the rock is determined.

**Sandstones.** This is a general term that can be applied to those sediments in which the grains of silica, of which sands are normally composed, are all of approximately equal size. Secondary classification depends upon average grain size, so that there are coarse, medium and fine sandstones, grading right down into the fine-grained siltstones. There are also such structural definitions as "soft" sand-

stones (i.e., unconsolidated) and "hard" sandstones (firmly cemented or compacted), which must also be differentiated one from another.

**Madstone.** Clay consists of very fine grains and when this forms a hard rock of uniform structure it can be termed a madstone. However, where the grains are really very fine and the rock is clearly stratified it is given the name shale, the two forms being easily distinguished.

**Shale.** When the grains are ground down to such a small size that they may be likened to flour then the material is known as a shale, being rather soft unless the quartz content is above normal. Shales vary in colour, with iron providing a red or yellow tint (ferruginous shales), bitumen imparting a black coloration (bituminous shales) and calcareous shales being normally light in colour and so on. The calcareous shales react to the hydrochloric acid test, which will be described in Part 3 of this series.

The presence of such soft rocks as shales, when interbedded with harder materials, is often the cause of origin of scenically beautiful waterfalls, for the comparatively rapid disintegration of the shales results in steps and even the undermining of the more compact rocks. The photograph shows such a fall, and the shales have been so far removed as to allow the harder rocks above to form a lip, under which one may pass and so walk behind the fall.

**Conglomerates.** If the particles in a sedimentary rock are of clearly differing sizes then they form what is termed a conglomerate. In some cases the differently sized grains may be only barely distinguishable; there may be several grades or even perhaps only two grades of vastly opposite character, as in the "pudding-stone" of Hertfordshire, in which good sized pebbles are cemented together by a fine claystone (see photograph). Most pebbles and the binding media are of silica, with the result that such a rock is a quartz conglomerate but the classification depends upon the most abundant constituent in any particular specimen.

**Grit.** Whereas sandstones, in general, contain rounded grains there are some forms which have angular grains and for these the term grit is used. Note that a conglomerate formed of such angular fragments is known as a breccia.

#### Sources of certain Sedimentary Rocks

Devonian sandstones and allied:

S.E. Wales	Gloucestershire
N. and S. Devonshire	Perthshire, Angus,
Cornwall	Caithness, Lanark,
	E. Cromarty

Early Palaeozoic sandstones, conglomerates etc.:

N. and S. Scotland  
N., Central and S.W. Wales

Other sandstones and conglomerates:

Northumberland	Monmouthshire
Yorkshire	Shropshire
Lancashire	Wiltshire
Cheshire	Dorset
Worcestershire	Surrey
Warwickshire	Kent
Herefordshire	

Millstone grit and allied materials:

Midlothian etc.	Northamptonshire
Northumberland	W. and S. Wales
Durham	Gloucestershire
Yorkshire	Somersetshire
Lancashire	N. and Central Devon

Some calcic sandstones:

Central Northern England	Surrey
Central Scotland	Kent
Warwickshire	Wiltshire
Lincolnshire	Dorset

#### Chemical Sediments

Most members of this composite group are composed of



In this specimen of conglomerate the silica pebbles are bound together by a compact claystone. In examples in which the larger or more abundant material in the sedimentary rock is in sharp or angular fragments the rock is called a breccia.

calcium carbonate (calcite); other types discussed are of silica and of carbonaceous substances. The calcite group exists in a great abundance of forms, but whatever their origin or texture, they may be referred to as 'limestones'. Briefly they are rocks made of the consolidated materials which have been separated from sea water by the concerted action of a multitude of living organisms, which rocks now form a fine-grained mass often many hundreds of feet thick. Some members of the limestone group contain the fossilised remains of both large and small organisms which had a hand in the original formation of the beds; indeed there may be so many of these fossils present that the particular rock is named after them, hence crinoidal limestones, which contain numerous crinoids or 'sea-lilies' (Echinodermata) for example.

The fossils found in limestones, sandstones, shales, clay



Fossil remains (giant ammonite, slightly enlarged) of an extinct cretaceous organism recovered from a clay deposit in Kent. Geological and zoological studies are linked in the science of palaeontology.



Alternate layers of hard and soft materials provide good examples of water-worn rock, as in this sandstone. Attractive effects can be given by the careful use of files and glasspaper, and bonding with a rounded hammer or stone can be used to effect on harder rocks that resist a chisel.

etc. (never in igneous material, seldom recognisable in metamorphic rocks) are studied in the science of Palaeontology, another aspect of Geology.

**Limestones.** This division of the rocks contains accumulations which vary in content, colour, texture and hardness. One can expect to find colours ranging from white through cream, yellow, grey, brown to red and black, and even blue is far from being unknown. The texture can range from a massive crystalline to sandy; hardness may range from a soft material which can be cut by a knife to one that is so hard that it requires the use of hammer and chisel or especially devised tools. All general limestones will react to the acid test but not always to cold acid, whereas some of the softer limestones will react but the texture will hide the effervescence.

**Chalk.** This is a fine-grained limestone which is normally soft and white but may be hard and grey; some aspects are reddish owing to iron staining. It is composed of the fragmentary remains of the shells of tiny organisms called foraminifera (Protozoa) and other similar materials. Some aspects of the chalk are so hard that it can be used as building stone, but even these are likely to be dangerous in aquaria.

**Oolite/pisolite.** These limestones are generally somewhat harder than chalk and indeed some are extremely hard. The texture is derived from the fact that they are composed of small grains or concretions, which in the oolites are so tiny that they often resemble the roe of fishes and it is upon this fact that the common name is based (Greek *ooon*: egg). Pisolite grains are larger and less spherical (Greek *peos*: pea).

**Flowstone.** This may be considered a generic term for such limestone forms as travertine and dripstone (stalactites etc.), the material having been dissolved out and re-deposited in springs, caves and rivers and even under railway arches on occasions.

It may be of a variety of colours in the lighter tones and very often shows banding and mottling due to the presence of iron or other staining. The texture is usually crystalline and the rock will be found to be made up of numerous fine layers.

**Flint.** Here we leave the limestones and return to the silica (quartz) which is so common in most igneous and sedimentary (mechanical deposit) rocks. Flint is com-

posed entirely of silica and to this extent has no connection with the calcite of the chalk in which it appears. It occurs in solid layers or as isolated nodules; in the former the layers may be several inches thick and, as can be seen in the face of various chalk cliffs, may extend for miles in an unbroken sheet. Nodules may be quite isolated one from another, may lay in groups or be present as a nodule band or layer. Flint is, somewhat naturally, found in the debris at the base of chalk cliffs and is common among the drift material in southern England. Both layered and nodule flint is very hard but also comparatively brittle, breaking with a typical 'conchoid' fracture and sharp edges that was a very useful function to early Man in his manufacture of stone implements.

Chalk flints are black or very dark grey but the surface is composed of a porous layer of silica particles which are so small that they scatter incident light they receive and thus appear white in colour. But some staining will often occur, even when this outer coating is eroded away, so that flints may be light grey, brown, yellow or a variety of other colours. Fresh or unweathered flints direct from the chalk will have this calcitic material within the pores of the outer skin; weathered flints will have had the skin removed.

