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

<table>
<thead>
<tr>
<th>POLISHED STAINLESS STEEL</th>
<th>Frames</th>
<th>Aquariums</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 x 15 x 12</td>
<td>£ 7 7 0</td>
<td>£ 9 9 0</td>
</tr>
<tr>
<td>30 x 15 x 12</td>
<td>£ 8 8 0</td>
<td>£11 11 0</td>
</tr>
<tr>
<td>36 x 15 x 12</td>
<td>£10 10 0</td>
<td>£13 13 0</td>
</tr>
<tr>
<td>48 x 15 x 12</td>
<td>£13 13 0</td>
<td>£21 21 0</td>
</tr>
</tbody>
</table>

DISTRIBUTOR OF
- McLynn’s Fish Food
- ES-ES Products
- Electrical and General
- Water Life, Aquarist, Ditchfield’s and T.F.H. Booklets
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M & R (DOG-FISH) LTD.
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### TROPICAL FISH

TROPICAL FISH LIST JAN./FEB. REGULAR STOCKS ARRIVING WEEKLY

#### LIVEBEAVERS

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guppies</td>
<td>6-1 pair</td>
</tr>
<tr>
<td>Fancy</td>
<td>10-6</td>
</tr>
<tr>
<td>Black Velvet</td>
<td>1-2</td>
</tr>
<tr>
<td>Assorted</td>
<td>3-1</td>
</tr>
<tr>
<td>Blue Veil Guppies</td>
<td>3-2</td>
</tr>
<tr>
<td>Delta</td>
<td>28-5</td>
</tr>
<tr>
<td>German Hummel</td>
<td>4-1</td>
</tr>
<tr>
<td>German Hannel</td>
<td>45-1</td>
</tr>
<tr>
<td>Lake Guppies</td>
<td>4-1 pair</td>
</tr>
</tbody>
</table>

#### Swordtails

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Standard</td>
<td>2-6 each</td>
</tr>
<tr>
<td>Red Large</td>
<td>3-6</td>
</tr>
<tr>
<td>Green</td>
<td>3-6</td>
</tr>
<tr>
<td>Green Wagtail</td>
<td>3-6</td>
</tr>
<tr>
<td>Red Wagtail</td>
<td>3-6</td>
</tr>
<tr>
<td>Tuxedo</td>
<td>3-6</td>
</tr>
</tbody>
</table>

#### Platies

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>3-6</td>
</tr>
<tr>
<td>Black</td>
<td>3-1</td>
</tr>
<tr>
<td>Tuxedo</td>
<td>3-1</td>
</tr>
<tr>
<td>Red &amp; Tail Yallow</td>
<td>3-1</td>
</tr>
<tr>
<td>Red Wagtail</td>
<td>3-1</td>
</tr>
<tr>
<td>Florida Blue</td>
<td>3-5</td>
</tr>
<tr>
<td>Various</td>
<td>7-6</td>
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#### Melolies

<table>
<thead>
<tr>
<th>Species</th>
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<tr>
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<tr>
<td>Green Saffin</td>
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<tr>
<td>Green Lyretail</td>
<td>3-4</td>
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<tr>
<td>Black Lyretail</td>
<td>3-1</td>
</tr>
<tr>
<td>Black</td>
<td>3-3</td>
</tr>
<tr>
<td>Red</td>
<td>3-4</td>
</tr>
<tr>
<td>Black Saffin</td>
<td>3-6</td>
</tr>
<tr>
<td>Hose Hollar</td>
<td>2-6</td>
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#### Rabbits

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Bloodfin</td>
<td>3-1</td>
</tr>
<tr>
<td>Penguin (Bondei)</td>
<td>4-8</td>
</tr>
<tr>
<td>Blind Cave Fish</td>
<td>3-1</td>
</tr>
<tr>
<td>Marble Hatchet</td>
<td>4-9</td>
</tr>
<tr>
<td>Silver Hatchet</td>
<td>4-1</td>
</tr>
<tr>
<td>Nonnansoma</td>
<td>3-4</td>
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<tr>
<td>Margarita</td>
<td>4-1</td>
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<tr>
<td>Nonnansoma Anomalis</td>
<td>5-6</td>
</tr>
<tr>
<td>Nonnansoma Beckfordi</td>
<td>5-6</td>
</tr>
<tr>
<td>Cepina Arndti</td>
<td>5-2</td>
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<tr>
<td>Copeina Gurtstai</td>
<td>3-4</td>
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<tr>
<td>Phcnewshkota Piscistischai</td>
<td>3-8</td>
</tr>
<tr>
<td>Alesine Logopina</td>
<td>3-5</td>
</tr>
<tr>
<td>Red Eye Clarina</td>
<td>2-1</td>
</tr>
<tr>
<td>Cosselle Tresas</td>
<td>4-6</td>
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</table>

#### LABYRINTHS

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siamese Fighter (male)</td>
<td>10-5</td>
</tr>
<tr>
<td>Siamese Fighter (female)</td>
<td>4-1</td>
</tr>
<tr>
<td>Gourami</td>
<td>3-1</td>
</tr>
<tr>
<td>Thick Lip</td>
<td>3-1</td>
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<tr>
<td>Dwarf</td>
<td>3-1</td>
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<tr>
<td>Three Sose</td>
<td>3-3</td>
</tr>
<tr>
<td>Opaline</td>
<td>3-3</td>
</tr>
<tr>
<td>Pearl (Leeri)</td>
<td>3-3</td>
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<tr>
<td>Kissing</td>
<td>3-1</td>
</tr>
<tr>
<td>Jewel</td>
<td>3-1</td>
</tr>
<tr>
<td>Honey</td>
<td>3-1</td>
</tr>
<tr>
<td>Paradise Fish (adult)</td>
<td>3-2</td>
</tr>
<tr>
<td>Combussa</td>
<td>3-6</td>
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</table>

#### PANCHAX GROUP

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Panchax Dayi</td>
<td>3-4</td>
</tr>
<tr>
<td>Laxiochea</td>
<td>4-1</td>
</tr>
<tr>
<td>Chaptier Orange</td>
<td>3-1</td>
</tr>
<tr>
<td>Thruss</td>
<td>4-1</td>
</tr>
<tr>
<td>Thruss</td>
<td>3-1</td>
</tr>
<tr>
<td>Seafalculis</td>
<td>5-6</td>
</tr>
<tr>
<td>Micro Sigma</td>
<td>4-6</td>
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</table>

#### AEGINEMOSIS

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Bivitamis</td>
<td>12-5 pair</td>
</tr>
<tr>
<td>Veatikiller</td>
<td>3-2</td>
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<tr>
<td>Filamentotomis</td>
<td>17-6</td>
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<tr>
<td>Calabaris</td>
<td>14-6</td>
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</table>

