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

POLISHED STAINLESS STEEL

Frames
Aquariums
24 x 15 x 12 £ 7 7 0 £ 9 9 0
30 x 15 x 12 £ 8 8 0 £ 11 1 0
36 x 15 x 12 £ 10 1 0 £ 13 3 0
48 x 15 x 12 £ 13 3 0 £ 17 0 0

DISTRIBUTOR OF:
- McLYNN'S FISH FOOD
- ES-ES PRODUCTS
- ELECTRICAL AND GENERAL
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- HYFLO PRODUCTS
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Angle Iron Aquariums, Frames and Stands a speciality. Odd sizes made to order, painted any colour, guaranteed rustless and free from welds. Stove enamelled Corner Bowls, Bow Fronts and Wrought Iron Units. Half Carriage Paid on these items.

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presents

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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OUR DOUBLE BLUE POLYTHENE SHEETING MAKES THIS POND FOR 18-
Larger sizes available, plans and instructions with Polythene. Also PLASTOLENE and FIBREGLASS PONDS, and the WONDERFUL NEW OTTER FOUNTAIN or Waterfall Kit.

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CHICKERELL, WEYMOUTH, DORSET
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"I have found BIOL highly successful as a food for my Marine Fish—feeding with BIOL has never fouled the water."

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Effective - Colourless
Does not harm the plants
Definite dosage given by ingenious chart
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LIQUIFRY - the ideal first food for baby egglayers & livebearers
Liquify No. 1 for egglayers.
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2/6d. per tube.

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Inter-Pet Supplies Company
18, Church Street, Dorking, Surrey

April, 1965
The most scientifically balanced diet ever offered for feeding all types of goldfish and coldwater fishes in pond or aquarium.

No dust to go to waste.

Will not cloud the water.

Easily measured bite size pellets.

Contains over 20 ingredients.

It floats.

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Pond Pack 3/6

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Invaluable for cleaning live food for immediate relief of fouled aquarium water due to overfeeding or dead fish, etc. Effective treatment for finrot, fin congestion, bacterial infection of the gills, popeye, etc.

Available in two sizes:
1 oz 2/- 4 oz 6/-
Polythene containers complete with instructions.

If you have difficulty in obtaining any of the above products write direct to
SOUTH COAST AQUATIC NURSERIES LTD., Old Bath Road, Colnbrook, Slough, Bucks.
OWEN REID'S
of Ealing

BETTER THAN EVER
VISIT THE MOST COMPREHENSIVE COLLECTION OF TROPICAL AND COLDWATER FISH IN THE MOST BEAUTIFUL SHOWROOM IN LONDON

BIGGER THAN EVER

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April, 1965
AT LAST!

The PEMCO Stainless Steel Framed Aquarium

Pemco aquariums are recognised in America as leaders in quality—look at these features:

★ The aquariums and reflectors are made of heavy gauge, highly polished stainless steel.

★ Crimped frame edges retain cement, keep tank watertight.

★ Flush fitting full reflectors with back strip for installation of service equipment.

★ Built to give years of lasting satisfaction—truly the finest quality and craftsmanship.

Available about the end of May. Book your order with your dealer now!

Dealers! See our stand no. 53 at the Pet Trade Fair—Harrogate May 4—5—6.

<table>
<thead>
<tr>
<th>Cat. No.</th>
<th>Length</th>
<th>Height</th>
<th>Width</th>
<th>Price</th>
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<tr>
<td>15E.</td>
<td>24½&quot;</td>
<td>12½&quot;</td>
<td>12½&quot;</td>
<td>130/−</td>
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<tr>
<td>10E.</td>
<td>20½&quot;</td>
<td>12½&quot;</td>
<td>10½&quot;</td>
<td>105/−</td>
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<tr>
<td>8E.</td>
<td>14½&quot;</td>
<td>10½&quot;</td>
<td>8½&quot;</td>
<td>87/6d.</td>
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<tr>
<td>103.</td>
<td>12&quot;</td>
<td>10½&quot;</td>
<td>6½&quot;</td>
<td>55/−</td>
</tr>
</tbody>
</table>

At last Inter-Pet makes these fine aquariums available at a price you can afford. The components for the stainless steel frames and hoods are imported from the U.S.A. The rest of the tank is British made.
Also new from Inter-Pet

The Jeto Extra Airpump
A pump with a new design of mechanism.
A very high output.
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INTER-PET is the only company in Great Britain who distributes through the trade a comprehensive range of foods, aeration, filtering and heating equipment, stainless steel aquariums and tropical fish.

INTER-PET 18 Church Street - Dorking - Surrey
Sales Division of Liquity Co. Ltd.

April, 1965
WE STILL HAVE THE LARGEST SELECTION OF TROPICAL & COLDWATER FISH, TANKS, PLANTS & EQUIPMENT IN THE NEW BOROUGH OF "BARNET" AND THE N.W. AREA OF GREATER LONDON

FISHES OF THE MONTH— MOONLIGHT GOURAMI 12/6 & 17/6 REED FISH 35-

"GREEN SHIELD" STAMPS GIVEN

NEW ARRIVALS
Golden Orf 6-7" £ 1-5-
Parrots 8-10" £ 4-5-
Green Tetra 6" & 8-5-
Large Goldfish 8-10" £ 6-5-
Medium Goldfish 6-10" £ 6-5-
Whatever & Guppy £ 5-5-
Sunfish 3-4" £ 6-5-
Red Parrot £ 6-5-
Goldfish £ 5-5-
ALL POND PLANTS STOCKED

THERMOSTATS
Fröbel... £ 18-5-
General External... £ 20-
Compact External Type QK... £ 22-5-
Wired External... £ 23-5-
Inter-Pet... £ 23-
UNO... £ 20-
Out/Adi... £ 18-
In/Adi... £ 18-5-
In/Adi... "Polycell"... £ 18-5-
Propar... £ 18-
Gear with union indicator... £ 18-5-
Wired... £ 18-
NEON... £ 18-
AERATORS
Ice... £ 18-
Air... £ 18-
Rota... £ 18-
Coffer... £ 18-
Monte Carlo... £ 18-
Monte Carlo... £ 18-
Fröbel... £ 18-
Dymas Mk. 1 A.C./D.G. ... £ 18-
Dymas Mk. 1 A.C. only... £ 18-

GARDEN PUMPS
Gravel... £ 2-
L-Pack... £ 2-
Jacket... £ 2-
Stones... £ 2-

PISTON PUMPS
Hydro-Jet New Super... £ 17-
Hyd-Jet"A"... £ 17-
Hyd-Jet"C"... £ 17-

Thermometers
Fryers... £ 0-5-
Blue Gem... £ 0-5-
Green Gem... £ 0-5-
White Gem... £ 0-5-

Sundries
T.Pieces... £ 0-5-
Clamps... £ 0-5-
Assorted... £ 0-5-
Assorted 5yd. £ 4-
Assorted 8yd. £ 5-

Sticks... £ 1-
Tying Stuff... 1½ oz.
Glass Wool... £ 0-5-
Filter Carbon 10... £ 2-5-
Harmon... £ 2-5-
Aquariummop... £ 2-5-

TROPICALS
"Neon", 8 for £ 1 : 2/6 each

— Reinecke... £ 6-
— Rosae... £ 6-
— Cryptocoryne... £ 6-
— Cristatus... £ 6-
— Fimbriata... £ 6-
— Heteranthera... £ 6-

ADULT RARE FISHES
Parrotfish... £ 10-5-
Elephant Head Fish... £ 20-5-
Arabian Ancistrus... £ 20-5-
Abu Gumbus... £ 20-5-
Puntiger... £ 20-5-
Black Cardinal... £ 20-5-
Gold Oranda... £ 20-5-
Golden Oranda... £ 20-5-

to 20-5-

SLIGHTLY SMALLER AS QUOTED

NYLON COATED AQUARIUM, STOCK SIZES
24 x 12 x 12... £ 18-5-
24 x 12 x 15... £ 20-5-
24 x 12 x 18... £ 22-5-
24 x 12 x 20... £ 23-5-

STANDARD AQUARIUMS (Light Gauge) (Angle Iron)
5 x 5 x 8... £ 9-5-
7 x 7 x 11... £ 13-
9 x 9 x 11... £ 16-5-
11 x 11 x 15... £ 22-
13 x 13 x 15... £ 23-5-
15 x 15 x 15... £ 25-5-
17 x 17 x 15... £ 27-5-

COVERS
Stands
12 x 10... £ 12-5-
15 x 10... £ 15-5-
18 x 10... £ 17-5-
21 x 10... £ 19-5-

AQUARIUMS SIZES SENT BY POST ONLY AT CUSTOMER'S RISK

ADULT RARE FISHES

PLANTS
Rhipsalis... £ 5-5-
Vallis, Tsuba... £ 3-5-
Vallis, Streaked... £ 3-5-
Amphiloph... £ 3-5-
Amphiloph... £ 3-5-
Ludisia... £ 3-5-
Pseudobulb... £ 3-5-
Hypnum... £ 3-5-
Caulinopod... £ 3-5-
Caulinopod... £ 3-5-
Koehne... £ 3-5-
Orchid... £ 3-5-

ADULT RARE FISHES

HEATERS 25w to 200w
Add 1½w to 30-35° 1½w up to 38-35° 2w up to 40-35° 3½w up to 50-35° 6w over 50-35°

CARRIAGE AT COST CHARGED ON AQUARIUMS, STANDS, AND TANKS. TERMS, CASH WITH ORDER.