**Magnetite.** There are brown nodules, cylinders, balls and so on which are often found in association with chalk or chalk-derived debris and which, owing to their iron-like appearance and weight, are often termed 'meteoric iron' or 'thunder-bolts'. In fact this is a form of iron sulphide and if the nodules are broken open they will reveal a radially crystalline structure of bright silver, which rusts to a brown colour.

**Coal.** The final class of sedimentary rock that will be mentioned here is the group which originates from plant matter, the coal series, which actually includes every stage from peat to anthracite. Especial mention might be made of the slate (*slate*) which sometimes accompanies coal deliveries. This is a claystone or shale and it occasionally may be found to exhibit fossil traces of the coal plants: ferns, club-mosses and horsetails which grew as giant trees in the Carboniferous period. The examination of coalfield waste heaps can often prove rewarding in this respect.

Sources of some harder limestones:

Central and W. Scotland (isolated parts)	Shropshire
Westmorland	Warwickshire
Cumberland	Extreme N.E. Wales
Northumberland	South Wales
Durham	Anglesey
Yorkshire	Somerset (Mendips)
Lancashire	Devon (Plymouth, Torquay)
Derbyshire	Kent (Kentish Ragstone, some aspects)
Leicestershire	Surrey (Bargate Stone, some aspects)

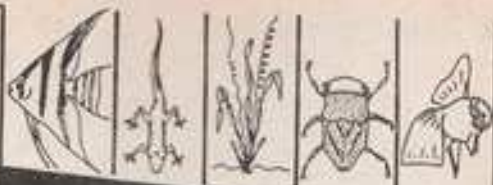
Next article: Metamorphic Rocks.



THE AQUARIST

## our readers

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.



## write

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

### Swimming Speeds

A GOOD deal more is known about the swimming speeds of fish than Mr. Fry indicated in his interesting article (*The Aquarist*, August). Dr. Richard Bainbridge of Cambridge University has measured the swimming speeds of trout, dace and goldfish 14 to 12 inches long, and has collated the observations of other zoologists on other species (*Journal of Experimental Biology*, volumes 35 and 37). The maximum speed depends on the time for which it is sustained, just as a man can run faster for 100 yards than he can for a mile. It seems that the following simple rule applies to fish of a wide variety of sizes and species: they can swim at a maximum speed of 10 to 12 times their length per second for a second or two, but the maximum speed they can sustain for an hour or so is only three to five times their length per second. A fish a foot long, for instance, can reach about 8 m.p.h. in a short burst and can cruise at about 3 m.p.h.

Mr. Fry does not give the sizes of the fish whose speeds he gives (indeed he says, contrary to Dr. Bainbridge's findings, that size has little to do with speed), but a few of the speeds he gives seem improbably high, and one wonders whether the observations on which they are based are entirely reliable.

R. MCN. ALEXANDER,  
Bangor, Caernarvonshire.

### British Marines

WITH reference to Mr. H. J. Vosper's letter headed "British Marines" (*The Aquarist*, September), I must agree that he is probably correct about the snakelocks anemone (*Actinonema minuta*) and that this anemone does, under certain conditions, retract its tentacles. Unfortunately this particular species is not found in my local collecting area and the ones I have kept in tanks have shown no reaction to those conditions which cause other anemones to withdraw their tentacles.

It may be of interest to note that I brought a couple of snakelocks anemones from South Devon to West Cumberland in the boot of my car without them suffering any ill-effects. They were carried in a carton containing damp seaweed.

A month after introduction to my anemone tank, the smaller of the two animals divided longitudinally, starting at the base and gradually extending upwards. After a few hours I had three "snakelocks" instead of two. The two

anemones resulting from the splitting process were, strangely enough, different shades of green.

Like Mr. Vosper, I have successfully used angle-iron tanks for marine creatures, but have found corrosion a constant source of trouble, a difficulty easily avoided by the use of nylon-coated tanks.

With regard to aeration, I have kept anemones without using an air pump but under such conditions the specimens remained in a half-open state even at night and after feeding, when most of them should be at their best.

In my article I purposely avoided mentioning the plumose anemone (*Marridium spiky*), for, as Mr. Vosper points out, this creature is not one for beginners, being a plankton feeder. Crushed white fish and mussels will sometimes be taken but there is always the possibility of water pollution. There is, however, always room for experiment, but anemones of the same species do not always react to food in the same way.

May I, finally, thank Mr. Hurlock for his suggestion for the prevention of water from the cover glasses of tanks running down the sides. It certainly is less complicated than the devices I have so far tried.

A. J. McLEAN,  
Egremont, Cumberland.

### Plops in the Night

THE following true anecdote may interest your readers. Touring on the Continent means sleeping in all sorts of rooms to an accompaniment of all sorts of noises: dustbins in Rheims, trains in the Aosta valley, wedding celebrations in Cologne, lorries in Ypres—I grew used to the lot but my strangest background noise occurred at Poligny in France.

I had enjoyed an excellent meal (trout cooked to perfection and good wine). My room overlooked the hotel yard but seemed peaceful enough. At first, that is. Soon a peculiar plopping, gurgling noise disturbed me. It continued all night and I feared the worst re-sanitisation. Daylight came and I located the sound. Bubbly-bubble-bubble-plop! No wonder the trout had kept so fresh. Beneath my window was a tank full of fish, hygienically aerated. My drains were only the bubbles in the fish tank. I must say this is the nearest I have ever come to sleeping with fish.

(Mrs.) E. HARRIS,  
Hayling Island, Hants.

## A Visit to Chester

continued from page 119

restaurants and cafés and with modernisation and extensions taking place to such a degree that something different appears nearly every time one visits it.

The idea of a Zoo without bars is becoming quite a reality. In a great many instances only a small wall or water channel separates the animals from the public, and inside the newer houses glass fronts are replacing wire mesh and some of the birds are in free flight.

As one looks around the Zoo the number of young animals seen that have been born in the Zoo proves that the conditions provided for the animals are as ideal as can be.

Beside the animals the gardens are delightful to walk through with well laid-out flower beds and borders wherever you go, which are filled with flowers from the beginning of the year to the end.

A novelty feature of the Zoo is the island waterway, and by means of a block of tickets bought at the waterbus terminus one can visit various parts of the Zoo by boat, using it in a similar manner to a bus service.

For the aquarist, however, the Aquarium is the centre of attraction and is well worth visiting. The tanks are illuminated by natural light and contain a wide range of water life, including tropical and coldwater fishes, pond

life, marine fishes and marine life from round our coasts. Except for one tank containing marine life from around Holyhead all seemed in perfect health and judging by the large amount of *Daphnia* present in nearly all of the tanks were well fed too.

The tanks are well set up with plenty of healthy-looking plants and in most cases one species of fish to each tank. This seems to be a very effective way to display them, for some were really outstanding. The tanks that I admired most housed a shoal of large beautiful cardinal tetras, a shoal of rosy barb, brown pompadour fish (discus), the one whose rockwork was covered with various types of anemones and the one with a shoal of large piranhas.