#### RASBORAS

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Harlequinis</td>
<td>2-6 each</td>
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<tr>
<td>Floresi Rasboras</td>
<td>4-6</td>
</tr>
<tr>
<td>Scisor Tails</td>
<td>2-9</td>
</tr>
<tr>
<td>Rasbora Kukhrome</td>
<td>7-6</td>
</tr>
<tr>
<td>Rasbora Domncoisosha</td>
<td>2-6</td>
</tr>
<tr>
<td>Piscornora</td>
<td>4-6</td>
</tr>
<tr>
<td>Rubasciac</td>
<td>2-6</td>
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#### BARBS

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tiger</td>
<td>2-6</td>
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#### DWARF CICHLIDS

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Kribena</td>
<td>10-14 each</td>
</tr>
<tr>
<td>Egyptian Mouthbreeder (adult)</td>
<td>4-6</td>
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</table>

#### CATFISH & LOACHES

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Corydoras</td>
<td>4-6</td>
</tr>
<tr>
<td>Hassleus (Dwarf)</td>
<td>4-6</td>
</tr>
<tr>
<td>Heteropterus</td>
<td>10-5</td>
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<tr>
<td>Auratus</td>
<td>8-6</td>
</tr>
<tr>
<td>Asilas</td>
<td>3-4</td>
</tr>
<tr>
<td>Asiles</td>
<td>4-6</td>
</tr>
<tr>
<td>Asiles (large)</td>
<td>8-6</td>
</tr>
<tr>
<td>Ancistrus</td>
<td>10-8</td>
</tr>
<tr>
<td>Aonias</td>
<td>4-8</td>
</tr>
<tr>
<td>Glass Khulli</td>
<td>3-5</td>
</tr>
<tr>
<td>Talking Cato</td>
<td>3-5</td>
</tr>
<tr>
<td>Uphose Down Cato</td>
<td>10-5</td>
</tr>
<tr>
<td>Glass Cato</td>
<td>5-4</td>
</tr>
<tr>
<td>Jeannine Weather Fish</td>
<td>3-5</td>
</tr>
<tr>
<td>Khulli Loach</td>
<td>2-6</td>
</tr>
<tr>
<td>Tying Loach</td>
<td>2-6</td>
</tr>
<tr>
<td>Ayoninen</td>
<td>5-6</td>
</tr>
<tr>
<td>Osmumelis Affinis</td>
<td>9-4</td>
</tr>
<tr>
<td>Meums (large)</td>
<td>18-6</td>
</tr>
<tr>
<td>Nonnemolchic</td>
<td>3-6</td>
</tr>
<tr>
<td>Stiped Loach</td>
<td>3-1</td>
</tr>
<tr>
<td>Corydoras JULI</td>
<td>3-1</td>
</tr>
<tr>
<td>Beafors Loach</td>
<td>8-8</td>
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#### SHARKS

<table>
<thead>
<tr>
<th>Species</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Black</td>
<td>6-1</td>
</tr>
<tr>
<td>Diamond</td>
<td>1-1</td>
</tr>
<tr>
<td>Red Fin</td>
<td>5-6</td>
</tr>
<tr>
<td>Red Tail (x small)</td>
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<tr>
<td>Red Tail (2 in.)</td>
<td>10-6</td>
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#### MARINE FISH

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Corysia</td>
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<tr>
<td>Blue Denmark</td>
<td>4-5</td>
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#### VARIOUS OTHERS

<table>
<thead>
<tr>
<th>Species</th>
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<tr>
<td>Target Fish</td>
<td>8-6</td>
</tr>
<tr>
<td>Malayan Angels</td>
<td>10-5</td>
</tr>
<tr>
<td>Bumble Bills</td>
<td>3-5</td>
</tr>
<tr>
<td>Silver Fox</td>
<td>3-5</td>
</tr>
<tr>
<td>Leaf Fish</td>
<td>4-7</td>
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<tr>
<td>Nethorbranchis</td>
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</tr>
<tr>
<td>Achna</td>
<td>35-5 pair</td>
</tr>
<tr>
<td>Nethorbranchis</td>
<td>19-6 pair</td>
</tr>
<tr>
<td>Heraphis</td>
<td>19-6</td>
</tr>
<tr>
<td>Madagras Rainbows</td>
<td>3-6</td>
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<tr>
<td>Austraian Rainbows</td>
<td>3-6</td>
</tr>
<tr>
<td>Glass Fish</td>
<td>3-5</td>
</tr>
<tr>
<td>White Cloud Mountains</td>
<td>3-5</td>
</tr>
<tr>
<td>Metamis</td>
<td>3-5</td>
</tr>
<tr>
<td>Schwamich</td>
<td>12-5</td>
</tr>
<tr>
<td>Blue Rainbow</td>
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<tr>
<td>Puntiartus</td>
<td>12-5</td>
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<tr>
<td>Headstander</td>
<td>19-6</td>
</tr>
<tr>
<td>African Gobies</td>
<td>9-6</td>
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<tr>
<td>Red Bellied Fuffers</td>
<td>10-6</td>
</tr>
<tr>
<td>Silver Headstanders</td>
<td>25-5</td>
</tr>
<tr>
<td>Bornea Sucker</td>
<td>12-6</td>
</tr>
</tbody>
</table>

All fish guaranteed live delivery and in good disease free condition. 7/6 rail and packing charge to be included with every order. See separate list for Plants, etc. All consignments of fish to be collected from nearest railway station.

**KEITH BARRACLOUGH**  
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Top Condition...Maximum Growth BIOL

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Standard size, 2/6d. for 7 grams.
Breeders' Pack, 5/3d. for 28 grams.

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* Contains minute food particles and particles to produce infusoria
  in the minimum possible time.

**A FEW DROPS A DAY IS THE LIQUIFRY WAY!**

Liquifry No. 1
(Red tube) for egglayer fry.

Liquifry No. 2
(Green tube) for baby livebearers, contains in
addition green vegetable matter.

Price 2/6d. per tube

Start your Baby Fish on Liquifry and watch them grow!

For Fungus and Finrot...LIQUITOX THE PROVEN SPECIFIC

* Colourless—Effective—Does not harm the plants.
* Definite dosage given by ingenious chart.

Price 1s. 9d. per carton of 2 capsules. Breeders pack 6s. 9d. per 12 capsules.
Each capsule will treat 4 gallons of aquarium water.

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**Tetra Min Fish Foods**

Because they see positive results in their fishes.
Because of its many and varied ingredients (over 30).
Because the tender flakes (6 different varieties in Tetra Min STAPLE FOOD) contain microscopic particles of high value protein and fat, assuring full and easy digestion and good nourishment.
Because Tetra Min never clouds water.
There are many more reasons for feeding your fish on Tetra Min Foods.
Tell us, why don't you use Tetra Min?