THE CENTRAL AQUARIUM
391 HENDON WAY, HENDON CENTRAL, N.W.4 Phone: HEN 9700
OPEN 8.00 a.m.—7.00 p.m. Emergency Phone: HEN 9700

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TETRAMIN Fish Foods

‘Large Flake’ Staple Food

TetraMin Staple Food which has not been broken too small
Ideal for large Tropical Fish (and small ones)
6/6d.

Blackwater Tonic

There are many species of fish Aquarists keep that live in naturally soft, slightly acid, blackwater. (Water which has a golden brown colour)

Blackwater Tonic is a concentrated extract of Peat, Tropical Plant Roots, Bark etc., and will help to produce these conditions in your aquarium

This will bring out the colours and will encourage the fish to breed more readily
4/- to treat 40 Gallons

TetraMin Staple Food Tablets

To ensure that your bottom feeding fish get their share
Ideal to leave for your friends to feed when you go on holiday
So easy to measure

FROM YOUR DEALER TODAY

April, 1965
CHOOSE FROM THE 'Es-Es' RANGE AND BE WITH IT!

14 OTHER PRODUCTS TO CHOOSE FROM
SEND FOR COMPLETE LIST AND BROCHURE FROM — SINGLETON BROS (Electronics) LTD
53 VICTORIA STREET, LONDON, S.W.1
**QUEENSBOROUGH FISHERIES**

111 GOLDHAWK ROAD, SKEPTHER'S BUSH, W.12
1 minute from Shepherd's Bush Market
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Telephone: WRAYSBURY 3885

16 PICTON PLACE, LONDON, W.1
1 minute from Southcote
Telephone: WELBEC 5438

**SPECIAL PLANT COLLECTIONS (post only)**

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

**TROPICALS**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50 plants including Dwarf Lily Cryptocoryne Hemisia etc.</td>
<td>£1</td>
</tr>
<tr>
<td>2</td>
<td>12 Vallisneria Torta</td>
<td>£1</td>
</tr>
<tr>
<td></td>
<td>12 Myriophyllum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Micro Sagittaria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Ludwigia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Elodea densae</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>15 Vallisneria Torta</td>
<td>£1</td>
</tr>
<tr>
<td></td>
<td>6 Myriophyllum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Ludwigia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Elodea densae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Barcope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 Amazon Chain Sword</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Parrot Hair Grass</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>1 Neomphos Scutata</td>
<td>£1</td>
</tr>
<tr>
<td></td>
<td>1 Glass Hygrophila</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Apogonatum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Wosinis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Giant Sagittaria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Cryptostegia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Indian Fern</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Parrot Hair Grass</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5 Golds</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>4 Vallisneria Torta</td>
<td>10/-</td>
</tr>
<tr>
<td></td>
<td>4 Myriophyllum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Ludwigia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Elodea densae</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>15 Parrot Hair Grass</td>
<td>10/-</td>
</tr>
<tr>
<td>8</td>
<td>1 Parrot Clover</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Mini Sagittaria</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Barcope</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultures of pure infusoria for your try.</td>
<td>5/-</td>
</tr>
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<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Price</th>
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<td>1</td>
<td>50 plants including Marginals</td>
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<tr>
<td>2</td>
<td>20 Pond Plants</td>
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<tr>
<td></td>
<td>1 Cream Water Lily</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Prince Alba)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>1 Bull Rush</td>
<td>10/-</td>
</tr>
<tr>
<td></td>
<td>2 Iris</td>
<td></td>
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<tr>
<td></td>
<td>2 Burgundy Ruff</td>
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</tr>
<tr>
<td></td>
<td>2 Oregano Mee-Nees</td>
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</tr>
<tr>
<td></td>
<td>3 Water Mint</td>
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<tr>
<td>4</td>
<td>12 Marginals</td>
<td>10/-</td>
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<td></td>
<td>4 Oxygenating Plants</td>
<td></td>
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<tr>
<td>5</td>
<td>Cream and Yellow Water Lily—Prince Alba 1 for £1</td>
<td>12/6</td>
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<tr>
<td>6</td>
<td>Water Lillies</td>
<td>£2</td>
</tr>
<tr>
<td></td>
<td>1 Pink</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Red</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Cream</td>
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<td></td>
<td>3 year-old plants</td>
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<tr>
<td>Willow Trees</td>
<td>£7.6</td>
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<tr>
<td>2.5 feet</td>
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**POND PLANTS**

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<td>12 Sagittaria</td>
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</tr>
<tr>
<td></td>
<td>6 Myriophyllum</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Ludwigia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Moneywort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Hornwort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 Parrot Riccia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Parrot Hair Grass</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>10 Planets for your Aquarium—Value 30/-</td>
<td>£1</td>
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<tr>
<td>3</td>
<td>6 Vallisneria Torta</td>
<td>10/-</td>
</tr>
<tr>
<td></td>
<td>4 Moneywort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 Elodea densae</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3 Hornwort</td>
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<td></td>
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**AQUARIUM OR POND**

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<td>1</td>
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<td>6 Ludwigia</td>
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<tr>
<td></td>
<td>6 Moneywort</td>
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<td></td>
<td>6 Hornwort</td>
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<td></td>
<td>1 Parrot Riccia</td>
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<td>3 Parrot Hair Grass</td>
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**TROPICAL OR COLD**

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<tr>
<td>4</td>
<td>Grass Amazon Sword Plants 6-8 inches</td>
<td>7/6</td>
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<tr>
<td>5</td>
<td>Water Lillies</td>
<td>2/6</td>
</tr>
<tr>
<td></td>
<td>Very beautiful plants of 3 for 15/-</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Water Hydrilla</td>
<td>7/6</td>
</tr>
<tr>
<td></td>
<td>6-8 inches Floating Plants</td>
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**Others**

<table>
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<tr>
<td>Live Daphnia</td>
<td>2/-</td>
</tr>
<tr>
<td>Tubularia</td>
<td>1/6</td>
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<tr>
<td>Microcosme</td>
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<tr>
<td>Whitehorn</td>
<td></td>
</tr>
<tr>
<td>Post Free</td>
<td></td>
</tr>
</tbody>
</table>

Algae eating Pond Snails: 6d each

14"-16" Hyglo Carp: £15 per pair. Limited Number Available.

Large Stocks of Coldwater Fish—Thousands of Tropical Fish in Stock

Stocks of all Ponds. Fountains, Statues, etc.

FULL CATALOGUE ON APPLICATION S.A.E.

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The AQUARIIST
AND PONDKEEPER

THE BUTTS, HALF ACRE, BRENTFORD, MIDDLESEX
Telephone: ISLeworth 6221
PUBLISHED MONTHLY

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The Editor accepts no responsibility for
views expressed by contributors.

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April, 1965

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Wanted—a London Show

THE report of the Aquarium Show Exploratory Com-
mitee, set up to investigate what demand exists for
a major aquarium show to be held in London, was
given at a meeting of representatives of aquarists' societies
held under the hospitality of Hendon Aquatic Society on
18th March. The Committee's findings were based on
replies received to questionnaires, and these revealed a
widespread demand for such a show. Of 37 replies
received only three societies replied 'no' to the question
"Do you want a show in London in 1966?" From answers
to questions designed to determine the type of show that
would be most favoured it appeared that most support
would be forthcoming for a show designed to attract
the general public and which would include sections for other
pets, although several delegates at the meeting stressed
that they thought these other sections should be restricted
to reptiles and amphibians, birds and perhaps some small
mammals. These were the questions asked, with the
numbers replying 'yes' to each one appended: "Should
such a show be a championship show, which would be of
interest only to aquarists (7), or a show with separate society
exhibits, and with trade stands, that would attract the
public (12), or an aquatic section to a much larger show
that would include other pets and attract a much wider
public (20)?" Nineteen societies also indicated that they
would be prepared to make some degree of financial
contribution to the cost of a show.

Unanimous support at the meeting was given to a
proposal by the Independent A.S. member (seconded by
Uxbridge A.S.) that the Aquarium Show Exploratory
Committee should continue to represent societies with the
aim of furthering the staging of an aquarium show, to be
organised by the pet trade or a professional organiser, with
the possibility that at a future date the Federation of
British Aquatic Societies should be approached to take
over its administration.

The Committee received replies from the following
societies: Basildon, Banbury, Bedford, Bournemouth,
Brighton, Bristol, Cambridge, Cheadle, Chingford, Crawley
College, Deal, Dumfries, East London, Exeter, Edmonton,
Enterprise, Hampstead, Harlow, Hendon, Herrs, F.G.A.,
High Wycombe, Independent, Isle of Wight, Llantris
Major, Penzance, Portsmouth, Paisley, Romsey, Salisbury,
Sittingbourne, Stone, Totnes, Uxbridge, Walton
stow, Weybridge, Weymouth, Witley, Witham.
Wild Goldfish

by Richard Guppy

As a coldwater fish that has been domesticated almost as universally as any other animal one could name, it is really surprising that the goldfish has not become naturalised in fresh water in many parts of the world. I do not claim to know exactly to what extent it has escaped into the wild, very little information on the subject is available. But there exists a sort of negative evidence; in the literature on fishing and freshwater fauna, there is seldom any mention of wild goldfish.

In The Freshwater Fishes of British Columbia (C. H. C. Clemens and Lindsey; 1959) the goldfish is listed as an introduced species. Only two localities are specified, both in the interior of the province, but little recent information seems to have been available when the book was compiled. I have a dim memory from my boyhood days in Rossland of a farm pond with large goldfish in it. Since, with other boys, I spent a good deal of time trying to catch these fish, they must have been unsupervised, but whether they were truly established, I could not, of course, venture to guess.