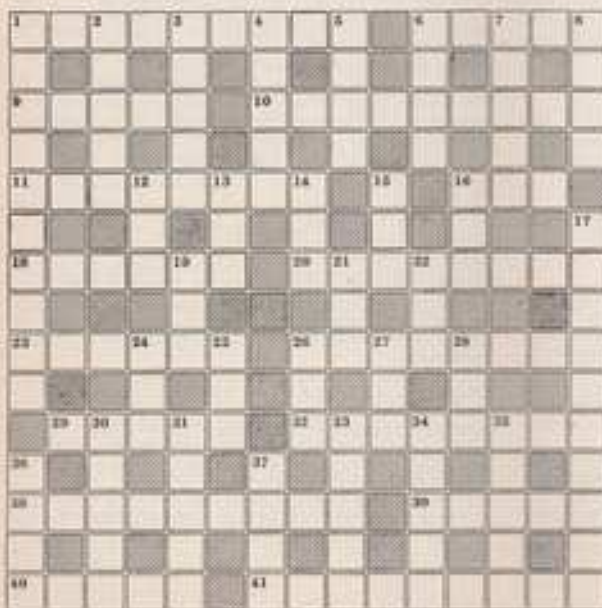
It seems a pity that excess fish not required by the Zoo cannot be purchased by aquarist visitors, for in some tanks what appeared to be live food for larger fish would have graced the tanks of many an aquarist!

The labelling of the fishes on display left a lot to be desired, especially where there were more than one species to a tank.

My only real criticism about Chester Zoo is that an additional charge of 2s. 6d. is made to enter the new tropical house. This is nearly as much as the admission fee and must deprive a lot of people from the pleasure of seeing some fascinating animals, birds and reptiles in their natural surroundings. I personally would prefer the entrance fee to be raised say by 6d. to cover extra cost. However, this Zoo is really magnificent and I do not think that anyone who visits it will be disappointed.

## The Aquarist Crossword

Compiled by M. W. SAUNDERS



### CLUES ACROSS

- Do the *Lepidosteus* dance at these? (9).
- Spenthrus*? (5).
- I'd run round to prevent flooding (3).
- Small fish whose name appears in lights (4, 7).
- Very trying but not knowing it (8).
- To love madly (3).
- Get off, almost, for being overactive (6).
- Sometimes found in ponds at night (8).
- Home of the sword plant (5).
- Speckles to accumulate (8).
- First sign of winter, Jack (3).
- Their reputation is growing (9).
- Small cichlid fish (9).
- A very doc? (5).
- Miserable from the start, though richer (5).
- Signifies all is well (4, 5).

### CLUES DOWN

- Home of the lily plant (10).
- These winds may help the export drive (3).
- Where fishermen sit, counting their money (5).
- Fabric from mill in England (5).
- What white may you aquarist in a jar (4).
- Join in reproduction (4).
- Complete and absolute (3).
- This race might help the runner get warm (4).
- Sounds like an expanse of water. Understood? (3).
- Might provide cover for your goldfish (3).
- Descriptive of a jewel orchid (3).
- Since (2).
- Rob goes round in a circle (3).
- The mark you leave and the view you get (10).
- South American city (3).
- Now about what you possess (3).
- Here of (3).
- Animal kingdom (9).
- Lot of holes tied up with string? (3).
- One of those devilish wee fish? (2).
- By way of (3).
- A controlled thermostat is (3).
- Howie acts (2).
- Suitable for catching fish—or animals (5).
- Give away a secret about the school nearby (3, 4).
- Our bottles they cannot be mixed (3).
- Mistake—or not? (5).
- Tank occupants do . . . (4).
- . . . And this helps them to do it (4).

Solution on page 121





## Notes from AQUARISTS' SOCIETIES

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

**THE results of the Bethnal Green A.S.'s annual open show were as follows:** Inner Club (aquaria tropical and coldwater); 1, Walthamstow and District A.S.; 2, Tottenham A.S.; 3, Walthamstow A.S.; 4 (Gold), Bethnal Green A.S. and Tottenham A.S. Breeders' egg-layers (A fish); 1 and 2, L. Bromley (B.G.A.S.); 3, R. Ebdon (Tottenham & Dist.); 4, B. Dean (Southend & Leigh). Breeders' livebearers (A fish); 1 and 2, J. E. Cobden (Cardiff); 3 and 4, T. Jones (B.G.A.S.). London lighter charrs; 1 and 2, H. Chapman (B.G.A.S.); 3, D. C. M. Durrant (Grey Thurrock); 4, T. W. Glass. All England lighter charrs; 1, J. E. Cobden (Cardiff); 2 and 4, D. W. Ellis (Willesden); 3, H. Chapman (B.G.A.S.). A.W. barbs; 1, L. Bromley (B.G.A.S.); 2 and 4, T. Gilman (B.G.A.S.); 3, W. Collins (Walthamstow); A.V. plecos; 1, T. Gilman (B.G.A.S.); 2, W. Wren (B.G.A.S.); 3, W. Barber (Tottenham); 4, T. Jones (B.G.A.S.). A.V. guppies; 1, E. Nichol (Grey Thurrock); 2, B. T. Mather (Walthamstow); 3, J. E. Cobden (Cardiff); 4, D. A. Crane (Horn). A.V. characins; 1, W. Collins (Walthamstow); 2, T. Gilman (B.G.A.S.); 3, S. G. Muncey (Tottenham); A.V. swordtails; 1, W. Barber (Tottenham); 2, J. Day (B.G.A.S.); 3, W. Wren (B.G.A.S.); 4, G. E. Greenhall. Danos, sailfins, W.G.M.M.; 1, J. E. Cobden (Cardiff); 2, L. Bromley (B.G.A.S.); 3, G. E. Greenhall; 4 (Gold), E. Nichols (B.G.A.S.) and S. G. Muncey (Tottenham). A.V. shilds; 1, H. Sumner (Chingford); 2, E. Nichol (Grey Thurrock); 3, P. Lobb (Tottenham); 4, D. B. Howman (Tottenham). A.V. catfish; 1 and 3, D. W. Ellis (Willesden); 2, A. P. Barnes (Tottenham); 4, D. B. Howman (Tottenham). A.V. eelgrass; 1 and 2, J. M. Challice; 3, L. Bromley (B.G.A.S.); 4, T. W. Glass. A.O.V. shilds; 1, I. E. Cobden (Cardiff); 2, W. Collins (Walthamstow); 3, D. C. M. Durrant (Grey Thurrock); 4, G. E. Greenhall. A.O.V. tropicals; 1 and 2, J. E. Cobden (Cardiff); 3, C. Bond (Chingford); 4, L. Bromley (B.G.A.S.). Sword pairs (B.G.A.S. members only); 1, H. Chapman; 2, T. Gilman; 3, E. Nichols; 4, J. Day. Best fish in show; J. E. Cobden (Cardiff), red tailed shark. Breeders' best; 1, Bromley (B.G.A.S.), angie. Bethnal Green members only; Best fish; L. Bromley. Aquarium rainbow; Best guppy; H. Chapman, eelshild; Best characin; T. Gilman, mountain minnow.

**THE Goudville and District A.S. (Lancashire)** scored a notable success when they staged a "fish of the year" show in conjunction with the Coal Industry Social Welfare Organisation's annual horticultural show at Colchester Hall, the National Coal Board's No. 7 Area Headquarters, near Goudville.

Until this year the show included everything but fish—so for the 1965 show the Goudville Society decided to put over to the public what the keeping of tropical fish involved. A non-competitive display of more decorative aquaria was held, and an specially constructed three-tier stand, individual aeries (30 fish) covered for the fish of the year title. A beautiful shild was provided by the Coal Industry Deposition and smaller prizes were donated by McLeven's aquarium. An electric catfish

attracted a great deal of attention and the show was completed with a "guess the number of fish in the tank" competition, the prize for which was the decorative aquaria which took second place at the Millers' open show at Birmingham at the end of August or an alternative of 25 cash. Decorated with posters and numerous plants of all descriptions the stand provided a most tasteful addition to the show and it caused a great deal of comment among the public and in the local press. It is hoped to make this show an annual event.