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SPECIAL PLANT OFFERS

OFFER No. 1
2 Wateria ....... 5/-
1 Aponogetum ....... 4/-
1 Nymphaea Striata stand 10/0 complete
6 Sagittaria Nanus ....... 4/6
1 Cryptocoryne Haematoxylon ....... 3/-
3 Micro Sagittaria ....... 1/-
Years for 10/- 23/-

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50 Assorted Tropical Plants including:
Dwarf Lily, Aponogetum Cryptocoryne, Wateria.
Years for 20/-

OFFER No. 3
30 Assorted Tropical Plants ....... 10/-

OFFER No. 4
30 Assorted Coldwater Plants ....... 10/-

EXTRA SPECIAL
Water Lettuce, very beautiful plants ....... 2/6

SPECIAL SERVICE
Live Daphnia by post ....... 2/- including postage

BOW-FRONTED AQUARIUM
Min. x 11in. x 11in. bow-fronted aquarium with wrought iron stand each 11/0 complete.
Min. x 12in. x 12in. = 29 gals.
Available in penny brown, black & gold, and porcelain

WITH PLAIN STAND
Inches 4 x 10 x 15 ....... 4/10
5 x 12 x 15 ....... 6/10
24 x 12 x 15 ....... 21/10
Completed with Stand and Hood (11in to centre of bowl)

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Aquatonic ....... 3/6
Bromide White Spot Cure ....... 2/6
Cure for Fish Sickness ....... 2/-
Vino Salts ....... 2/-
Sea Salt ....... 1/6
TetraKleen all 4/6 each

STANDS
All Standard Sizes of Aquariums in Stock. Any shape or size made to

Aquarists Specification. Installations a Specialty.

STANDS
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24 x 12 x 36 ....... 47/-
30 x 12 x 36 ....... 53/-
36 x 12 x 36 ....... 67/-

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Memory each.
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Thermometer each.
Ground thermometer each.
Glass tube thermometer each.

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Windmill Filter each
Windmill Filter 1/2, 1/3.
Dwarf Filter each
Corner Filter each.
Air Lines each
Slim Jim Outside Filter each.
Filter King Outside Filter each.
Return Filter each
Ornamental Rock each.

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Montrose ....... 21/-
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Dunlop ....... 17/-
Dainty ....... 13/-
Hydromine ....... 18/-
Hydromine ....... 20/-

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“QUEENSBOROUGH” Glass, 25w, 40w, 60w, 80w, 100w, 150w, 200w...
“Queensborough” Heaters, 100w and 150w.
Preheat each.
Inter-Per Thermometer Standard Heater 12v and 220v.

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Refrigerator Hand each.
Filter each.
Siphon Tubing 700, 710.
Hand Type Plastic each.
Swirl Away ....... 4/6

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Kallina aquatica ....... 9/-
Elodia densa ....... 9/-
Hygrophila ....... 9/-
Rhaboidea ....... 9/-
Sagittaria marina ....... 9/-
Echinodora micro ....... 9/-
Fibrous Juncus ....... 9/-
Fibrous Juncus ....... 9/-

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Queensborough Tropical Fish Food 1/4 lb and 1/2 lb.
Exotic Flakes ....... 1/6
Hydro Flakes ....... 1/6
Bromide ....... 1/6
Bromide Flakes ....... 1/6
Bromide Flakes 1 1/2 lb.
Liquids No. 1 and 2 ....... 1/6
Infusoria ....... 1/6
Fusilier ....... 9/-
Dried Daphnia ....... 2/6
Fish Food ....... 7/-

Ants Eggs ....... 1/6
Warden’s Tread Pec. 5 lbs of food ....... 1/6
Grey Toby ....... 1/6
Brown Toby ....... 1/6
G. Bartram’s ....... 1/6
Infusoria 1/6
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THE AQUARIST
The Choice of Fishes and Plants

When the new aquarist has set up his aquarium he is inclined to rush into a dealer’s shop and buy any plants or fishes which take his fancy. It is at this point that the beginner is most likely to waste money. Some advice can be given to prevent the purchase of fish and plants which may be unsuitable for his particular set-up. Possibly the local dealer is the best person from whom advice may be obtained, as although it is, naturally enough, the dealer’s aim to sell his stock, he will not sell anything that could jeopardise future sales.

Considering plants first of all, it is well known to the experienced aquarist that it is almost impossible to predict which plants will thrive in any given aquarium. Two seemingly identical tanks in the same room will seldom support the same plant life, and one tank will even show different plants flourishing at different seasons. There are so many variable factors in such a small environment that it is often difficult to have control of all of them.

Lighting and Plants

Light conditions, for example, vary with seasonal change, except in the tank which is kept in total darkness and has its supply of electric light exactly controlled. Different types of light bulbs and tubes may provide light whose wavelength is biased towards one or the other end of the spectrum, thus influencing plant growth. Another governing factor for plant growth is the quantity of dissolved gases and mineral salts in the water. As water evaporates from the tank, the concentration of dissolved mineral salts rises. Topping up with distilled water can deal with this problem, but it means purchasing quantities of distilled water, which can be bothersome. As an alternative, quantities of water can be siphoned from the tank and replaced with fresh tap water which has been allowed to stand for a while in an open container. It should be heated to the temperature of the aquarium water before being added. By boiling tap water its temporary hardness can be removed—the salts removed being deposited as scales inside the kettle used. The value of using the above measures to keep down the salt concentration is doubtful, as it might improve one tank’s conditions, but could do the opposite in another, depending upon whether the fish and plants kept appreciate low or high concentrations of salts in their water.

Decomposing food and organic matter add to the mineral salt concentration. One of the available water testing
kites can give valuable information about reaction (pH) of the water.

Faced with such a prodigious list of variables, the beginner could not be blamed for wondering which plants his tank could support. It is here that money could be wasted on buying quantities of specific plants which might not flourish in the particular aquarium. Useful advice would be to purchase one of the bargain bundles of aquatic plants listed in *The Aquarist*'s pages. These contain a number of varieties of plants at a reduced price, and after such a collection has been growing in the tank for some time, the aquarist can see which plants are suited, and purchase more of these specific sorts.

**Which Fishes?**

When choosing fishes the beginner usually does not realise what the small fishes on display will have grown into in a year or so, on a good diet. Two fishes which attract the beginner are the angel fish and the three-spot gourami. Neither of these fish I consider suitable for the small tropical aquarium for the reason that they will soon grow too big, given suitable food. These fishes are usually purchased in pairs, and I have found that if one of the pair should die, the other one can, when it grows large, turn into a rogue fish which can terrorise a community tank of smaller tropicals. On a number of occasions I have found an adult angel or gourami to be the cause of smaller fishes losing their greens through fin nipping. If no alternative accommodation is available for the large fish, this usually means that they have to be destroyed or given to someone, and no fish lover wants to destroy a large healthy fish.