Some reasons can be suggested why goldfish might fail to survive when left to their own devices. The most obvious is their colour: being very conspicuous they would always be taken by predators before any other species with which they might be competing. But common goldfish (the only variety we need to consider here) produce quite a number of late colouring individuals in nearly every generation. Many of these breed once or more before taking on the red colour. Selection against the bright coloured fish might only tend to produce a late or non-colouring race.

It is usually during the first year of their lives that goldfish are killed by unsuitable climatic conditions. This result comes about simply because the young fish have not made enough growth during the summer and autumn. It is true that full grown fish are sometimes found dead after their pond has been frozen. There are various reasons for such tragedies, none of which would apply to wild fish in natural waters. Fish kept in tanks outdoors, or in ponds which have been meticulously cleaned out, are more liable to die when frozen in, than would be the case if some decaying organic matter were present on the bottom. Also the strain of fish makes a great deal of difference.

Those which have been kept indoors for some generations, especially the fancy types, and those raised in subtropical regions, are bound to develop, by mutation, many individuals which are not resistant to low temperatures. In my experience (and I have had plenty of experience in that particular direction) it is not possible to produce a strain of goldfish which will be free from drastic mortality, if the water temperature cannot be kept above 70°F (21°C) during most hours of the day, for 3 months after spawning has taken place.

Other factors being equal, mortality seems to increase with the period of time during which the fish are continuously chilled. Chilling does not necessarily mean freezing, probably 45°F (7°C) is as bad as 32°F (0°C). So long as its body remains at a low temperature, the resistance of the fish to disease and parasites is being steadily undermined. If it is of a hardy strain, and past its juvenile tender stage, it will probably get safely through an ordinary winter in temperate climates; but weakly fish, and particularly those which did not get a fair chance to grow before cold weather set in, will usually be laid low by some 'bug' or other, often just as the water is warming up in spring.

It should be noted in passing that fish do not hibernate in the strict sense of the word. They cease to feed because metabolism is slowed down by cold. In true hibernation, a protective instinct causes the animal to anticipate an inevitable food shortage. The fish may have plenty of food available all year, but cannot eat in winter. The
mammal does not mind cold if food is obtainable. Cold-blooded animals do not lose weight in the winter, so they do not need to fatten for ‘hibernation’. I have carefully weighed terrapins, which are more easily handled than fish, and I found that their weight remains absolutely constant during a 4 months’ fast. The winter killing of young goldfish must be due to the fact that the built-in tolerance to prolonged chilling takes longer to develop than the fish grows slowly.

There is really small wonder then, that goldfish seldom manage to become established as wild fish in regions of cold and uncertain summers. For that reason I was more than a little interested when I received the story of just such an occurrence here on Vancouver Island. The news first came to me through my wife, on her return from visiting a friend. The friend, so I was told, had brought him in quantities of goldfish, which he had caught in the ‘swamp’. I am afraid that I did not appear quite ready to swallow the story. At any rate, after she next visit, my wife brought home tangible evidence in a form of two 3-inch goldfish. Even at that stage, I confess, I handed the literature to make sure there were no native fish in western North America which might be confused with goldfish. Of course, the fish arrangement, combined with red colour, leaves no chance for error.

After that, I was not long in investigating for myself this extraordinary source of free-for-the-taking goldfish. So far as I could find, there was a stretch of water, perhaps about 50 yards in length, with a depth of 8 to 10 inches. At one end of this section a tiny trickle flowed in, at the other end the water was discharged through a culvert. I have examined the culvert, and thought about the presence of the presence of the fish. The other end of the culvert was quite submerged in the water of a wider and deeper section of the same stream. I assumed to extend for some distance at right angles to the road.

The mystery was not entirely elucidated by this discovery. My informant was quite in agreement with my suggestion that the fish in the roadside ditch were just an overflow from some larger reservoir. But he would have none of the theory that they came up through the culvert. His idea was that they came downstream after heavy rains had filled the ditch. He knew the owner of the field well, having done odd jobs for him at times. This man was not interested in goldfish, and had emphatically denied putting any in his ditch.

The fish were not difficult to catch, in fact most of those taken by my companion had been caught in his hands, since he had managed only a very small hatching. With the more elaborate rig that I had brought along, I caught several fish in a very short time. I also brought a great many of other water life, some of which helped to explain the apparent success of goldfish in colonising the ditch. It was well populated with tadpoles of the red-legged frog (Rana aurora), and with rough-skinned newts (Taricha granulata) in the process of metamorphosis. Several hatches annually over a number of years. These tadpoles will not succeed in just any water, as they do fairly well in concrete ponds, from which it seems that it may be just lack of calcium that holds them back. In nature the frogs spawn only in water where the tadpoles will grow quickly to a good size. Since they breed readily in captivity, it is not likely that they know anything about the mineral content of the water. Possibly they just return to the ponds in which they were hatched; such a habit would surely have the effect of concentrating them in the most favourable water.

Even the news, a very common amphibian here, were interesting. A large proportion were metamorphosed juveniles, a stage in their lives which is normally spent on land. It almost seemed as if they had found this ditch suited to their needs, that they had stayed on in the water after their usual time for taking up terrestrial life. I have not heard of any evidence of this having had passed. I was not surprised to find that the soil through which the ditch had been dug was heavy clay. I have noticed that clay bottomed ponds are extremely favourable to aquatic life.

When starting on this expedition, I had not expected to find many more hatching of the year than larger fish. Following the normal spawning season for goldfish, which hereabouts would be June or perhaps late May, the fry would have had time to grow into recognisable fish, without yet being decimated by predators, or the cold of winter. But, to my surprise, all the fish I caught were exactly the same size, about 3 inches long. Five were fully coloured, the other two had not yet started to change. This is that the proportion one finds in any garden pond where the fish have not been culled for a few years.

Not all the fish in the ditch had been of this size, as witness the two first brought to me. The later history of these two is peculiar. I kept them for a year, and eventually they died without having grown any bigger. Other fish in the same tank grew well, one in particular, a hatching when the wild fish were put in with it, had outgrown them by the time of their demise.

The conclusion seems unavoidable that there had not been a really successful spawning in the ditch for some years past. 1938 was a particularly good year for goldfish, owing to above normal temperatures prevailing from March well into September. Fish hatched that year that appear to have been 5 years old, therefore could well be the size of those I had caught. It must be admitted that uniformity in size is not very good evidence of equal age. Growth slows greatly after a certain size is attained, so that there tends to be a plateau on which the evidence of age difference is largely obliterated. Still, on the whole, the indications are strong that nearly all the fish in the ditch were the result of one very successful spawning.

I did not accept without reservations the assurances of my informant, that neither he nor his one-time employee had ever seen fish in that part of the ditch that was below the culvert. I privately decided to have a look for myself one day. But for one reason or another I did not get back there until the following spring, and then I found a startling change.

In no part of the system was there more than an inch depth of water to be found. Further investigation showed that the whole business had been held up by a dam in the field, which from the road had not been discernible, although it was not more than 50 yards away. The dam had evidently been put in to provide drinking water for cattle, why it had been destroyed I cannot say. Certainly it had been there for a long time. I remembered that several years earlier I had stopped to watch a muskrat feeding in the ditch, and there was enough depth then to allow the animal to swim under water without showing any signs of movement on the surface.

There was no sign of any run-off channel below the dam; clearly there had never been more than a drizzle of water.
Hemiodus semitaeniatus

by JACK HEMS

ELEGANCE is the key to this large characin's attraction. The beautifully streamlined body is shining silver overlaid where a strong light catches it with a glister of metallic green to blue. A conspicuous black spot adorns the flanks. Extending backwards from this bold marking is a black line that widens at the root of the tail and then continues on to the lower lobe of the deeply forked caudal fin. The narrowly pointed extremities of this fin are sometimes tinged with pink. The other fins are more or less clear.

H. semitaeniatus—It has no popular name that I know of—is native to Guiana and Brazil and made its debut as a heated aquarium fish in Germany as long ago as 1912. It is an active, fast swimmer (and a good looper into the bargain) and flourishes best in clear, well-oxygenated water maintained at a temperature in the lower to middle seventies (°F). Ordinarily it has a hearty appetite and, apart from eating all the usual, and unusual, live and/or dried foods, will take quite a toll of the fresh shoots and tender foliage of some of the submerged plants. Therefore, to safeguard these from excessive cropping, it is wise to include such things as finely chopped lettuce or tiny portions of cooked spinach in its diet.

It is a peaceful, shoaling species; at all events in its young days. But with good feeding and a spacious tank to dance about in it will not take much more than a year to attain a length of 8 in. or thereabouts. At this size it is really too large, too boisterous and too voracious to be kept in a community aquarium stocked with the general run of mild-mannered, smaller fishes.

Up to the present writing, H. semitaeniatus has not been bred in captivity, and if it carries any external sexual distinguishing feature aquarists do not know it.

A Simple Marine Aquarium

by RICHARD CAULTON

It is surprising how many aquarists are turned against keeping marine life by notions of tremendous obstacles of cost and difficulty of upkeep. In fact a marine aquarium can be less expensive than an ordinary tropical aquarium and be less expensive than an ordinary tropical aquarium and be less expensive than an ordinary tropical aquarium and be less expensive than an ordinary tropical aquarium and be less expensive than an ordinary tropical aquarium and be less expensive than an ordinary tropical aquarium and be less expensive than an ordinary tropical aquarium and be less expensive than an ordinary tropical aquarium. The fascination of a marine aquarium is, indeed, not so much the beauty of the inhabitants (though they do possess beauty) as their great diversity. As well as fishes, small crabs, sea urchins, sponges, beautiful and bizarre shellfish, and even certain corals can be kept. These and a host of other animals can be housed together in the same tanks.