The winner of the shild for the best fish in show was Mr. V. H. Tilley. His exhibit was a beautiful knife guppy. Mr. Tilley was presented with a replica by the Society. The results were: A.V. characins; 1, M. Meakin; 2, A. Pickering; 3, J. A. Reed; 4, R. Tottenham; 5, Strutton; 6, J. A. Reed. A.V. barb; 1, P. Turner; 2, A. Taylor; 3, P. Strutton; 4, A. G. Day; A.V. catfish; 1, A. G. Day; 2, J. A. Reed; 3, A. Pickering; 4, C. Crosswell; 5, T. Edge; Guppies; 1, J. H. Hensley; 2, J. Brett; 3, A. C. Hammersley; 4, J. Brett. Barbones, danos and white cloud minnows; 1, J. A. Reed; 2, A. Pickering; 3, T. A. Reed; 4, J. Upson. A.V. Anabantids; 1, V. H. Tilley; 2, P. Strutton; 3, J. A. Reed; 4, C. Ellis.

**AT the first meeting after the summer recess of the Thurrock Aquarist Club** the chairman welcomed new members to the Club. The evening was devoted to Club affairs regarding the annual show which was held on the 2nd October.

Also under discussion was F.R.A.S. membership. After a lengthy discussion the Club unanimously decided to become members of the F.R.A.S.

On the same evening a table show was held for barbs and the result was as follows: 1, Mr. P. Rowell (obey barb, 64 pts.); 2, Mr. B. Barber (blue barb, 64 pts.); 3, Mr. D. Durrant (sailfin barb, 60 pts.).

The fish which to congratulate Mr. Brian Barber on taking first prize in the common goldfish class and also best fish in show at the Tottenham and District annual open cold-water show.

**THE Chester and District A.S.** recently visited the trout hatcheries at Chirk, in Wrexham and the Chester was Assisium. At the last meeting there was a large number of entries for the table show of breeding pairs, and the best prize of a Shirley Plant Manual was won by Mr. S. Callister. An interesting talk on the keeping and breeding of catfish of the genus *Urochloa* was given by Mr. E. Stiles. He illustrated his talk with paired living specimens so that members were able to study the differences in the sexes.

**AT the September meeting of the Wakefield and District A.S.** the results of the last yearly trophy show, judged by Mr. P. Macdonald (Huddersfield), were as follows: 1, Mr. Conant; 2, Mr. Englefin; 3, Mr. Fawcett; 4, Mr. Southy. At the same meeting Mr. L. Ormsall (Tadcaster), gave a talk on fighters and toothpicks.

**THE second annual open show results of the Horden and Essington A.S.** were as follows: Guppies; 1 and 3, C. Simpson (Peterslee); 2, J. Hoyle (Peterslee); 4, J. Robinson (Peterslee). A.O.V. livebearers; 1, E. Clark (Sunderland); 2, F. Pullman (West Hartlepool); 3, B. Aldby (West Hartlepool); 4, M. Little (West Hartlepool). Barbs; 1, R. Adamson (Ind.); 2 and 3, D. Potter (Horden); 4, E. Moskayil (Horden). Characins; 1, W. Peter (West Hartlepool); 2 and 4, E. McFarland (Horden); 3, P. William (Seaham). Labrynthia; 1, R. Adamson (Ind.); 2 and 3, F. Pullman (West Hartlepool); 4, J. Allen (Middlebrough). Fighters; 1, V. Conner (Middlebrough); 2 and 4, R. Atherton (Ind.); 3, P. Wallace (Seaham). A.O.V. eelshild; 1 and 3, J. Robinson (Peterslee); 2, J. Hoyle (Peterslee); 4, R. Marmann (Horden). Cats and loaches; 1, J. G. Herring (Peterslee); 2, J. Robinson (Peterslee); 3, D. Potter (Horden); 4, R. Dean (Seaham). A.V. barb, danos or guppies; 1, J. G. Robertson (Tyneside), guppy and livebearer; 2, J. Hoyle (Peterslee); 3, J. Bond (Tyneside), guppy and livebearer; 4, W. Peter (Horden). A.O.V. eelgrass; 1, R. Robertson (Ind.); 2, D. Hoag (West Hartlepool); 3, S. Brunson (Ind.); 4, W. Harrison (Peterslee). Breeders' egg-layers; 1, J. G. Reed (Tyneside), guppy and livebearer. Breeders' livebearers; 1, J. G. Robertson (Tyneside), guppy and livebearer; 2, D. Porter (Horden); 3 and 4, J. G. Reed (Tyneside), guppy and livebearer. Best fish in show; Mr. R. Adamson, with a sailfin barb.

**MEMBERS of Leeds and District A.S.** were given a talk by Mr. Hunt of the Great, Sunderland, at a recent meeting. The talk, which was a most interesting and enlightening one, was on Mr. Hunt's wide experience in rearing and keeping cichlids.

At the September meeting the members were given a talk by the secretary on the evolution of fish from the first life to the modern fish.

**DESPITE** very inclement weather there was a good attendance at the first meeting of the Lytham A.S. The first item on the agenda was the election of the officers for the first year which resulted as follows: Chairman, Mr. E. Wright; secretary, Mr. W. Longbridge, 86, Greenfield, Catterick Park, Fenclinton, Lancs.; treasurer, Miss C. Worthington. Mr. D. Baker gave a lecture on the general aspects of fishkeeping which the members found most interesting. There followed a discussion on plant life and tank lighting. Tentative arrangements were made to attend the show at Balfour, Manchester, in November.

**THE Freeland A.S.** held their annual general meeting recently and the following changes were made in the Club. Secretary, E. A. Thomas, Esq., 54 Stamford Road, Colton Park, S.E.1; treasurer, B. Pease, Esq., 71, President Avenue, Black Fen, Sidcup, Kent; show secretary, E. Keop, Esq., 5, Langley Mansions, Langley Lane, Vauxhall, S.W.8.

The Society enjoyed a very good year socially and financially.

**THE Garforth and District A.S.** announce that due to pressure of work Mr. R. Davis has regrettably had to relinquish his post as secretary. Consequently a few changes in officers are as follows: Secretary, Mr. Paul Chisley, 66, Darnley Avenue, Garforth (tel. Garforth 2911); treasurer, Mr. G. Driscoll; and show secretary, Mr. R. Davis. The other officers are as before.

**THE annual members' best fish competition** was recently held by the Barrow and District A.S. and, as is usual with this popular table show, there was a pleasing number of entries. Mr. E. Searcy of Widdowson very kindly consented to judge the entries and finally chose a silver shark, owned by Mr. D. Adams, as the winner. Mr. A. Elson's Simons lighter was second, and a sailfin molly, owned by Mr. B. Mills was third. Before presenting the winner

with his trophy, Mr. Smart made a few short comments on each fish in the show, pointing out minor defects and indicating the features he would look for in a prize-winning specimen.

The Society is interested in producing a series of colour slides of members' fishes and aquaria, but no club member has sufficient knowledge to do the job properly. If any fellow enthusiast can give some practical help, the Society would be very grateful. The secretary is Mr. E. Ralph, 6, Malton Crescent, Harlow-in-Pennine, Lancs.