With his dealer's advice, and after some time, the beginner will see which of his choice of fish and plants suits his own particular aquarium. He can make any modifications which he then considers necessary. The result should be a balanced aquarium which should need a minimum of attention, and which should give a maximum of pleasure at a moderate price.

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**Fishes of the Genus *Mimagoniates***

by Dr R. O. B. LIST

**Breeding** in fishes of the genus *Mimagoniates* is by far the easiest and most convenient of all egg-laying tropicals. The male uses his anal fin to deposit a minute sperm package on to the region of the ovary in the female. The second package permits the male seed to wriggle completely into the female vent on its own accord. The male shows no pronounced special adaptation of the anal fin, but it has a series of small hooks, visible only under a microscope. The hooks hold the male anal fin on to the female for the time required for the male to deposit the sperm package. This means of fertilisation has two distinct advantages: (1) one such fertilisation allows the female to lay completely fertile eggs for several months after, and often for the whole of the life span of the female; (2) by such a process no inerfertile eggs can ever be laid.

*Mimagoniates* species are suitable for community aquaria but they are not very hardy and extremely sensitive to changes in water temperature. The outside temperature limits are 72° to 77°F (22°-26°C).

They will take not only live food but also dry food, but with the latter will only feed when near the top surface or in mid-water. The mouth prevents the fish picking up food from the bottom.

Sexing is relatively simple. In the male the dorsal fin is pointed, and rounded in the female.

They prefer a large well stocked aquarium but the water should be somewhat shallow. It will therefore be necessary to use bog as well as true aquatic plants.

*Mimagoniates barbati*

Habitat: Argentina, South Brazil and Paraguay.

Family: Characins.

Size: 1½-2 in. (4-5 cm).

Temperature: 72-77°F (22-26°C).

General colouring of this species is light brown with an overall green sheen. The sides have a dark blue horizontal band, running from the eye to the caudal, broadening towards the rear with a metallic green line. The dorsal fin is yellow to orange and the caudal, anal and pelvic are of reddish hue. Egg-laying takes place in 2 to 3 days after spawning and very fine Infusoria must be the first food. The usual spawning is about 70 eggs.

*Mimagoniates microlepis*

Habitat: South Brazil.

Family: Characins.

Size: 2½-3 in. (6-8 cm).

Temperature: 72-77°F (22-26°C).

The word 'microlepis' indicates 'small scales', and this species is sometimes known as the blue tetra. The general colour is a bluish silver. The back is brown and the belly white to light yellow. The sides have a broad bluish lateral band, extending from the head to the caudal, accompanied by a yellow line. The fins are of a yellow-greenish hue. The anal as well as the dorsal fin has a light blue outer margin and the dorsal also has a brown to orange line parallel to the outer margin. The lateral band is sometimes edged with a coppery red iridescent stripe.

A peculiarity of *M. microlepis* is the fullness of the upper edge of the lower half of the caudal fin of the male. There is no edging on the anal fin of the female.

Both species are sensitive to sudden changes in water temperature. They are quite lively in behaviour but *M. barbati* tend to hide very quickly when alarmed. Both species appear to be happier when kept in small schools.

It has been considered that the young fry of *Mimagoniates* are difficult to rear after hatching, but one should not forget the small formation of their mouth. First foods, therefore, need to be tiny.
A Mild-mannered Large Gourami

Snakeskin gourami (Trichogaster pectoralis)

by JACK HEMS

Judged simply as a community fish, the air-breathing snakeskin gourami, as Trichogaster pectoralis is commonly called, has all the qualities looked for in a tropical except one: its inordinate size. A full grown specimen may reach about 9 inches in length, but to offset this undoubted failing it has neither a quarrelsome nature nor boisterous habits. Even when mating time comes round its manners remain peaceful and dignified. How different from the three-spot gourami, the blue gourami and the opaline gourami, the males of which often become most wildly dashing and savage-natured towards their own mates as they mature.

In coloration T. pectoralis shades from dull olive green on the back through golden yellow on the flanks to silvery underparts. The sides are adorned with a brownish to blackish stripe that zig-zags its way from the pointed snout through the large black eye to the root of the tail, and which in turn is crossed by numerous backward slanting shadowy to blackish brown bars. The pectoral fins are drawn out into long, hair-like antennae. The anal fin, spinous anteriorly, is long-based and marked yellow. The short-based dorsal fin is longer and more pointed in the male than in the female.

In the wild T. pectoralis is found in South Vietnam, Thailand and the Malay Peninsula and, of course, it is necessary to maintain its tank at a temperature in the neighbourhood of 70°F (21°C) to 75°F (24°C), with a rise to 80°F (27°C) or thereabouts for breeding. But besides this basic requirement, it is liveliest and shows its colours best in sediment-free, slightly acid water well furnished with plants growing luxuriously under a bright top light.

It doesn't eat the plants, but it will spend a lot of time picking at the leaves to rid them of algae, which it likes and should have in its diet. For the rest, it should be given the regular dried foods and small living foods such as Daphnia, midge larvae and white worms. Scraped lean meat, cooked or uncooked, makes a good substitute for live food. As an alternative to algae, Betmax, duckweed and shredded lettuce or minute portions of cooked green vegetable (spinach preferably) may be offered.

T. pectoralis breeds like the other gouramis mentioned above. The male assumes richer colours and blows a bubble nest at the surface of the water. If the female is ripe for spawning, a condition made easily apparent by her fuller sides, darker appearance and coquettish ways, she falls in with the male's inclinations and allows herself to be coaxed beneath the nest. There they embrace time and time again, during which hundreds of buoyant eggs are laid. If the eggs do not rise immediately in the water both sexes gather the slow-starters into their mouths and spit them out again into the nest. After spawning is over, more bubbles are tossed up to the nest to help sandwich the less secure eggs into position. In about 2 days the eggs hatch out and the fry can be seen quite clearly if you look up through the mass of froth towards a bright light. Both sexes also share in the task of caring for the young in the larval stage. If some of the rapid developers leave the nest before they are strong enough to swim properly, the male or the female will see to it that they are returned to the nursery with the least possible delay.

In breeding the snakeskin gourami the following points must be observed. Firstly, the spawning tank should be on the large size, say, about 3 feet long. Depth of water is not all that important, but larger broods of quick growing fry usually result from hatching the eggs in water only about 8 inches deep. Jars of Infusoria should be got ready when spawning seems imminent because the fry will die like flies in the winter time if miniscule food is not available from the start of their lives. Infusoria or a manufactured fry food or, as a last resource, flour-fine

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dried food, should be fed to the fry for about 2 or 3 weeks, after which most of them should be large enough to take tiny live food such as microworms, Grindal worms and so forth. A bottom-haunting peaceful carfish like Corydoras aeneus can be introduced into the tank after the fry become free-swimming to keep the floor clear of uneaten dried food. Do not make the mistake of introducing any smalls into the tank to act as scavengers because they, or their descendants, will only eat the eggs of subsequent spawnings.