The tank is the most important single factor in the marine aquarium, as in any other. The best type to use is the one without joints, made of either glass or plastic. This eliminates any chance of damage from the action of sea water. In sizes of about 2 feet these are easy to obtain and almost as cheap as metal-and-glass tanks. The only other necessary item of any cost is the air pump for aeration, which the freshwater aquarist undoubtedly already has in his possession.

In many books on marine aquaria the authors give descriptions and diagrams of complex systems of filtration, often coupled with devices to simulate tidal movements and ensure a circulating water supply for the tank. In my experience these, though perhaps beneficial, are not necessary. If for instance barnacles or some of the small molluscs are included in the tank they will, by virtue of their remarkable feeding mechanisms, make excellent...
A Bottom-Spawner—Cynolebias whitei

by A. VAN DEN NIEUWENHUIZEN

Photographs by the author

A BOTTOM-SPAWNING fish which has become better known in recent years is Cynolebias whitei. According to the German ichthyologist Dr. Werner Ladiges, Cynolebias whitei is found in the neighbourhood of Guabo Prado not far from Rio de Janeiro in Brazil.

The male whitei is considerably larger than the female. The scales of the body are rather large and may vary in colour according to the environment in which the fish are kept. If some specimens are kept in a tank with a dark bottom compost and others in one with a light bottom medium, the body colour of the fish will be seen to differ.

If the light is right, we can see that each scale has a light seam along its edge. The total effect of this is increased by the presence of a few rows of fluorescent spots along the body. These rows change into a pattern of stripes on the back of the fish, which makes the male whitei resemble the head-tail of the male Aplocheilus zonatus. The anal fin of the male whitei is very striking indeed. Its colour, like that of the dorsal and caudal, is wine-red. These fins are covered with the little blue-green spots, and the anal fin has a bright orange seam. The caudal has a fluorescent blue edge.

The female whitei is considerably less pretty than the male. The fins are much smaller, and the body colour varies between brown and grey. We can notice a dark spot near the anal fin, and another close to the caudal. When the female is in good condition, the body is covered with dark and light vertical stripes. The fins show dark spots.

As mentioned above, Cynolebias whitei is a so-called bottom-spawner. If we study the actual spawning process carefully, however, it becomes apparent that the different bottom-spawning species of Pterolebias and Cynolebias do not spawn in a similar fashion. In general it can be claimed that the spawning behaviour of Pterolebias longipinnis and Pterolebias pennata is very similar, but that of Cynolebias whitei differs significantly.

In C. whitei it is the male who takes the initiative, despite the fact that the female is also very active. I have been able to watch this during my study of the mating behaviour of this fish, and have been able to photograph much of it.

It is a good idea to keep the sexes separated for a while (a week or so) if one wishes to watch the mating at a given time. As soon as we place the fish together, we see the male starting to court his mate. The female, at first greyish in colour, becomes darker, the vertical stripes become more clearly visible and the egg tube appears. In the beginning, especially before the egg tube appears, she does not respond too wholeheartedly to the advances of the male. The latter starts his courtship by swimming around the female while spreading his fins widely. He swims in a typical fashion, appearing to flutter his fins like wings before halting in front of his female. At the same time he also bends his tail fin slightly towards his mate, only to resume his dance again later when she moves on.
A little bit later we see him swimming over the bottom, shaking lightly during his progress. In this stage he often stops right in front of the female, spreading his fins and looking like a big trap into which she has to enter. At first she often retreats, however, which in its turn incites the male to a further display of activity. His green spots become blue, something that creates a beautiful contrast with the red colour of the fins. By this time it may become clear that the female is about to end her resistance and will start participating in the spawning (this may be after a few minutes, but may also take half an hour). She then moves towards the male and the ensuing activities may happen so fast that things may be almost over before we realise what is going on. At other times, however, everything may go slow enough for us to watch... If we watch the course of events carefully, we first see that the female proceeds to excite the male by touching him. Sometimes she touches him with her body, in other instances she merely uses her mouth. She may touch the side of his body or the gills.

These signs of affection excite the male considerably. He starts searching the tank bottom very diligently for a suitable spot to spawn. He may suddenly stop his search, while the female is still showing interest. At this stage of the spawning procedure the female starts using even more advanced tactics to arouse her partner's interest. She touches the inside of one of the pectoral fins with her mouth. This really gets the male going. He reacts by searching more intensely than before, actually feeling the bottom surface in his search. The reason for this increased excitement can be found by studying the inside of the male's pectoral fins. These contain a series of small antennae, tiny organs covered with nerve cells. The stimulation of these nerves by the female excites the male very much. Indeed, some of these antennae can be seen in the form of little white spots.

During his search of the tank bottom the male occasionally swims on his side. In that position he covers the female with his body, so to speak. We can observe the male's actions very well if we cover half the tank bottom with soft peat, leaving the other part hard. As soon as the male reaches the soft part, he tends to dive into the ground. As can be seen in the pictures, the female persists in her attempts to stimulate the male. If she is unable to reach his pectorals she merely pushes his side with her mouth. Sometimes she opens her mouth while pushing, so that it looks as if she is actually kissing her partner. As soon as the male has found a suitable spawning spot, he disappears into the compost. In doing so he assumes an oblique position, while folding his anal fin in the direction of the female. Sometimes the female dives simultaneously into the soil, but at other times we see her wait until the male is halfway down before entering. During this brief moment the female keeps in contact with the male. If the contact is broken the male is almost certain to stop his downward movement.

If there is a thick layer of peat moss on the tank bottom, we won't see much of the actual spawning act. With a thinner layer or when the fish happen to spawn close to the front glass, one can better observe what is going on below the surface of the compost. As with Pterophyllum species, the fish bend their bodies strongly, and the female always lies below the male during the spawning act. If there is only a thin bottom layer the male remains almost above the ground.

Usually the male is the first to reappear after the spawning; the female follows later. It may take her up to 3 minutes to come up again. Sometimes both fish reappear simultaneously. Gradually the spawnlings become more violent and follow one after the other, progressively faster. Sometimes the male tries to fold himself across his mate, but she does not seem to like this. She tends to react by moving away. The male tends to do this when he reappears long before his female. He waits for her with his fins widely spread and approaches her as soon as she appears above the surface. Sometimes the male is so excited that hecommences diving into the soil again before his partner has had time to come up completely. This kind of behaviour does not lead to a complete spawning, however. An indication of the activity of these fish is the fact that I discovered that a shutter speed of 1/1000 second was not
that enough to "freeze" the vibrating movement of the male's dorsal and caudal fins during his downward dive. All my pictures of this particular phase show a bit of blurring due to movement.

From this description it may be concluded that the male is the initiator in the spawning, activated, however, by his female. The latter tends to follow a relatively stable pattern in its co-operation with the male. We see exceptions, of course, but from pictures and movies it is apparent that there is a large degree of regularity and stability in the spawning behaviour of Cynolebias robustus. We can observe this easily, but some aspects must be photographed because they occur too fast to be noticed by the unaided eye.

Finally, a few remarks about the development of the eggs, the hatching and rearing of the fry. The eggs of Cynolebias robustus are rather large and clear. It is easy to find them in the peat after the spawning. It is easy to separate the fertilised eggs from the rest. The fertilised eggs are somewhat adhesive, so that they tend to stick to the peat, but this is not so for the bad eggs, which also tend to be white in colour. If one keeps the eggs in water during the first 2 weeks one can follow the development of the embryo nicely. First we see the initial splitting of the shell, then the further development of the fry.

After 2 weeks it is advisable to place the eggs in moist peat. It is sufficient to keep the eggs "dry" for 6 weeks but there is reason to believe that a period of 10 weeks will give better results. If one has kept one male robiculus in the company of two females over a one-week period, one may count on about 200 fry. If the females are larger, of course, we can expect better results than when they are small or very young. We have to keep an eye on this kind of breeding situation, because when a female is totally empty, she is best removed from the tank. If this is not done the male may chase her to death. During the breeding period the best food is blood worms and Tubifex. The fry should be fed live baby brine shrimps immediately after hatching.

Eggs of Cynolebias robustus some hours after spawning. Fragments of peat stick to fertilized eggs, which are clear and colourless.

They grow surprisingly fast and may soon be given Daphnia and, later, Tubifex, white worms, mosquito larvae, etc. In a good sized tank the young fish will measure 1½ inches in about 4 weeks. At that time they will start also their first breeding attempts.

I would advise you not to separate the sexes too long before breeding, for the females start spawning together to get rid of their eggs. Cynolebias robustus is a so-called annual fish, but we can have a steady supply of them by keeping a supply of eggs at hand. The eggs can be kept for a very long period of time and make it possible to raise new robiculus at your convenience.

**AQUARIST'S Notebook**

*by T. ROLAN*

Apart from their activities around garden ponds, I had not thought of cats (the furry kind, not the aquatic ones) as being a menace to the fish-keeper with a fish house. However, recently I was told about an experience of a well-known goldfish breeder that proves my view to be a mistaken one.

Late one night he heard the crashing of broken glass from his fish house, and discovered on making his way there a very scared female scrabbling frantically over his tanks and knocking glass and jars etc. to the floor. After he had cleared it out of the floor he found that the beast had been walking over the glass roof and had fallen into the fish house when one of the panes gave way.

Avery keepers complain often about cats scaring their breeding birds with their roof-top prowling at night, and now it seems that aquarists, too, are at risk, as the insurance people say, in this respect.