**THE Portsmouth A.S.** held their 13th annual open show recently. The main attraction was a large outdoor aquarium set up in the museum by Mr. Fosse and furnished by Mr. Evans. An exhibition of reptiles by Mr. Howard, and a water-bill show by Mr. Hanz. Out of a record number of entries the results were as follows: Club furnished tropical: 1, Portsmouth; 2, Southampton; 3, Medhall and Risque. Coldwater: 1, Roddall and Ringler; 2, Carleton Club; 3, Portsmouth. Individual furnished tropical: 1, R. H. Nunn; 2, G. B. Bass; 3, M. Mason. Coldwater: 1, W. Leach; 2, R. M. Wittington; 3, Miss B. Nunn. Marine furnished: 1, Mr. and Mrs. J. Howard; 2, B. Sartin; 3, Mr. and Mrs. J. Howard; 4, A. Roddall. Individual furnished junior tropical: 1, T. E. Smith; 2, S. Sartin; 3, J. Spragg. Coldwater: 1, J. Spragg; 2, R. Sartin; 3, A. Roddall; 4, J. P. Parnham. Goldfish: 1, S. P. Dawson; 2, Mrs. W. Vowsey; 3, S. Sartin; 4, Mrs. V. Leary. Bronze fishbowl: 1, 2 and 3, R. M. Wittington; 4, R. Forrest-Jones. London shubunkins: 1, G. Eastwood; 2, J. and A. R. M. Becker. Fantails: 1, R. M. Wittington; 2 and 3, Mrs. G. L. Sartin. Moors: 1, R. M. Wittington; 2, H. B. Gull; 3, H. W. Hatcock. A.O.V. fancy goldfish: 1, A. H. Bassing; 2, W. Leach; 3, Mrs. G. L. Sartin; 4, A. H. Bassing. Radda, rock, oriole, carp: 1, Mrs. G. L. Sartin; 2 and 3, Mr. and Mrs. J. Howard. A.O.V. river and pond: 1, Mr. and Mrs. J. Howard; 2, S. Sartin; 3, Miss W. G. Ryder; 4, V. B. Hanz. Novice exhibitors: 1, R. Sartin; 2, V. B. Hanz; 3, R. Sartin. Guppy (male): 1, Scott-Morgan; 2, A. Taylor; 3, P. D. Hall; 4, R. Keating. Guppy (female): 1, A. Taylor; 2, P. D. Hall; 3, V. J. West; 4, R. Forrest-Jones. A.V. swordtail: 1, 2 and 3, R. Scott-Morgan; 4, N. Franklin. A.V. platy: 1, P. H. Hamlin; 2, J. Scott-Morgan; 3, D. Leary; 4, P. Gardner. A.V. mollie: 1, D. Hancock; 2, S. Sartin; 3, J. Scott-Morgan; 4, R. Wylie. A.O.V. livebearer: 1, R. Keating; 2, R. Cooper; 3, J. Goddard; 4, G. E. Greenhall. Goldfish: 1 and 4, R. Keating; 2, J. Andrews; 3, D. W. Ellis. A.O.V. cichlid: 1, E. Warren; 2, G. Goddard; 3, E. A. Warren; 4, L. W. Jordan. Barb: 1, J. J. Parnham; 2, E. A. Warren; 3, R. Wylie; 4, M. Warren. Rasbora: 1, G. E. Greenhall; 2, A. D. Gosnell; 3 and 4, N. Franklin. Characins: 1, Mr. and Mrs. C. A. Bailey; 2, A. H. Rander; 3, V. P. Vowsey; 4, Mrs. N. Jordan. Cichlid: 1 and 4, N. Franklin; 2, G. E. Greenhall; 3, V. J. West. A.O.V. cichlid: 1, V. J. West; 2, D. W. Ellis; 3, H. D. Cross; 4, J. Scott-Morgan. Fighting tooth carp: 1, Mrs. V. Leary; 2, H. D. Cross; 3, D. J. Collins; 4, R. Wylie. Darter, carp, minnow: 1, R. D. Hall; 2, R. Keating; 3, V. B. Hanz; 4, V. J. West. Fighters: 1, A. H. Bassing; 2, H. D. Cross; 3, J. Scott-Morgan. A.O.V. labyrinth: 1, H. D. Cross; 2, A. H. Bassing; 3 and 4, E. A. Warren. A.O.V. eel: 1, P. D. Hall; 2, A. D. Gosnell; 3, Mr. and Mrs. C. A. Bailey; 4, E. Leary. Novice tropical: 1, G. B. Bass; 2, Miss J. Hall; 3, R. Sartin; 4, C. F. Hollis. Breders coldwater: 1 and 2, R. M. Wittington; 3, G. Eastwood; 4, 5 and 6, R. M. Bockart. Breders livebearer: 1, L. J. Jordan; 2, J. Scott-Morgan; 3, D. Hancock; 4, H. Cross. Breders eel: 1, J. Andrews; 2, R. Sartin; 3, R. Keating; 4, V. P. Vowsey. Breders guppy: 1 and 2, J. Scott-Morgan; 3, A. Taylor; 4, J. Scott-Morgan. Rooted plants: 1, 2 and 3, J. Roddall; 4, V. J. West. Plant arrangement: 1 and 2, A. H. Bassing; 3, R. M. Wittington; 4, A. W. Atkinson. Floating plants: 1, R. M. Wittington; 2, R. Forrest-Jones. Parachuted vivarium papilio: 1, A. W. Atkinson; 2, R. Sartin. Parachuted vivarium snailbait: 1, Miss J. Carpenter; 2, A. W. Atkinson.

#### NEW SOCIETY

ON the 25th August the Lytham A.S. was formed. The Club is to cater for tropical and coldwater fish keepers in the area from Lytham St. Anne to Preston, Lancs. The meeting was attended by ten members, and a further five names were given in applying for membership. Headquarters of the Club is the Lytham Institute, Clifton Street, Lytham, and the meetings will be held once a fortnight. Anyone interested in joining will be made very welcome. Further information can be had by applying to Mr. Greenfield, Caxton Park, Frodickton, nr. Preston, Lancs.

AN open show was held by **Hendon and District A.S.** on a change from the usual invitation shows of previous years. Despite the unimpressive climate, such was the number of show on the far side of London and following close on the tail of shows the few weeks previous, it was well supported. The entries were bunched in their owners square jars or small tanks on light stands erected on the stage of the hall. During the evening and providing a dark background behind the entries gave the show a very pleasing effect which relieved the usual eye-sore result associated with jar shows. During the judging, the stage curtains were drawn and two side shows on full-keeping vivaria were screened. First prize winners were—A.V. platy: 1, Holden (Hendon); vivarium: A.V. swordtail: E. Davies (Riverside); sword: A.V. eel: J. Carr (T. Glass Willenden); A. vivarium: A.V. dario, rasbora, W.C.M.M. R. Bagg (Riverside); R. heteropetala: A.V. mollie: E. Ellis (Kington); sword: A.V. platy: M. Atard (Riverside); eel: A.V. barb: M. Atard (Riverside); river: A.V. shanora: R. Bagg (Riverside); N. Trifanovskii: A.V. Sumner Aguliers; E. Davies (Riverside); red: A.O.V. labyrinth: A. Stevens (Hendon); last: A.V. corydoras: L. Clements (Tottenham); swordfish: A.O.V. tropical catfish: F. Ellis (Hampstead); plecostomus: A.V. cichlid: F. Ellis (Kington); N. novemacule: A.O.V. tropical eel: A. Greenhall (Kington); black shark: A.V. tropical breeder: T. Glass (Willenden); fly: A.V. common goldfish: A. Sartin (Hendon); A.V. shubunkin: F. Clements (Tottenham); Bristol: A.V. fancy goldfish: A. Sartin (Hendon), first.