Another thing to remember is to keep the surface free of dust and other scum by drawing sheets of newspaper over it every other day; for a film of any sort on the water prevents the fry from taking their gulps of air. Of equal importance is a well-fitting cover to keep the warm, moist air in, and an even temperature of the water; for the fry are easily killed off by a rapid fluctuation of upper-level temperature, or definite chilling of the water.

The snakekin gourami is as prolific as the three-spot and blue gouramis, and will spawn several times every year, usually from late spring to early autumn, if conditions are right.

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Java Moss

by LEBISTES

A TRUE aquatic moss which is decorative in appearance and ideally suited to the breeding tank for its eggs- or fry-saving qualities ought surely, to be welcome in any comfortable room temperature or tropical tank.

Such a moss is Vesicularia dubya, which was first singled out for special study from a collection of plants sent from the Botanical Gardens in Bogor, Java, to the University of Vienna in the early 1930s. Seemingly the moss is not confined only to Java, but is found over quite a wide area of the East Indies.

To look at, Java moss bears a marked resemblance to our native willow moss (Fontinalis antipyretica), but is smaller leaved, brighter green, and much easier to establish in the aquarium. Like willow moss, it will, when grown, send out pieces on the water surface, or water-logged piece of wood and grow slowly, ever so slowly, upward in spreading masses towards the surface. Alternatively, pieces can be pushed into the compost where, in the course of time, they will form similar ascending growths.

Especially, V. dubya is a plant for still, clean water and a moderate light. In short, the tank to suit it must be free from swirling sediment, fierce aeration, glaring illumination, which would encourage smothering algae, and large, perpetually dashing fishes.

It is doing well in my own community tank stocked with small shoals of brightly coloured tetras, guppies and platys. The fine grit bottom is spread over a thin layer of previously well-soaked peat, and the water is as spotless-looking (without filtration) as one sometimes finds around the margins of a sedgy, undisturbed woodland pond or lake. The only other plants in the tank are a variety of Cryptocoryne and some water wisteria. These have been planted in sunken pots of pure yellow clay. The Java moss has already hidden the rims of the pots, and has created a most pleasing effect.

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Begonia Rex

by LEBISTES

A FEW plants can equal Begonia rex for adding a splash of colour to the fish house. These plants come in a variety of leaf colours, varying from reds and purples, through black, to pale yellowish greens and silvers.

Begonia rex is a plant which can tolerate low light conditions and this makes it an ideal subject for placing below the stands supporting rows of tanks in the fish house. When placed in these shady positions the plant grows towards the main source of illumination, and as the leaves reach maturity they get very large and the colours assume a glazed sheen. The fact that the leaves are positively phototropic—that is, they grow towards the light—means that the plant assumes a sort of loop-sided effect, with the advantage that it faces the light and thus full advantage of its coloured leaves can be taken. Another point is that the plant does not need to be turned towards the light weekly.

A minimum temperature of 55°F (12°C) in winter is necessary to keep the plant healthy, and the fish house should prove a suitable home. There are two main ways in which the plant may be propagated. The first is from seed, which usually costs about 2s. 6d. for a packet, which should produce a variety of leaf colours. Seed could be germinated on top of a tropical aquarium. The plant's flowers are rather insignificant and should be removed to prevent the plant from wasting its energies on seed and flower production. Secondly, plants growing in pots can be purchased and are increased from leaf cuttings. This is done by taking a large mature leaf, cutting off about four-fifths of the stem, making small cuts through the main leaf veins on the back with a razor blade, and laying the leaf flat on the surface of a seed pan containing a mixture of peat and sand. The leaf should be peggged down with pieces of bent wire, or with hair pins bent into a right-angled triangular shape. A small stone placed

Continued on opposite page
Purple-headed, Black Ruby or Nigger Barb

by B. FRY

ONE of the handsomest, hardiest and best-behaved occupants for a community tank is Barbus nigrofuscatus, which is native to the shallow, weedy and overhung fresh waters of Ceylon. Although it is most often popularly referred to as the nigger barb, it is sometimes called, in this country and less often in America, the diamond barb, the black ruby and the purple-headed barb, the last being a literal translation of the appellation by which it is commonly called in Germany, namely the Purpurkopfbarbe.

The general colour of the male is greenish olive on the back, yellowish grey on the flanks, and silvery on the belly. Three broad black vertical bars on the flanks are the flashing-sided sides. A fourth bar extends across the head and through the gold-tinted eyes to fade away on the throat. There is a flush of scarlet across the head, growing in intensity towards the snout. The dorsal, anal and ventral fins are black, and the caudal and pectoral fins are silvery clear. Normally, and age for age, the female is fuller-bodied than the male and her colours are considerably more subdued. Both sexes average about 2 in. in length.

When the male displays before the female, which he often does if the water is really clear, the aquarium is backed by dense thickets of plants, is brightly lighted by sun or artificial means and has a temperature in the neighbourhood of 77°F (25°C), the anterior part of his body glows like a hot, draught-whipped coal, and his black markings become even more pronounced and, on the upper sides and back, show flecks of green and gold.

Feeding the nigger barb presents no difficulties, for it is omnivorous by nature, but requires a proportion of live and fresh food and algae (or a suitable substitute such as cooked spinach) in its diet if it is to be kept in robust health.

The nigger barb will not pick on the other fishes in a community aquarium unless they are small enough to be mistaken for something extra special in the way of live food, will not uproot or denude the higher plants of their foliage, or hide itself away for what may seem like hours on end, but it will wage war to the death on snails, especially those with hard shells such as Bulinus and Planorbis.

Breeding procedure follows the typical Barb species pattern, the male intensifying his colours and chasing the egg-swollen female in and out of his territory. Every now and again there are momentary pauses during which the couple engage in what looks like the opening movements of a wrestling match. Sometimes eggs are released while the circling movements are going on, sometimes the chase just continues without any eggs being laid until such times as the female is driven at or into the plants. The eggs are adhesive, and to trap them plants with fuzzy or mossy foliage are recommended. The tank for spawning should not measure less than 2 ft. in length. The temperature should be maintained at about 80°F (27°C).

Directly spawning is over the parent fish should be removed to another tank. The fry emerge from the eggs in about 3 days, but do not begin to swim about freely until another 48 hours have passed. This quiescent period is taken up with absorbing the yolk sac. When they have done this, and are seen to be moving jerkily across the floor of their aquarium as if searching for something (something to eat, of course), then it is time to introduce food.