Aquarists soon become used to the vagaries of hoses, which often seem to develop into a living form when water goes through them. But beware of the hose that is left full of water with one end in the tank. An experienced fish-keeping friend of mine found that he had done this some hours after he had disconnected the hose from the tap. When he returned to the scene the tank had only a half-inch of water left in it and his large breeding pair of angels were flapping about on their sides. The rest of the water had splashed out through the hose. Fortunately the fish showed no after-effects of this experience, but the episode might well have been a disaster.

I lost one of my own angels last month in a way that is a well-known and singularly frustrating trait of this fish. I moved a pair that had occupied one tank for about 6 months to another tank only a few feet away. They were transported this short distance after setting in a large jar of their own aquarium water, but almost immediately one of them turned on its side and refused to do anything but lie there and "pant". As I feared, in a few hours it was dead; its mate was completely unaffected by the move and remains well. This type of loss never seems to occur with small angels, only with the big ones; nor have I known it to happen with any other kind of fish, though I believe large discus can show the same trick. Does anyone know the answer?

April, 1965
Starting Right
A pictorial establishment

Photography by J. H. Tart

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If the aquarium has been used before, it is first cleaned with a nylon pot scourer kept especially for this purpose (1). A new aquarium needs only to be rinsed, care being taken not to disturb the end panels when it is lifted.

The gravel for the base is washed, a small amount at a time, in running water (2) until it is free from matter likely to cloud the water.

After the gravel has been placed in the tank (now in its permanent position), water is siphoned in from a bucket (3). A sheet of brown paper or polythene over the gravel avoids disturbing it and possible water cloudiness.

Rocks should be well scrubbed with a brush in hot water (4), before being placed in position in a natural fashion (5). Notice how the strata are all placed in the same horizontal plane.

THE AQUARIST
ABOUT THE POND THIS MONTH

Stocking with Fishes

by A. BOARDER

FOR a garden pond constructed during the winter months and recently stocked with water plants, now is a good time to introduce some fishes. Many newcomers to the hobby try to keep too many fishes in the pond and so stand the chance of something going wrong before the summer is out. There seems to be an idea about that to have a successful pond it is necessary to fill it with fishes of all kinds. This is quite wrong; it is much easier to maintain a garden pond in excellent order for many years if it is not overstocked at first. There must always be sufficient swimming space for all the fishes and there must also be spare room for them to grow and develop in a healthy manner.

It is difficult to give a precise number of fishes suitable for a pond, because of the differing sizes and depths of ponds of the various designs. If it is intended to attempt to breed some of the varieties of goldfish it is important that only one type is kept in the pond. All varieties of goldfish will interbreed and so a number of unhappily mates could be obtained which would not be worth the food they ate.

As a rough guide, a pond 10 feet by 5 feet, of varying depths from 15 to 21 feet, will be taken and the pondkeeper will be able to assess the numbers of fishes needed for a pond of similar size. In such a pond I would recommend four goldfish, four shubunkins, four fantails and four comets. These fish should be not more than 3 inches long over all. Two small tench could be added, either green tench or golden ones...

These fish would have room to grow and to develop strongly. Although such a mixture of varieties would not be intended to breed, if there were sufficient water plant coverage in the pond they might do so. A few young ones might be raised but their parentage would be, of course, very doubtful and they would not be of much value.

If a greater variety were required then some of the goldfish varieties could be dispensed with and two or three golden rudd, golden orfe or bitterling could be added. The orfe could grow very large in a few years with good feeding, but the others could very well remain in the pond for a number of years without getting too large for their pond. It may be noticed that I have not mentioned any scavengers. This is because I consider that a hungry goldfish is just as good a scavenger in the pond as any carass or other type of so-called scavenger. Tench can eat up most of the spare matter in the pond, but also so could the goldfish as long as it is not otherwise overfed. The amount of food needed to be given to pond fishes will depend on the amount of natural food available. In any pond with a fair growth of water plants there will always be a certain amount of
food, but as the fishes grow it may be necessary to give some extra.

The fewer fishes there are in the pond the less trouble will the pond maintenance be. Not only will the fishes keep more free from any disease but they will need so very little food that it is possible that the pond can be self-supporting. It is a sure sign of overstocking with fishes when it is necessary to feed them every day.

If it is required to breed a few goldfish in the pond it may be necessary to feed the fishes to assist them to develop their eggs. The old recommended food for this purpose consists of garden worms, and I cannot find anything to equal it for value. It is also a fact that very few fishes will refuse to take worms when they are hungry. Breeding will be the subject of my next article.

If any new fishes are purchased make sure that you do not introduce any pests or diseases into the pond with them. It is a good plan to place a new fish in a glass container and examine it carefully. See that there is no sign of fungus on the fish. Watch for any sore or inflamed patches. Also make sure that there are no fish lice on it; these may not be very evident to the beginner, but the lice usually stick to the body or fins of a fish and cause a small wound. This may appear as a small red spot and such a sign should be investigated. A healthy fish will normally carry its dorsal fin erect. If a fish is sitting this fin is usually lowered. I have, however, noticed that in a fish suffering from swim bladder trouble this fin can still be erect. Strange to relate, a fish in an upside down position from swim bladder trouble appears little the worse for the position and its fins can remain extended.

When introducing fresh fishes to the pond always inquire about the temperature at which they have been kept at the dealers. Many fishes are subjected to almost tropical conditions and so, when they are placed in a cold pond, they soon develop troubles. If you find that this has been the case do not put the fishes straight into the pond but try to keep them for some hours in a rather cooler position than that in which they have been. The carrying can can be lowered into the pond water so that the temperature gradually gets to that of the pond.

Do not try to keep any freshwater mussels in your pond if it is freshly made. These molluscs can only live in water which has a good depth of mud or mud at the bottom. They travel about and feed in such matter and if the pond is a new concrete one, the mussels would soon die and pollute the water very quickly. As for water snails, this again is a matter for the individual. They will do little good in the garden pond and again little harm. They can provide a little food when their young hatch out from the eggs, but they can eat some of the water plants and would usually eat some of the fishes' eggs if in any numbers in the pond.

The main point to consider when stocking the pond is to try to think what the numbers would be likely to be in a similar amount of water in the wild. Also remember that it is far easier to keep a few fishes healthy in a pond than to try to do so with too many.

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**HOUSE PLANTS FOR THE FISH HOUSE**

**"Busy Lizzies"**

_by B. Whiteside_

These attractive house plants will thrive in a light position in the fish house and will reward their owner with an attractive display of small flowers. Two sizes of plants can be grown. *Impatiens balsami* will grow to a height of about 12 inches, and the plant comes in a variety of hybrids with colours ranging from white and pale pinks to reds and pale purples.

For a smaller plant, *Impatiens*, or balsam as it is called, variety Orange Baby or Scarlet Baby, can be grown. These reach a height of about 4 to 6 inches, and, as the names suggest, have bright orange and scarlet flowers with a luminous tone which stands out from the pale green leaves of the plant. The plants can be grown from a packet of seeds; these require a well drained seed compost and a reasonably high temperature for germination. The seedlings should be pricked off into 3 inch pots. John James Potting Compost no. 1 being used. They require frequent watering during the summer, but this should not be excessive as it may lead to decay of the roots and stems. The plants like a light airy position and when they receive conditions to their liking they respond with masses of bright luminous blooms, freely produced throughout the summer season. The dwarf species produces compact little plants, a group of which, when in flower, is a sight to be remembered.

Plants have almost transparent stems which root easily from cuttings inserted in jars of water and later potted in 3 inch pots. Plants can be brought through the winter if given some heat but are so easily grown from seed that this is usually not worth while. Packets of seeds are inexpensive and extra plants not required for the fish house can be used for decoration in the home, or can be planted outdoors as bedding plants if well hardened off.

Plants require little attention and if they do become too large or leggy, they can be cut back and will soon produce fresh new growths from their base. Parts removed can be used as cuttings.

**THE AQUARIST**
A Springtime Breeder—the Bitterling

by B. FRY

The bitterling, or bitter carp, a barbless cyprinid so named because of its acid-tasting flesh, is native to central and eastern Europe and Asia Minor. In Britain it has come to have become established in recent years in parts of Yorkshire. It is technically known as Rhodeus amarus Linnæus, and averages around 2½-3 inches in length. Out of the mating season (April-June) it is grey-green on the back shading to silver on the sides. But when breeding time draws nigh the male sports a rainbow lateral stripe and a galaxy of wonderful body colours: violet, pink, orange, green and blue predominating. Even his fins, which are normally pinkish to yellow, or grey, assume richer tones. The dorsal and anal fins, for instance, become bright red margined with black; the caudal lobes of the forked caudal fin melt into a vivid blue-green base. The female, not to be outdone, develops an over-done of pink to pinkish yellow and a longitudinal stripe which reflects varying prismatic tints. Small wonder, then, that the fish is often referred to as the rainbow carp.

Apart from the beauty of its springtime apparel, the bitterling is very popular with coldwater aquarists because it is not fastidious about what it is given to eat, and will take dried or live food, or substitutes for live food, freely. Furthermore, it has a remarkable and unusual spawning procedure. This it will quite readily demonstrate at the proper time of the year in an aquarium furnished to suit special tastes. First you must cover the floor of the tank with a thick carpet of well-washed sand, or fine grit. Then, after the tank has been filled with ordinary tap water, some bunching plants such as Elodea densa or Cattleyphyllum demersum must be introduced for their nesting qualities. The plants should be weighted to the bottom with lead bands, or tied to stones. Most important of all, however, are two or three pond mussels. Those belonging to the genera Unio or Anodonta are recommended. As freshwater mussels are heavy consumers of oxygen, and need a reasonably spacious bottom area to move around in, a tank measuring not less than 24 in. by 12 in. by 12 in. is advised.