Best fish in show glass presented by the F.R.A.S. was awarded to L. Clements (Tottenham A.S.) for his swordfish specimen.

Total points awarded: Hendon A.S., 65 pts.; Kington A.S., 20 pts.; Riverside A.S., 27 pts.; Tottenham A.S., 20 pts.; Willenden A.S., 10 pts.

**THE results of the Tottenham and District A.S.** open coldwater show were as follows: Best fish in show: Mr. Barber with common goldfish, 69 points. Common goldfish: 1, Mr. Barber; 2, 3 and 4, Mr. Berger. Shubunkin: 1 and 3, Mr. Wittington; 2, Mr. K. Lobb; 4, Miss D. Morris. A.O.V. singular fancy: 1, Mr. Elford (Gerrard); 2, Mr. Leach (Gerrard); 3, Miss Berger (Gerrard); 4, Mr. Smalley (Gerrard). Fantail: 1 and 2, Mr. A. Stammer; 3, Mr. Berger; 4, Mr. Linnell. Veltail: 1, 2 and 3, Mr. Berger; 4, Mr. Linnell. Moore: 1 and 3, Mr. Berger; 2, Miss D. Morris; 4, Mr. Sartin. A.O.V. tropical fancy: 1, Miss Berger (Gerrard); 2, Mr. Linnell (Gerrard); 3, Mr. Berger (pearl scale); 4, Mr. Berger (Gerrard). A.O.V. coldwater: 1, Mr. Sherwin (van Ness); 2, Mr. K. Nutt (G. oriole); 3, Mr. K. Nutt (G. oriole); 4, Mr. Tancorn (minnow). A.V. breeder: 1, Miss D. Morris (moose); 2, Mr. Linnell (veltail); 3, Mr. Linnell (moose); 4, Mr. Linnell (veltail). A.V. singular breeder: 1 and 2, Miss D. Morris (shubunkin); 3, Mr. K. Nutt (shubunkin); 4, Mr. Elford (crickcrick).

AT the September meeting of the **Pontefract and District A.S.**, the members entered a fish show and general discussion, the table show was for A.O.V. and the result was as follows: 1, Mr. K. Mortimer (trout barb); 2, Mr. H. Copley (catfish); 3, Mr. D. Cohen (albino tiger barb).

An inter-club show is being planned between **Pontefract and Willington Societies**. The Society welcomes all visitors to meetings which are held at Carbone Secondary Modern School, Carbone, nr. Pontefract. Will anyone interested in joining the Society please write to the secretary: H. Copley, 14, Castle Vale, Kettlewell Road, Pontefract, Yorks.

AT their September meeting **Harlow A.S.** were held in the Enfield A.S. The programme for the evening was an inter-club table show, which was won by Enfield with 22 points to 28. The individual results were as follows: Characins (silver model): 1 and 2, Mr. J. H. Soames (Harlow); 3, Mr. R. Kerridge (Harlow); 4, Miss Collins (Enfield). Labyrinth (silver model): 1, Mr. Barrell (Enfield); 2, Mr. Soames (Enfield); 3, Miss Collins (Enfield); 4, Mr. J. H. Soames (Harlow). Fighting tooth carp (silver model): 1, Mr. Cobman (Enfield); 2, Mr. J. H. Soames (Harlow); 3, Mr. Cobman (Enfield).

**THE Liverpool show results of the Merseyside A.S.** were as follows: Parachuted aquaria: 1 and special, Mrs. C. Atterworth; 2, Mr. B. Jones; 3, Mr. J. Robinson. Livebearer—Guppies: 1 and special, Mrs. C. Atterworth; 2, Mr. B. Moore; 3, Mr. J. Robinson. Platies: 1 and 2, Mr. H. Swanson; 3, Mrs. C. Atterworth. Mollie: 1, Mr. H. Swanson; 2, Mr. C. Turner; 3, Mrs. Chambers. Swordfish: 1, Mr. C. Turner; 2, Mr. B. Jones; 3, Mrs. C. Atterworth. Barb—Large: 1 and special, Mr. R. Parker; 2, Mr. R. Parker; 3, Mr. J. Poole. Buffalo: 1, Mr. J. Robinson; 2 and 3, Mr. E. Sinks. Goldfish—Large: 1, Mr. F. Mullis; 2, Miss A. Collins; 3, Mr. J. Rock. Small: 1 and special, Mr. H. Swanson; 2, Mr. B. Jones; 3, Mr. H. Swanson. Characins—Large: 1, Mr. R. Moore; 2, Mr. R. Stammer; 3, Mr. R. Sinks. Small: 1 and special, Mr. R. Stammer; 2, Mr. R. Sinks; 3, Mr. F. Mullis; 4, Mr. J. Robinson. Breders: 1 and special, Mr. J. Robinson; 2, Mr. D. Thomas; 3, Mr. R. Stammer. A.O.V. labyrinth: 1 and special, Mr. C. Turner; 2, Mr. D. Thomas; 3, Mr. J. Robinson. Fighters: 1, Mr. D. Thomas; 2, Mr. C. Turner; 3, Mr. T. Wray (senior). Top minnow: 1 and special, Mr. J. Robinson; 2, Mr. J. Robinson; 3, Mr. H. Swanson. A.O.V.: 1 and special, Mr. Atterworth; 2, Mr. R. Parker; 3, Mr. R. Parker. Best in show (trifid barb): Mr. R. Parker.

**THE following are the results of the Huddersfield Tropical Fish Society first open table show.** Section 1—Class A: 1, R. Bean (Smith); 2, Mrs. Cohen (Doncaster); 3, J. A. Hanson (Huddersfield). Class B: 1, P. Groomer (Workop); 2, H. Stated (Halifax); 3, E. J. Thomas (Tadcaster). Class C: 1, G. H. Wood (Halifax); 2, D. Brenchin (Charlton); 3, J. Rowell (Huddersfield). Class D: 1, A. Marrow (Workop); 2, A. Malby (Ottum); 3, D. P. Parris (Not's Tropical); section winner: A. Marrow (Workop). Section 2—Class E: 1 and 3, P. Dwyer (Sawley); 2, A. E. Gardner (Stretford). Section 3—Class G: 1, A. Hunt (Chapeltown); 2, P. Knowles (Workop); 3, P. Gregory (Ottum). Class H: 1, D. Frewley (Halifax); 2, R. Wilkinson (Halifax); 3, R. Dean (Sawley). Section winner: A. Hunt (Chapeltown). Section 4—Class I: 1, B. Helms (Aldbrough); 2, E. Mitchell (Huddersfield); 3, P. Gregory (Ottum). Class J: 1, R. Wilkinham (Ottum); 2, A. B. Wylie (Stretford); 3, A. Fudge (Huddersfield). Section winner: K. Wilkinham. Section 5—Class K: 1 and 2, J. Basser (Tadcaster); 3, A. Marrow (Workop). Class L: 1, A. E. Gardner (Stretford); 2, L. Kay (Huddersfield); 3, J. Wylie (Huddersfield). Section winner: A. E. Gardner (Stretford). Section 6—Class M: 1, J. H. Wood (Halifax); 2, A. B. Wylie (Stretford); 3, P. Clark (Gatford). Class N: 1, L. Greenhall (Tadcaster); 2, Mrs. Knowles (Workop); 3, J. Pate (Tadcaster). Class O: 1, P. Groomer (Workop); 2, A. Bobbington (Stretford); 3, D. Wells (Thorne). Section winner: P. Groomer (Workop). Section 7—Class P: 1 and 2, Mrs. V. M. A. Wiggins (White Rose A.S.); 3, A. Hunt (Chapeltown). Class Q: 1, A. E. Gardner (Stretford);