Infusoria is their best baby diet, and enough of these microscopic forms of life should be fed to them every day to keep their silvery bellies round and shining. As they become big enough to take other food, provide tiny water fleas, brine shrimps, Grindal worms or mashed white worms or newly hatched midge larvae. Powdered dried food may be given them as a substitute for live food, but, naturally, the best results are obtainable only with the former. Generally speaking, the youngsters reach full size in 9 months to a year.

The species has a life span of between 3 and 4 years and can stand a slow drop in the temperature to 65°F (18°C) with no ill-effects. This is not all. It is a very prolific fish and will breed several times every year.

Begonia Rex

(continued from page 172)

on top of each cut will serve the same purpose, by keeping the cuts in contact with the compost. The pan is kept fairly moist, without being wet enough to cause the leaf to rot before rooting. Cover the pan with a sheet of glass and turn this daily to prevent drops of moisture from falling on the leaf. A warm, light spot will hasten rooting.

In a few weeks roots will have formed at the cuts, and these will soon be followed by small plantlets which can be removed and potted into John Innes potting compost no. 1, when large enough.

One particular variety of Begonia rex, Iron Cross, has very attractive dark cross-like markings on its hairy pale green leaves, and these contrast well with the red and silvers of other varieties. All kinds need a fair amount of water in summer, but should be kept nearly dry in winter. Excess of water will cause the plant to rot at its base, and drops falling on the leaves can cause spots to decay. An occasional feed of a balanced liquid fertiliser in summer will help to bring out the full colour of the plant's leaves.

Perhaps the colour is the only plant which can approach the rex begonia for leaf colour. If you want to add an extra splash of colour to your fish house, at floor level, several of these plants will be a worthwhile investment, and more plants can easily be propagated from leaf cuttings by the method explained above.

B. Whiteside

January, 1965

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Much has been said and written about this little jewel among our tropical aquarium fishes throughout the years. *Betta splendens* is frequently being spawned and raised under a great many different conditions and, of course, every aquarist who was ever successful in raising this fish considers his method the best. The following is a brief attempt to bring together past experiences with *Betta* obtained by myself as well as by many others, with the intention to furnish some basic guidelines for future breeding attempts by other aquarists.

Breeding behaviour in general resembles that of most of the other anabantids. There are no special requirements as far as the breeding tank is concerned, yet I would certainly not recommend a tank of less than 10 gallons, since this might create a problem of overcrowding once the anticipated young have hatched. One should always bear in mind that one female, depending upon her size and age, can produce between 200 and 700 eggs per spawning, and the average number of fully developed fish in a successful spawning normally ranges from 400 to 500 fish. The bigger the tank the smaller are the problems later on.

If one insists on a nicely decorated tank (I found it very inconvenient to have a breeding tank in the living room!) it should not be cluttered up with unnecessary obstacles such as large rocks etc. Select a medium grain sand for the bottom. Do not use coarse gravel since the baby fish during their early age can easily be trapped in it. As for the plants, anything will suffice as long as you include some floating plants like floating water sprite (*Ceratopteris*), *Salvinia* or even *Azolla* to provide support for the anticipated bubble nest. Specific water conditions for the successful breeding of *Betta splendens* are not of any importance. This fish has been raised in many extremes, thus no particular attention is necessary. Water tempera-
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Above, male fighter below his bubble nest; left, from the top downwards are shown successive views of the spawning embrace of male and female.

THE AQUARIST
Fighting Fish

ERIC FRIESE
by the author

Temperatures should remain constant between 80° and 85°F (26-29°C).

Select a nice, healthy and strong looking pair for breeding. Considerations for certain colour variations are secondary. Normally, the offspring of one pair of Betta shine in all colours of the rainbow, with one colour having a slight predominance and present to some degree in the majority of the young. This dominating colour can be quite different from that of both parent fish.

As soon as your tank is set and ready to go you may introduce the male Betta. The female should be kept separate. Under normal conditions in the next day or so the male should start building his bubble nest. If he fails to do so some encouragement should be given by transferring the female to a small jam jar suspended in the tank where the male is. This little trick has always worked wonders on my reluctant Betta males. As soon as he can see the female he normally does not waste any time and starts building the nest without delay. If for some strange reason this should not work then the female may be introduced to the tank. However, being exposed to the often rather vicious attacks and courting manoeuvres of the male the female is seriously in danger of becoming badly torn up or even killed. If both fish are together the pair should be constantly watched to prevent any fatalities. If all goes well, the nest is built and the female has put on enough roe, the spawning will commence. Graceful embraces occur and the eggs are extruded in small batches by the female and immediately fertilised by the male. This ceremony takes place right underneath the bubble nest, and since the eggs are not buoyant they sink slowly towards the bottom. However, male and female go after these eggs immediately, pick them up in their mouths and spit them into the bubble nest. The eggs are held in the nest partly by capillary attraction and partly by the viscosity of the nest. This egg-carrying ‘service’ is continued until the entire spawning act is completed. Now the role of the female has ended, and to avoid any family arguments she should be removed from the tank. The male resumes all parental responsibilities. The nest is closely guarded and if an occasional egg should drop out of the nest it is returned by the male.

The incubation period is remarkably short, requiring only 30 to 40 hours at the above-mentioned temperature. The newly hatched fish remain in the nest until the yolk sacs are absorbed and the fins have developed. This is normally completed in about 3 days after the hatching. At that time the young Betta start swimming out of the nest. To prevent any possibilities of cannibalism on the part of the male, he should be removed from the tank at this time. About 72 hours after hatching minute food in the form of Infusoria should be offered. After about a

Continued at foot of next page

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The Pearl Danio (Brachydanio albolineatus)  
by JACK HEMS

Admired alike for its delicate beauty, peaceful habits, ceaseless activity and hardiness, the pearl danio or opalescent fish, technically known as *Brachydanio albolineatus*, has remained a firm favourite ever since it was first introduced to tropical aquarium keepers about 50 years ago. It is found in the wild in standing and fast-moving fresh waters in Further India, Burma and Sumatra and attains about 2½ in. in length.

The general colour is shiny, gun-metal blue to violet overlaid with a shell-pink to greenish iridescence which melts imperceptibly into pearly white flushed with pink on the underparts. A magenta red stripe, coloured green to gold along its edges, extends from roughly the middle of the body to the bifurcation of the caudal fin. This is yellowish green, as are the other fins, though a faint to pronounced reddish tinge is present in their bases. Small, hair-fine barbels are present on the mouth. Sexing mature fish is easy because the female is fuller-bodied and deeper-bellied than the male, and her colours are never quite as bright.

*B. albolineatus* thrives best in a well-lighted aquarium maintained at a temperature range of 72°F (22°C) to 75°F (24°C), but a gradual drop to the middle sixties (°F), or a slow rise to the eighties (°F) will be attended with no ill-effects. Nevertheless, it is asking for trouble to subject this fish to extremes of temperature for any length of time.