The presence of the mussels, combined with the stimuli afforded by the season’s higher temperatures (a range of about 65°F (17°C) to 70°F (21°C) is about right), longer and brighter days, and gaudy habiliment of the male has an interesting physiological effect on the female: she develops from just behind her ventral fins a pinkish, worm-like tube called the ovipositor. This tube runs down, presumably, until its discharge, and is ready maneuverable and can be extended to roughly 2 inches in length. I say presumably because quite recently the interesting theory has been advanced that the eggs do not emerge from the tip of the wormiform appendage at all but from the orifice of a much shorter and scarcely noticeable organ, placed immediately in front of it.

But let us return to the male. About this time small white tubercles (nuptial ex crescences or pearl organs as they are called) develop above his upper lip and eyes. Concomitant with this sign of fertility he becomes even more replete, and soon takes to swimming so and fro over a mussel. Not infrequently he rubs his body against the lips of the mussel’s shell.

Photo: Lawrence E. Perkins
Male and female (right: with ovipositor showing) bitterling poised above a mussel.

It has been said that this curious action is performed to move the mussel to what is to follow. At what follows is this: the female, perhaps preceded or accompanied by the darting and shimmering male, glides over the mussel and, as she does so, ejects an egg or two into the ciliated breathing apparatus of the mussel. Fertilisation of the implanted egg is achieved by the male releasing his milt at about the same time. It is interesting to note that if the flames of the mussel snap to after the female’s brief visit, the male will stay around until they open again.

This performance is usually repeated at irregular intervals over a period of about a week, and once or twice the mussel may become the repository of the fish’s forty or more eggs. The eggs hatch out in a few days, but the fry stay attached to the walls of the mussel’s gill-chamber for a good while longer. During this time they absorb the contents of their abdominal yolk sac and, it is believed, fasten on particles of edible matter and infusoria inhabited by their host. After they swim out of the mussel, infusoria must be continued to be provided for a week or so, after which the silvery fry should be large enough to take brine shrimps, tiny Daphnia and powdered dried food. Thenceforward growth is very rapid.

In a well planted tank the baby bitterling may be left with their parents, but some breeders, playing for safety, tap a loaded mussel to close it, then remove it with its bitterling eggs to another well-oxygenated tank for the fry to hatch out without the overweening of the parents. It is interesting that there is a reciprocal action on the part of the mussel. For when these molluscs breed the females pour out from their broad pouches tiny larvae furnished with a sticky thread by which they can adhere to passing fish. Once attached to their host they imbibe themselves in its skin and do not release their hold until they are large enough to drop off and lead an independent existence.

April, 1965
A Garden Method of Culturing Water Fleas

described by N. STOCKS

The difficulty in finding Daphnia is the main deterrent to most people in feeding this fine food to their fishes. However, if you have a sheltered spot in your garden and you are prepared to go to a little trouble, as most of us are, for our fishy friends, you can produce as much as you require.

I have never seen Daphnia in its natural habitat, yet in the past 2 years I have bred them by the millions and have fed all my fishes as much as necessary for their health.

The first Daphnia I ever saw were shown to me by a fellow aquarist, who gave me some Daphnia in a pound jam jar to take home with me; it is the descendant from those that have kept my fish in live food over the last 2 years, even though my stock of fish has grown from half a dozen to several hundred.

High Rate of Growth

Nothing has ever astonished me more than the rate at which Daphnia reproduce from spring to autumn. It is truly fantastic, and their successful culture has been to me an interesting as the breeding of fish.

I must emphasise that my method of culture is not the only one known by any means, but it is successful, and that is sufficient reason for making it known to you.

My early experiments were made in an old baby bath, but I now use old double concrete washbasins. First of all you must make arrangements to feed the Daphnia, and this means a good quantity of green water. However, you cannot keep them in the same container as the green water or they will die of all organisms faster than they can reproduce. This is the reason for having the two separate containers, one for Daphnia and one for green water.

I first started my green water culture with a pinch of warmish clippings from the lawn mowings kept, plus a dash of soya bean flour, mixed first, like mustard, and then added to the water. In the full spring sun it will begin to turn green in 1 or 2 weeks after that it is merely a matter of a little more soya bean flour being added. As soon as it is really green it is good for Daphnia and the more like soup it becomes the more Daphnia you will have. However, do not overfeed the soya bean flour or it will begin to smell and 'go off' and become useless.

Food for the Fleas

I mix two heaped teaspoons of soya bean flour to the sun half of a double washbasin once a week in spring, then increase to twice a week when the sun gets higher and the Daphnia are breeding really fast. This is usually about the time my young goldfish and shubunkins are big enough to take them as fast as I pour them into the ponds. At this time I am pouring one 2 gallon bucket of water thick with Daphnia into the ponds. This 2 gallons is replaced by 2 gallons of green water from the tub of green water, and this in turn is topped up with 2 gallons of tap water. All this Daphnia is produced for the cost of four teaspoons of soya bean flour a week.

The green water is also the first food for my young fish. From the first it has always had in it Paramecium and other animals, and I presume that the soya bean flour keeps them so plentiful. I check drops of water from time to time with my son's microscope to make sure that they are there.

Sometimes your green water will 'go off' and smell, even though you have not overdone the soya bean flour. It goes greyish white and if not disposed of gets so foul that even the snails die. I have found this to be the fault of an organism in the water which apparently gobbles the algae faster than Daphnia; the soya bean flour is not consumed, bacteria take over and the result is a very bad smell.

I think that birds must be responsible for bringing this organism from natural water when they perch on the sides of the tub to drink. That is why I have two tubs of green water. I have never had them both 'go off' together. I clean the affected tub out and scrub with hot water and strong washing soda.

Cleanliness is Essential

Another point to remember is that you must be scrupulously clean when feeding from the Daphnia tub and topping up with green water. If you use the same utensil to dip out the Daphnia and to ladle the green water into the Daphnia tub, the chances are that you will transfer a few Daphnia, which have stuck to the sides, into the green water tub. If this should happen all the green water would be used up in a fortnight by the Daphnia which had been produced from those few. I have an old bucket which I use exclusively for the Daphnia but if by any chance I do use any other utensil I immediately rinse it under hot water. I have learned these few points the hard way.

All this may sound a lot of work but like everything else, you become skilled at it and in no time it is no trouble at all. Second-hand tubs are quite cheap and even if they leak slightly this takes up as the algae grow and blocks up any cracks. If you acquire a set of tubs make sure that you thoroughly clean and scrub them or you will have trouble getting your cultures going, as neither the Daphnia nor the organisms in the green water like either detergents or soap.

If all this seems too ambitious for some of you, don't hesitate to have a go with a smaller container. Joseph, my son, has kept his tropicals fed with Daphnia cultured in a 2 pound glass jar for the last 2 months. He has fed his fish by tipping some out of the jar and then has topped up with green water from one of my tubs.

The main essentials are plenty of light and a little extra warmth in winter for the Daphnia. Don't worry about a bit of sludge or a few leaves in the tubs, the Daphnia like it. Throw a banana skin into your green water, it seems to help; also have a few snails in each tub.

Reprinted from "New Zealand Aquatic World"
New Aquarium Power Filter

Eheim Aquarium Power Filter. Overall dimensions: 6½ in. diameter by 15 in. high. Price: £11 13s. Supplied by South Coast Aquatic Nurseries Ltd.

This filter combines the features of high rate of water flow through it, a large filter medium capacity and a return achieving forced aeration of the aquarium. The first and third of these features are efficiently provided by a neat electrically operated pump mounted on a plate secured by wing nuts to the cylindrical filter. The pump is silent in operation and, like all parts of the apparatus, is corrosion free, so that it can be used with sea water as well as fresh water. Water flow is traced by arrows in the diagram on this page, from polythene intake (1) via (2) through the filter and from the pump (4) to a perforated return tube (6) secured above the water surface and along the aquarium’s length. Air is forced into the aquarium as the filtered water is pumped back through the jets, which also ensure that aquarium sediment is dispersed towards the intake pipe for removal. One gallon per minute is the rate of flow. Strong clear green plastic is used in the construction, this colour preventing algae growth in the apparatus. Convenient packs of carbon or special absorbent filter medium are available for the Eheim. A sump below the filter medium allows accumulation of larger particles of sediment so that the medium is not blocked by them. In a fish house this unit is ideal for use as a mobile filter, being moved from tank to tank as needed; a useful extra accessory is a supporting frame to hang the filter on the tank. A larger model having a double pump unit and two intakes, for use with aquaria of more than 50 gallons capacity, is also available.
A Collecting Trip to Tacoma

by GIL HEWLETT
(Vancouver Public Aquarium)

ON 17th January Vince Penfold, Billy Wong and I embarked on a collection trip to Pt. Defiance in Tacoma, Washington, some 170 miles south of Vancouver. Our objectives were to collect specimens not normally or easily obtained in our local Vancouver waters, and also to study the very interesting Pt. Defiance Aquarium, built in 1962.

For most of the journey we were enveloped in thick swirling fog which made driving quite difficult. We arrived at the Aquarium Sunday evening just in time to have Cecil Brouse, the curator of both the Zoo and the Aquarium, give us a royal tour. Cecil had been curator of the old Pt. Defiance Aquarium for many years and is a tremendously inspired and hard working person who has made considerable contributions to the aquarium field.

The aquarium, a fascinating and unique establishment, cylindrical in shape, consists of a large central “ocean” tank which may be viewed from both above and below the water level. Many different species are found here, such as orange rockfish (Sebastes pinniger), yellowtail rockfish (Sebastes flavidus), octopus, starfish, large dogfish sharks (Squalus acanthias) and a magnificent chinook salmon (Oncorhynchus tsanymnous), weighing approximately 55 pounds. Every Sunday a diver dons a weighted, brass shoulder helmet and descends into the tank to feed the fishes. Speaking into a small microphone under his helmet, he reveals to the public some of the interesting habits of the animals feeding about him. Standing on a walkway surrounding the large tank, spectators are able to watch the show through glass windows. Along the outer wall of the passage way are many beautiful display tanks.