2, D. Priestley (Hull); 3, J. W. Allen (Norm. Tropical Soc.); Section winner: A. E. Gardiner (Stratford). Section 8—Class 7: 1, F. Dunley (Snooth); 2, R. M. Paine (Tadcaster); 3, F. Gregory (Oram). Section 9—Class 3: 1, F. J. Thomas (Tadcaster); 2, P. Knowles (Workington); 3, R. Walters (Huddersfield). Class 1: 1, D. Wain (Thorn); 2, R. M. Paine (Tadcaster); 3, F. Gregory (Oram). Section winner: D. Wain (Thorn). Section 10—Class 7: 1, A. Toon (Prestatun); 2, A. Mason (Workington); 3, D. A. Nicholls (Oram). Class 1: 1, P. A. Nicholls (Oram); 2, A. B. White (Stratford); 3, R. Wilkinson (Oram). Section winner: Mrs. P. A. Nicholls (Oram). Section 13—Class W: 1, R. Bean (Snooth); 2, I. Brown (Huddersfield); 3, B. Helm (Airedale). Section 13—Class X: 1, W. H. Smith (Stratford); 2, I. Booth (Stratford); 3, A. B. White (Stratford). Section 13—Class Y: 1, Miss L. Pratt (Huddersfield); 2 and 3, Miss D. White (Huddersfield); 4, Miss A. Wiggins (White Rose A.S.). Best fish in show: R. Greenway (Crosshill).

IN the second annual open show held by the Houslow and District A.S. over 500 entries were received. The results were as follows: A.V. plate: 1, Mr. R. Barber; 2, Mr. M. Bertley; 3, Mrs. P. Bone; 4, Mr. D. Woodward. A.V. medal: 1, Mr. J. Miller; 2, Mrs. P. Bone; 3, Miss E. Ellis; 4, Mr. R. Barber. A.V. award: 1, Mr. R. Luff; 2, Mrs. P. Bone; 3, Mr. P. Cairns; 4, Mr. L. Smart. A.V. champion: 1, Mr. A. Naylor; 2, Mr. R. Biggs; 3, Master C. Smith; 4, Mr. B. Denton. A.V. barb (single): 1, Mr. E. Aykott; 2, Mr. R. Luff; 3, Mr. D. Woodward; 4, Mr. H. Harris; 5, Mr. B. Booth. A.V. barb (large): 1 and 2, Mr. R. Luff; 3 and 4, Mr. J. Thorne. Breeders' eggplant: 1 and 2, Mr. D. Woodward; 3, Mr. R. Barber. A.V. larva: 1, Mr. J. Thorne; 2, Mr. H. Pratt; 3, Mr. C. Fisher; 4, Mr. E. Shoppard. A.V. Siamese light: 1, Mr. J. Thorne; 2, Mrs. P. Bone; 3, Mr. E. Glynn. A.V. dwarf cichlid: 1, Mrs. D. Denton; 2, Mr. B. Baker; 3 and 4, Mrs. P. Bone. A.O.V. cichlid: 1, Mr. A. Naylor; 2, Mr. B. Booth; 3, Mr. R. Fowler; 4, Mr. J. Thorne. A.O.V. tropical fish: 1, Mrs. P. Bone; 2 and 3, Mr. D. Woodward; 4, Mr. G. Greenway. Breeders' livebearer: 1 and 2, Mr. B. Baker; 3, Mr. B. Ellis. Common goldfish: 1, Mr. W. Walters; 2 and 3, Mr. B. Fisher. A.O.V. goldfish: 1, 2 and 3, Mr. W. Walters. Inter-club farmed aquaria: 1 and 2, Surrey A.S.; 3, Houslow A.S. Individual miniature farmed aquaria: 1, Mr. P. Cairns; 2, Mr. E. Perry; 3, Mr. R. Biggs; 4, Mr. M. Patrick. Best fish in show: Mr. G. Aykott (common barb). Highest club points: 1, Houslow A.S. (77 pts.); 2, Surrey A.S. (34 pts.); 3, Riverside A.S. (14 pts.); 4, Uxbridge A.S. (13 pts.).

In a recent Club meeting a "Club Cross Fish Quiz" was held with great success, it was organized by Mr. R. Luff, the Society's chairman. Meetings of the Houslow A.S. are now held fortnightly on Wednesdays at the Territorial Army Centre, Hemsworth Road, Houslow, Midls.

THE ladies stole the show when the Worthing Tropical Fish Club resumed meetings after a summer break with a "Larvicare" show (including guppies). Of the seventeen entries, two young ladies took three out of the first four places between them.

The entries were judged by Mr. J. Smart (P.R.A.S.). After awarding the prizes, Mr. Smart raised the standard of entries and expressed hopes that it would not be long before Worthing could stage an open show such as Brighton does each summer. Result of the show was as follows: 1 and 4, Miss M. Scott; 2, Miss T. Graywood; 3, Keith Gears.

THERE was a record entry at the Midland Aquarium and Pool open show in both the Coldwater and Tropical sections, and there was