Like most lively fishes, *B. albolineatus* is always ready for food, and in this it is easy to please; for anything alive or dried will be accepted with relish. It should be stressed, however, that live food such as *Daphnia* or midge larvae, combined with separation of the sexes over a period of a week or so, cannot be bettered for bringing a pair into breeding condition. This condition, it seems necessary to say, is clearly recognizable by the male’s enhanced colours and extra liveliness, and the female’s distended abdomen and sides.

As a sexually excited male is a most enthusiastic driver, the tank destined for spawning a pair should measure at least 18½ in. long. Obviously, unless it is the intention of the breeder to transfer some of the post-larval fry to another tank for growing on, then moving the spawning tank is the better. For with plenty of swimming space and the right sort of food in clean, well-oxygenated water, it is possible to coax the younglings along to a saleable size in the proverbial no time.

At this point, however, it is necessary to draw attention to the fact that the pearl danio is an avid eater of its own eggs. Therefore it falls to the aquarist to devise some method of protecting them from the parent fish. The most natural method that comes to mind is to carpet the floor of the tank with a tangled mass of weighted-down, fine-foliaged vegetation into which the eggs will fall. But a surer aid to success is a perforated plastic sheet cut to fit inside the aquarium like a false floor, and raised just off the bottom on stones. Shallow water, too, not more than 5 in. deep over the protection given, is essential. For in a greater depth the fish are likely to take quite a heavy toll of the eggs before they fail to safety. It is recommended to introduce the conditioned fish into the prepared tank last thing at night, for then you can be almost certain that they will spawn the following morning or afternoon. Returning to the actual spawning for a moment, many breeders mate two males to a female to ensure a high percentage of fertile eggs.

When spawning is over (a spawned-out female looks thin and tattered in appearance) the parent fish should be removed from the tank. If a perforated screen has been used to save the eggs, this should be lifted out. But plants, or a floor covering of glass marble (which some successful breeders prefer to defeat the spawners’ cannibalistic intentions), can remain where they are.

As a rule, the rather large eggs incubate before 2 days are out, but the fry, which at first adhere to the plants, the glass floor, or the sides of the tank, do not become free-swimming until they have absorbed the nourishment contained in the abdominal yolk sac. This takes about another couple of days, then the fry strike out in all directions in search of microscopically small food.

Without question the least trouble-free and most growth-promoting first food is Infusoria. But if this is not available and flour-dine dried food is used as an alternative, do take care not to introduce too much of it at a time or else pollution, with its attendant dangers, will set in. Should you be away from home most of the day, a siphon-type drip-feeder for Infusoria (or a liquid fry food which can be purchased from your dealer) is quite easy to rig up above the surface of the water. Larger food such as Greenal worms should follow on as a matter of course.

That is, as soon as the fry are large enough to take it. Assuming that all goes well, the fry should measure about 1 in. long within the space of a month, and be ready to breed themselves at the age of 6 months. Like all rapid developers and extremely active livers, the pearl danio is past its prime for breeding at about 18 months. Its life-expectancy is about 2½ years.

Siamese Fighting Fish

(continued from the preceding page)

Week brine shrimp (Artemia salina) nauplii will be taken, and from there on no further difficulties in raising the young Betta should arise.

The labyrinth organ forms in the young Betta about 3 to 4 weeks after they hatch. During this time excessive fluctuation in the water temperature should be avoided, since the young fish are somewhat sensitive to low temperatures. The “fighting spirit” in the young Betta males develops rather early, and individual males should be separated after about 2 months, preferably in small jars standing next to each other, so that the males can grow good finnage by being constantly excited.

*Betta splendens* thrives equally well on dried food as on live food, but frequent live food feedings, especially with mosquito larvae, seem to promote better and more intense colours. This fish is a rather prolific species, and a female can spawn again after about 4 to 5 weeks, and can thus produce 5,000 or more eggs annually.

THE AQUARIST
The Garden Pond in Winter

by A. BOARDER

THERE is very little work to be done to the garden pond
in winter if the annual cleaning out has been carried
out properly, but trouble might come if the pond
freezes over fairly thickly.
Some pondkeepers will tell you that they never break
the ice at all but leave everything to nature. This policy
may be all right but so much depends on the condition
of the water. The type of pond can have an important
bearing on whether to open the ice or not. Any large
pond with a natural or clay bottom will be safer than a
concrete one when severe frost occurs. When water freezes
there is considerable expansion and the forming ice can
cause considerable pressure. If fishes are present they
would become injured or even killed by this pressure.
The concrete pond cannot expand with the ice as would
the surrounds of a natural pond and so it is more important
to open the ice on the concrete pond to relieve the pressure.
However, the opening of part of the ice for this purpose is
not the only reason for this. The most important point to
consider is that the water may have become foul. If a
medium sized concrete pond has not been cleaned out
during the late autumn, then the water may well be very
foul through the decomposition of fallen leaves and decaying
vegetation. This decaying matter produces foul gases and
once the pond freezes over these foul gases cannot escape
from the pond. In addition the fresh oxygen cannot enter
the water and so the fishes are killed, not by the cold, but
by the lack of oxygen.

Another reason for foul water is that too much dried food
has been given late in the season. Much of this food may
remain uneaten and this will soon turn the water very foul.
It is a good plan to refrain from using any dried foods after
the end of October, and if any food is given let it be in the
form of live food, either garden worms, white worms,
Tadpole or Daphnia. It will be found that once the water
cools down in the region of 40°F (5°C), then the fishes will
go off their food and any given will only remain to cause
trouble. Some pondkeepers may not be able to recognise
when the pond water is in an unhealthy state. The experi-
enced aquarist will know very quickly and will know how
to correct this state. The main thing is to empty out as
much as possible of the water and refill with fresh. Then
do nothing afterwards to cause fouling of the water. The
fishes will not need constant feeding. It is surprising
how much food is usually present in the normal pond.
Healthy water should have no objectionable smell and
should be clear in colour. A slight green tint, through
the presence of green algae, will do no harm. Do not allow
the water to remain too thick with this algae late in the year,
as a large quantity of it suddenly dies there can be severe
pollution of the water.