Vince was intrigued by the idea of a trip into the depths of the tank, complete with diver's helmet, wet-suit and microphone. However, it was less than successful. The helmet was cumbersome and obstructed his vision, so that a small octopus which followed him around was constantly getting stepped on. Worse yet, his pleasant speaking voice came out distorted into an unintelligible sound.

The actual operation of the aquarium is the epitome of simplicity and efficiency. Raw sea water is pumped up from the sea, some 300 yards away, to an epoxy-covered steel trough above the tanks. The trough curves around the building and water for the tanks is siphoned from it. This eliminates many mechanical difficulties. The overflow from the fibre-glass tanks drains into a trough on the floor and out of the building. The plankton found in this ocean water serves as the natural food for most invertebrates and enables the public to see these creatures in peak condition and to watch them actively feeding.

On Sunday night we went beach seining off Pt. Defiance with full-time collector and assistant, Don Godberry. Taking advantage of a very low tide, we managed to obtain many interesting fishes such as ratfish (Hydrolagus colliei), whiting (Trisopterus luscus), painted greenling (Ocyurus chrysurus), white-spotted greenling (Hexagrammos otakarae) and sturgeon poacher (Agoes anguineus). We also collected several beautiful salish sculpin (Nematalosa fasciata) by dipping them off a sea wall.

The operation of a beach seine itself consisted of a 400 foot line to either end of a 150 feet seine with floats on the top and leads on the bottom. One line and the net were cooled on a small boat while the end of the other line was secured on the beach. As Don drove the boat straight out from shore, Vince paid out the line and net to a distance of about 400 feet off shore, then the other line was brought back to the beach. With two men on each line, the net was slowly and laboriously dragged ashore, entrapping fish and invertebrates that lay in its path. Once beached, the

Continued on page 16

The Kissing Gourami

THE kissing gourami (Helostoma temminckii) is of the ambystoma family. It is a most interesting fish and may reach a length of 4 inches in captivity although twice that length may be reached in the wild.

The kissing gourami is cream in colour, although a slightly darker shade may be noticeable above the elongated anal fin during spawning.

The most striking feature in the manner of the kissing gourami is its familiar attitude of 'kissing', which may be observed almost continuously. Although the lips are large in appearance the throat of the fish is comparatively small. The basis of its diet is algae but the fish must have plenty of dried food, which must be of a fine nature.

Distinguishing the sexes is rather a problem. The kissing gourami, unlike other gouramis, does not show a different fin structure for each sex. The only sexual distinction is that the female appears broader when viewed from above.

Unlike most gouramis, the kissing gourami when spawning does not make a bubble nest for the eggs. Instead the eggs are surrounded by a film of oil which makes them rise and adhere to the water surface.

M. M. Clark

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.

Thermostat and Air Pump

I READ with interest Mr. Scarrot's letter in the February issue, but I feel a word of warning is necessary before other readers copy this idea of wiring vibrator pumps in parallel with tank heaters. This practice is liable to cause sparking at the thermostat contacts which will lead to blackening and eventual failure to complete the electrical circuit when the contacts close. The trouble can be quite easily overcome by wiring a suitable capacitor across the thermostat contacts. The exact value will depend on individual circumstances, but can easily be found by trial and error. It should be the lowest value which will eliminate the spark; if too high a value is used there is a danger of both heater and air pump running at reduced power when the thermostat contacts are open. A useful starting value would be 0.1 mfd, 350 volts A.C., which could be supplied by any radio component shop.

F. C. Boucher, B.Sc.,
Chelmsford,
Essex.

Teaching the Aquatic Way

IT probably depends on the type of school whether the entrance hall can be a suitable place for an aquarium to be sited (as Mr. B. Whiteside suggests in the March issue). The experience of a school teacher friend of mine suggests that a non-opening top to the tank is necessary if it is in an unwatched situation. He spent a whole morning at school serving up a tropical aquarium with a tasteful display of rocks and plants, switched on the overhead light and left it to settle down before placing in the fishes. Just over an hour later, when he came back to look at his tank, he found that a wafer of green soap had thoughtlessly been added by some unknown hand. He had to dismantle the whole set up before it could be made ready for use again.

T. Rolan,
Morden, Surrey.

Bedroom Aquaria

I WAS amused—and somewhat relieved—to discover from your February issue that I am not alone in being faced with the problem of tanks of fish in the bedroom (Mr. Billy Whiteside's article "Fish in the Bedroom").

Having exhausted all other available areas in the house we now have six tanks installed in our bedroom. (My husband assured me at first that this was a temporary measure.) I have become quite fond of our fishy guests; but they certainly present problems! Firstly I would point out to Mr. Whiteside that buckets of water from the bathroom are not necessary if you have a garden hose. This can fairly easily be passed through the upstairs window. If employing this method it is advisable to ensure (a) a strong waterproof covering on the floor, and (b) that your neighbours are not over-sensitive, or are used to your eccentricities.

Secondly, if your fish need a meat diet, make sure that their supplies, stored in the refrigerator, are in an airtight container, or do not have the chance to mature too much. The odour of over-ripe prawns, whilst appealing to fish perhaps, does not mingle well with the butter etc.

Finally, if you always require live food, this can apparently also be stored in the bedroom. I caught my husband hastily pushing a jar out of sight behind the tanks; on examination this proved to contain a selection of juicy earthworms!

(Mrs.) J. N. Carrington,
Dorking, Surrey.

Modified Thermostat

Referring to the article "Thermostatically Speaking" in the February issue, it is possible that some readers have gained the impression that by the modifications described by Mr. Staines, only an external thermostat can be made to control to plus or minus 1°F. Such is not the case, of course.

Mr. Staines has described how to get the best control from an external thermostat by making it follow the water temperature as closely as possible. The variations in temperature which remain will be due to the thermostat characteristics, and may be as close as ±1°F for a very good one.

J. Grant,
Hayling Island, Hants.

Events in Germany

Thank you for including my letter in the January issue concerning the German Shows and Congresses. May I ask whether you would be kind enough to publicise the following further information.

The German Guppy Federation (D.G.G.) have their International Show in the Berlin Aquarium, and this commences on 22nd August and lasts until 26th August. British exhibitors will not need to pay entry fees, as these
have been waived. Judging will be identical to F.O.B.S. Standards. There are classes for single males and also for three males, which must not be from the identical breed.

The East Berlin International Show to be held in Humboldt University commences on 5th September and this is to be followed by their Congress from 10th to 12th September inclusive. Classes for the East German Show are not yet known to me.

I am also advised that West Berlin members will gladly accommodate British exhibitors in their own homes, provided, of course, that they are not too numerous.

As a lot of interest has already been aroused through your January issue, I feel certain that your readers might also like to have the above news.

R. O. B. LINT
Rainlip, Middlesex.

A Collecting Trip to Tacoma

The contents of the net were soon emptied into waiting tubs of sea water.

On Monday, Don, Vince and I went trawling, while Billy and Ron (an employee of the Pt. Defiance Aquarium) went fishing for yellowtail rockfish. Oyster trawling involves the use of two boards, which, when in the water, shank to left and right, keeping the conical net open. The outfit is dragged along the bottom for a period of some 20 minutes, so as not to injure the captured fishes. A fair number of specimens were obtained in this manner, including giant scallops (Rhaphidochiton richardsonii), lemon sole (Parophrys vetula), pimpy pufferfish (Dentex dentex), and a couple of baby octopus (Octopus sp.). Just as we were finishing up for the afternoon, Billy and Ron arrived on the scene, coming from the west. They had started out to go 2 miles to the east and had managed, somehow, in the thick fog, to get 6 miles past their point of departure in a westerly direction. Safely returned, they looked very chilled, a little shaken up, and were without any yellowtail rockfish.

Reach netting was resumed that night and the next morning we went Scuba diving with Don while Billy and Ron loaded the truck with fishes. We left Tacoma in mid-afternoon, after thanking Cecil and his congenial staff of four for a most enjoyable stay. We stopped at the Seattle Marine Aquarium, run by Ted Griffin, a very enthusiastic individual, who is interested in capturing a killer whale (who isn't?). The trained harbour seals (Phoca vitulina) and California sea lions (Zalophus californianus) were utterly fascinating and are a great crowd pleaser. Ted very kindly gave us a fine 7 inch specimen of a sturgeon (Psettus sp.) as a parting gesture. We finally arrived back at Vancouver about 2 a.m. and after unloading all the fish into various tanks, wended our weary ways home for a much-needed sleep.

The AQUARIST Crossword

Compiled by M. W. SAUNDERS

CLUES ACROSS
1. Fish that can exist without water (10).
2. Descriptive of a certain bottom-dwelling fish (8).
3. Found that the ship lost (4).
4. Found on the water's edge (8).
5. Nothing in fish in disease (8).
6. They guide ships and aircraft (6).
7. Might wake you—tea would put a Placenta to sleep (4, 7).
8. Teacher (6).
9. Mustache with a gap (5).
10. Events, in terms about the police (9).
11. With eggs, an egg (6).
12. Common name for Lutus bicolour (3, 6).
14. Saucing companion (6).
15. Fish which might get under your feet (4).
16. They help the fishers (10).