an attendance of 6,000. The results were as follows: Coldwater Common goldfish and comets (1 in. body limit): 1, H. T. Jago; 2, Mrs. A. Lucas; 3, W. Forman; 4, C. Hill. Breeders' class (four fish): 1 and 2, P. R. Close; 3, H. Stock; 4, S. T. Tibble. Breeders' class (six fish): 1 and 2, P. R. Close; 3, H. J. Whiting; 4, H. T. Jago. Best shubunkins (3 in. body limit): 1, and 4, W. Hickey; 2, A. C. Norton; 3, F. R. Close. Galaxo vitellus: 1, P. R. Close; 2, 3 and 4, C. H. Barrett. Bristed shubunkins (bred 1965): 1 and 2, H. J. Whiting; 3 and 4, P. R. Close. Scold vitellus: 1, P. R. Close; 2 and 3, A. Roberts; 4, H. Stock. Twinails (other than talco vitellus): 1, H. T. Jago; 2, T. L. Dodge; 3 and 4, S. T. Tibble. Bristed shubunkins (M.A.P.S. membership only): 1, H. T. Jago; 2, H. J. Whiting; 3, W. Hickey; 4, P. R. Close. Galaxo vitellus (bred 1965 by exhibitor): 1 and 2, P. R. Close; 3 and 4, S. T. Tibble. Bristed shubunkins (5 in. body limit): 1 and 4, W. Hickey; 2, H. T. Jago; 3, W. G. Bryant. Oranda, telescopis (other than species), loachids, celestis, bubble-eyes: 1, G. Fenn; 2, G. H. Barrett; 3, R. P. Biddle; 4, R. A. Mason. Moor: 1 and 3, C. H. Barrett; 2 and 4, T. L. Dodge. Bristed shubunkins (3 in. body limit): 1 and 2, W. Hickey; 3, F. A. Mason; 4, W. G. Bryant. Galaxo vitellus and talco vitellus: 1, S. T. Tibble; 2, H. T. Jago; 3, C. H. Barrett. Scold vitellus: 1 and 2, R. A. Mason; 3, G. Fenn; 4, J. D. Bradford. A.V. pond or river fish (7 in. body limit): 1, J. D. Bradford; 2, T. L. Dodge; 3 and 4, R. W. Forman. Individual decorative coldwater aquaria: 1, Mrs. J. Biddle; 2, R. W. Forman. Inter-club decorative coldwater aquaria: 1, Walsall; 2, Southwick; 3, Burton; 4, Fort Dunlop. Bristed shubunkins (1 in. body limit section): 1, D. Haynes; 2 and 4, Miss R. D. Rogers; 3, Mrs. M. Owen. Tropical—Barbs: Timpa, Oligolepis, Cumingia (true pair): 1, D. Scoble; 2, T. J. Jerram; 3, A. W. Spencer. Barb: Tetanodon, Nigrofasciatus, Ticto, Conchostoma (true pair): 1, A. Palmerfield; 2, D. A. Thomson; 3, A. W. Skinner. Any other barb: 1, T. J. Jerram; 2, P. Woodall; 3, E. Leach. Danio, Brachydanio, W.C. minnows (true pair): 1, A. R. Hadden; 2 and 3, A. W. Skinner; 4, D. A. Thomson. Any catfish: 1, T. J. Jerram; 2, W. Devision; 3 and 4, T. Payne. Channa, Hypoclinemus, Homogammarus, Cardinalis: 1, W. Devision; 2, D. Bennett; 3, T. Payne; 4, P. Scoble. A.O.V. channa: 1, Mrs. P. Bone; 2, P. W. Jinks; 3, M. G. Davis; 4, J. E. Foddis. Mado fish (single): 1 and 3, T. J. Jerram; 2 and 4, A. W. Spencer. A.O.V. male ambient (single): 1, H. Willett; 2, M. G. Davis; 3, D. G. D. Lucas; 4, W. Devision. Cichlid (3 in.): 1, D. A. Thomson; 2, W. Eganston; 3, M. G. Davis; 4, W. Devision. Goldfish (over 7 in.): 1, K. Hillier; 2 and 4, K. G. Pearce; 3, Miss S. Davis. Cichlid (dwarf)—single: 1, W. Eganston; 2, M. G. Davis; 3, D. A. Thomson; 4, H. Cosmo. A.V. single guppy (single): 1, P. Woodall; 2, W. Devision; 3, S. Nalambali; 4, T. A. Norton. A.V. molies (true pair): 1, M. G. Davis; 2, D. Bennett; 3, S. Peter; 4, W. Devision. A.V. swordtails (true pair): 1, H. Stock; 2 and 4, D. A. Thomson; 3, R. Lawson. A.O.V. tropical fish (single): 1, T. J. Jerram; 2, W. Eganston; 3, W. Devision; 4, D. G. D. Lucas. Breeders' class (six fish) Eggplant (bred 1965): 1, P. Scoble; 2, Mrs. P. Bone; 3, A. W. Spencer; 4, D. A. Thomson. Breeders' class (six fish) livebearers (bred 1965): 1, M. G. Davis; 2, W. Devision; 3, D. A. Thomson; 4, S. Pease. Any cichlid (true pair): 1, T. J. Jerram; 2, J. E. Foddis; 3, R. Hillier; 4, J. Vickery. Eggplant (nothops (single): 1, M. D. Lushan; 2, J. D. Bradford; 3, P. Scoble; 4, D. A. Thomson. Plate class: 1, K. G. Pearce; 2, P. W. Jinks; 3, K. N. Wally; 4, E. Leach. Any channa (true pair): 1, W. Woodward; 2, B. M. Woodward; 3, Mrs. M. Edwards; 4, A. I. Holt. Any danio, brachydanio, W.C. minnows: 1, J. Wain; 2, T. Payne; 3 and 4, R. M. Woodward. Any barb (multiple): 1, B. Vernon; 2, F. Stronon; 3, D. A. Latham; 4, J. D. Scoble. Any livebearer (multiple): 1, K. N. Wally; 2, J. Wain; 3, A. J. Bagg; 4, G. Roman. Any male ambient (multiple): 1, I. A. Reed; 2, T. Thorp; 3, Mrs. R. Hallam; 4, F. Lawson. Individual tropical aquaria:

1, K. G. Pearce; 2, G. P. Ebbin. Inter-club tropical aquaria: 1, Haden A.S.; 2, Coalville A.S.; 3, Burton and District A.S.; 4, Midland Aquarium and Pool. Inter-club competitive single: 1, Southwick; 2, North Warwickshire; 3, British Killariff; 4, Walsall.

THE Bridgend A.S. which was formed in April 1964 holds its meetings on the third Thursday of every month at 7.30 p.m. in the Y.M.C.A. building in Bridgend, and anyone interested is invited to attend. Further information can be obtained from the secretary, Mr. W. H. Taylor, 12, Channel Avenue, Penyaf, Bridgend, Glam.

THE Bristol Aquarist open show attracted a record entry of 1,000 exhibits. Outstanding tropical fish were the cat fish and in the cold water class the Veitail, which was also the best exhibit in the show.

Judges came from London, Birmingham and Bath, and the cups and plaques were awarded to the following: Goldfish, H. T. Jago; 5-inch Shubunkins, M. Ansell; 3-inch Shubunkins, M. T. Whiting; Vitellus, P. Close; Moor, J. L. Dodge; Telescopis, L. G. Finery; Nymphae, P. Radford; Scold Potamo, V. Cepaldi; Galaxo Potamo, H. T. Jago.

River fish, Stream Savage (single); July Shubunkins, H. T. Jago; baby Moor, T. L. Dodge; baby fancy fish, H. T. Jago; teams of baby Shubunkins, H. T. Whiting; baby Twin Tail, P. Close.

Pair of Shubunkins, H. T. Jago; service Shubunkins, P. V. Greenhill; farmed tropical aquaria, Peter Cepaldi (single); tropical aquaria, Mrs. I. M. Stone; inter-club aquaria, Youth A.S.; Fighting Fish, N. C. Staines; Lakelandia, D. A. Wilcox; Barb, H. Toon; Channa, E. A. Short; a.o.v. Channa, E. Brown; Cichlid, G. Gillard; Angel Fish, I. Andrews; a.o.v. Eggplant, T. D. Smith; Catfish, P. Brown; Sword Tail, Scott Morgan.

Teams of Eggplant, D. A. Wilcox; teams of Live Bearers, P. Wally; Short Tail Guppies, Scott Morgan; Long Tail Guppies, Scott Morgan; female Guppies, K. Malon; tropical plants, K. G. Pearce; cold water plants, S. J. Davis.

#### BRITISH AQUARISTS FESTIVAL

A "Draw" will be made among all competing societies. A prize of £10 will be given towards the expenses of the lucky winning society. (See page xii.)

#### Crossword Solution

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

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continued on page 27

PREPAID ADVERTISEMENTS—continued from page 57

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