CLUES DOWN
1. Useful for checking your fishes' spouts (5).
2. Skilled (5).
3. Where fish have built-in spotlights (4).
4. Wastage from a restaurant (4).
5. Ease reins for hidden luminarias (9).
7. How fishes go to school (5).
8. Yours truly roiled to the country (4).
9. More colourful, but not carried by fellow aquarists (7).
10. Drink fowl drink (3).
11. Perhaps that guy and keeps the water in (3).
12. Nuts goes round to an actuary (8).
13. Our feathered friend might follow the lady (4).
14. Spears goes round and round the Branchiostoma testis (8).
15. His ship was adorned on a mountain (5).
16. Type of match resting on the bed (4).
17. The more provides the link—just about (6).
18. Inquisitive about some tanks (4).

Solution on page 18

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

News from AQUARIST'S SOCIETIES

AT the March meeting of the Alnsworth and District A.S., the speaker was Mr. E. J. West of Alnsworth who gave a talk on 'The Care and Feeding of Fishes.' This was an interesting talk, as it covered the feeding habits and spawning of different species of freshwater fish.

The Blackpool and Fylde A.S. held their first meeting of the year on the 25th September. The speaker was Mr. J. Smith who gave a talk on the care of tropical fish. The talk was well received and the members enjoyed the evening.

The member of the Portsmout A.S. held a general meeting on March 3rd. The speaker for the evening was Mr. J. Smith of Portsmout. The meeting was well attended and the members enjoyed the evening.

The East Dulwich A.S. held an inter-Club meeting on the 25th March. The speaker for the evening was Mr. J. Smith who gave a talk on the breeding of tropical fish. The meeting was well attended and the members enjoyed the evening.

The Bedford A.S. held their annual general meeting on the 15th March. The speaker for the evening was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish. The meeting was well attended and the members enjoyed the evening.

The Whitley A.S. held their first meeting of the year on the 25th January. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Newquay A.S. held their first meeting of the year on the 25th January. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Wigan A.S. held their first meeting of the year on the 15th March. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Blackpool and Fylde A.S. held their second meeting of the year on the 25th March. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Alnsworth and District A.S. held their second meeting of the year on the 25th March. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Bedford A.S. held their third meeting of the year on the 25th March. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Whitley A.S. held their third meeting of the year on the 25th March. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Newquay A.S. held their second meeting of the year on the 25th March. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.

The Wigan A.S. held their second meeting of the year on the 15th March. The speaker was Mr. J. Smith who gave a talk on the care and feeding of freshwater fish.
A.V. harter's and prize cards were won by: 1, Mr. Percival (Northchapel); 2, Mr. Wells (Bedford) and shared 3, Mr. Percival, Northchapel; and Mr. Serrescliff (Bedford).

A HOME aquatic competition has recently been held by the Dacot and District A.S., for which a challenge silver cup was presented to the winner. Eighteen tanks were judged and the results were: 1, A. W. Jackson; 2, T. J. Jones; 3, T. Durrant and the judge was the club chairman, Mr. L. Timmis. Although this club was formed July, the membership stands at 45 and continues to increase.

THE annual general meeting of the Barrow and District Aquarium Society was held recently, when the officers and committee for the coming year were elected as follows: President, Mr. E. B. Milner; Secretary, Mr. K. D. Owen, 42, Elmwood Road, Barrow, London, S. 12. Treasurer, Mr. T. S. Edwards (Barrow-in-Furness).

THE president and secretary of the Lincoln Aquarium Society have announced that the Society's annual show was visited by over 200 neighbors and that 200 prizes were distributed to the winners. The Society's annual show will be held on Saturday, 5th June at Blackpool Road, Lincoln. The main feature will be the display of imported aquariums and the Society's annual competition will be held on the same day. The Secretary of the Society, Mr. M. M. C. Ingles, 3, Elmwood Road, Barrow, London, S. 12.

INCREASED membership which resulted in subscriptions nearly double those of the previous year, was reported at the annual meeting of the Devonport Aquarium Club at Ottery St. Mary, Devon, on 16th May. The meeting was conducted by the President (Mr. E. T. Southwell), and the Secretary (Mr. C. F. Hallett) reported a balance in hand to the members. The Secretary (Mr. W. Gwynn) said that the Club had increased its activities this year and that the Club's library, covering every aspect of fishkeeping, including growing and breeding, as well as angling, was now available to the members.

Officers appointed were: Chairman, Mr. S. C. T. Wheeler; Treasurer, Mr. E. T. Southwell; Secretary, Mr. C. F. Hallett; Honorary Secretary, Mr. H. R. Phillips; Honorary Treasurer, Mr. J. R. L. Smith; Honorary Secretary, Mr. R. M. Southwell. The Club's annual show will be held on Saturday, 11th June, at the Victoria Hall, Newton Abbot, Devon.

THE Newcomer Group and Livebearer Society hold the 1983 Midland Aquarium Society's Annual Show at Palace Street, Birmingham, on Sunday, 10th June. The show is open to the public from 10 a.m. to 4 p.m. Admission will be free. The Club will be exhibiting a range of fish, including angelfish, tetras, discus, and goldfish, as well as a display of livebearers and shrimp. The Society will be exhibiting a range of fish, including angelfish, tetras, discus, and goldfish, as well as a display of livebearers and shrimp.

A MEETING was held in Manchester on the 10th March for the purpose of forming the Barrow and District A.S. There was an attendance of twenty, and there was plenty of enthusiasm. Further meetings will be held in the Angel Inn, 37, Wellington Street, Barrow, Manchester, every second and fourth Wednesday at 8.30 p.m. The following officers were elected:—Chairman, Mr. W. J. Adams (secretary); Mr. A. Thomas (assistant secretary); Mr. L. D. Jones, 38, Railway Street, Barrow, Manchester. Anybody who is interested should attend the next meeting or contact the secretary, and can be assured of a warm welcome.

A CLUB has been formed, named Tropical Aquarium Breeders, as the name suggests it consists only of experienced aquarium breeders, from various societies and the officers and their associates are as follows:—Chairman, Mr. J. Turner (B.A.S.U. and O.A.S.K); Secretary, Mr. C. Walker (D.D.A.S.); Treasurer, Mr. G. Richardson (A.F.A.S. and B.A.S.K); Overseer, Mr. M. L. Jones (A.F.A.S. and O.A.S.K); Treasurer, Mr. J. T. P. Wilson (A.F.A.S.); and Mr. J. Allan (D.D.A.S.).

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South American Livebearers

Hybrid Blue Phantoms 7.5-8.0 cm 7.5
Pea Yellow 7.5-8.0 cm 7.5
Large Sailfin Black Mollies 3.5-4.5 cm 3.5
Black Body Red Veil Guppy (Guppies) 95-105 cm 95
Virgin Female 95-105 cm 95

Tropical Fish List March–April Regular Stocks Arriving Weekly

LIVEBEARERS

Guppies

Fashion 12.5 pair 12.5
Assorted 12.5 pair 12.5
Lady Guppies 42-48 pair 42-48

Swordtails

Red Swordtail 3.5-4.5 cm 3.5
Red Long 3.5-4.5 cm 3.5
Green 3.5-4.5 cm 3.5
Red Wiggly 3.5-4.5 cm 3.5
Tetra 3.5-4.5 cm 3.5
Red Eye Red 4.5-5.5 cm 4.5
Golden 4.5-5.5 cm 4.5
Simpson Red 12.5 pair 12.5
Green Longtail Molly Fish 7.5-8.0 cm 7.5
Leopard Guppies 15-20 pair 15-20

Platies

Red 3.5-4.5 cm 3.5
Black 3.5-4.5 cm 3.5
Tetra 3.5-4.5 cm 3.5
Green Tail Molly 3.5-4.5 cm 3.5
Red Wiggly 3.5-4.5 cm 3.5
Rainbow 3.5-4.5 cm 3.5
Varicoloured 7.5-8.0 cm 7.5

Mollies

Black Longear 3.5-4.5 cm 3.5
Black Sailfin 3.5-4.5 cm 3.5
Mosquito Fish 2.5-3.0 cm 2.5
Hell Bachelor 3.5-4.5 cm 3.5

CHARACINS

Tetras

Goldlight 3.5-4.5 cm 3.5
Neon 3.5-4.5 cm 3.5
Red Fin 3.5-4.5 cm 3.5
Black 6.5-7.5 cm 6.5
Gold 6.5-7.5 cm 6.5
Tropical 3.5-4.5 cm 3.5

PANCHAX GROUP

Danio 3.5-4.5 cm 3.5
Leaffish 4.5-5.5 cm 4.5
Chalumna Oranda 3.5-4.5 cm 3.5
Threadfin 4.5-5.5 cm 4.5
Aphanius 10-15 pair 10-15

RASBORAS

Horseheads 2.5-3.5 cm 2.5
Rainbow 2.5-3.5 cm 2.5
Silver Tails 2.5-3.5 cm 2.5
Betta 2.5-3.5 cm 2.5
Gold 2.5-3.5 cm 2.5
Veil 2.5-3.5 cm 2.5
Black Veil 2.5-3.5 cm 2.5
Rasbora 2.5-3.5 cm 2.5

CICHLIDS

Angelfish

Standard 3.5-4.5 cm 3.5
Lace 3.5-4.5 cm 3.5
Silver Tails 3.5-4.5 cm 3.5
Gold 3.5-4.5 cm 3.5
Veil 3.5-4.5 cm 3.5
Black Veil 3.5-4.5 cm 3.5
Rasbora 3.5-4.5 cm 3.5

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3/6 each 4 for 10—
3/6 each 4 for 10—
4/6 each 4 for 14—
3/6 each 4 for 10—
22/6 each 8 for 20—
7/6 each 10 for 20—
5/6 each 4 for 20—
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