Should the water take on a dirty-blue colour it is probably
very foul and will smell badly. The sides of the pond and
any water plants may become covered with a mauve
coloured slime. In such water, fishes would soon die if
there was a covering of ice on the water. However, whatever
the condition of the water I think that it is a good policy to
open at least one part of the pond every day once ice has
formed. Do not, of course, use a heavy instrument to
break the ice but prick it gently with a pointed instrument
and make a hole with as little striking as possible. A quarter-
inch chisel will make a good tool for this task, or a sharp
pointed garden fork can be used. The idea is to make a
hole of a fair size through which any foul gases can escape
and to enable oxygen to enter the water. A very simple way
is to make a hole in a stand a water can of boiling water on

the ice. A nice round hole will soon be formed with no
danger whatever to the fishes. The can will not fall into
the water if it is left, as the handle and spout will prevent
this from happening.
Small ponds can have some boiling water poured round
the edge of the pond to melt the ice there, so that the top
layer of ice can float freely. This saves the concrete sides
from any cracking. The idea that a pond with sloping
sides will prevent any cracking once ice forms is nonsense.
Once ice forms on concrete nothing except thawing it
may move it a fraction of an inch, and sloping sided ponds
can crack just as easily as perpendicular-sided ones.
During a prolonged freeze up see that part of the ice is
opened every day and give no sort of food whatever. If
snow should fall and lie on the pond make sure that it does
not remain for any longer than can be avoided. A layer of
snow can darken the water and so it will become impure.
Snow can be swept from a small pond and flushed from a
larger one with a hose.

Once a thaw arrives the ice will soon soften. It can then
be carefully pricked into small pieces and removed from the
pond altogether. The ice will do no good if left in the
water. Once it is removed some fresh water should be run
into the pond to make up the loss and also to give the
fishes some fresh well oxygenated water. If the pond has
cracked through very severe pressure of ice, it may be
necessary to make some repairs as soon as possible. If
any of the cracks are near the top of the pond, it is possible
to leave well alone until the weather improves. If the
cracks appear to be rather deep in the pond a temporary
repair job must be done. Should the cracks reach the bottom
of the water will all escape and the fishes will die in that
water and be found dry. If found before they dry out it is possible to save
them by putting them into containers.

Should the cracks be only near the top and only a
little water is lost a repair can be done fairly simply. Lower
the water slightly to give you working space and get some
Prompt cement from a builders’ supplier. Scrape out the
cracks (they show up as the concrete dries), and make a
stiff mix of the cement with one part of sand. I like to
seive the sand so that only the very fine, sharp type is used.
When ready to use it, wet a little at a time and force it
into the cracks. Do not let it spread over the edges but
see that it is forced well down into every crack. This
cement sets rock hard in about half an hour, and so if the
water has been well lowered for the repair, some fresh
water can soon be run in and no harm will be done.

If only a small quantity of the cement has been used it is
quite probable that the amount of free lime will do no
harm. It depends on the size of the pond in relation to the
amount of water in it and also on the extent of the cracks
mended. In any case after an hour the mended portion
should be carefully washed to remove any free lime. A
quantity of lime in the water could be fatal to fishes and
it is said that less than 1 per cent of lime is sufficient to
kill goldfish. This point may well be thought about by
any pondkeeper who is tempted to put lime into the water
to try to kill algae; like the advice given by Punch to those
about to get married: "Don’t!”
New Methods of Fishkeeping

HERR DIETER VOGT described aquarium techniques currently in use in Germany in his talk at Hendon’s Annual Convention in London, which is reported here by A. E. STEVENS

OVER 350 aquarists with their friends and families attended the Annual Convention of Aquarists organised by Hendon Aquatic Society in November last. Amongst the audience were club members from the Greater London area and the Home Counties; there were also parties of aquarists from the Isle of Wight, Stone and North Staffs., Sheffield, Leamington and several other clubs from the South Coast. One visitor to the Convention had travelled down from Inverurie, Aberdeenshire.

The guest speaker was Herr Dieter Vogt, editor of the German aquarium magazine Die Aquarist and Terrarium Zeitschrift (DATZ), who had travelled from Schorndorf, near Stuttgart, to give his first lecture in this country.

In the first part of his lecture, Herr Vogt spoke on “New Methods of Fish-keeping” and by means of diagrams he described his way of fish-keeping, which, he assured the audience, was very successful and his methods had been confirmed by other aquarists on the Continent.

In Germany, special water pumps for aquarium use were available and these pumps had a capacity of 4 litres per minute (almost 1 gallon per minute). The pump, which was suitable for large tanks, could be used with a conventional filter but better results were obtained if the water to be circulated was taken from a pipe set in a back corner of the base glass (with suitable precautions taken to prevent small pieces of gravel from being sucked into the pump). With this method the gravel was used as a biological filter and the anaerobic bacteria present in the gravel did the work of breaking down the mullm. The filtered water was returned to the aquarium by means of a pipe closed at its far end and having small holes at intervals along its length. For the labyrinth fishes this return pipe was set beneath the water surface but with fishes that took the oxygen from the water, the pipe was suspended above the surface and along the length of the back glass of the tank.

With such a volume of water being passed through the pump, quite a strong current was caused and the plants showed its direction. The fishes had to swim against it and consequently had more vigour than aquarium fishes in still water; because they had to work to maintain their position they needed to be fed more—little and often was a good rule.

For smaller aquaria or where a smaller circulation current was required, a much smaller pump was available and was of such a size that it could easily be carried in a pocket, and to demonstrate this Herr Vogt caused much amusement by turning out his pockets in pretending to mislay it. The pump, developed as a result of satellite ‘miniaturisation’ techniques, was just over 2 inches long and about 1 inch in diameter. It was completely submersible owing to its plastic coating and was electrically safe, being run from a 16 volt a.c. supply from a small transformer. Its moderate output of 50 litres per hour (about 11 gallons per hour) made it suitable for breeding tanks. This small pump caused a lot of interest amongst the audience who were delighted and amused with its demonstration.

The lecturer then went on to describe a new type of aquarium that had recently been put on the German market. This was the “Bochum-Aquarium”, named after its inventor. It was similar to the conventional aquarium but it had a bottom glass which sloped in two directions and in order to stand up with the sides vertical it needed a special stand. Typical dimensions for a reasonable sized aquarium would be 100 cm. long (40 in.), 60 cm. wide (24 in.) with the heights of the corners being 34, 36, 38 and 40 cm. (133, 144, 154 and 164 in.). In the lowest corner an outlet pipe was set flush with the bottom glass and in the diagonally opposite corner (the shallowest corner) there was the return pipe of sufficient length so that it could stand proud of the gravel. Either of the water pumps mentioned previously could be connected by means of plastic tubing between the outlet and inlet pipes of this new aquarium. The best method to prevent gravel from being sucked into the pump was to place a small sheet of nylon sponge (from plastic) over the flush outlet and weight it down with a few pebbles and then cover with the normal gravel. The water return pipe could be hidden by means of a few small rocks or a piece of bark. Cork bark and dead wood were widely used on the continent as aquarium decorations, and when Herr Vogt stressed that sunken galareons, divers, mermaids, crocodiles etc. were not essential to good fish-keeping there was a roar of approval from the audience, who were in complete agreement with him. Because of the two-way slope this type of aquarium needed very little cleaning; all the mullm was drawn to the lowest corner, where it was sucked into the gravel and worked on by the bacteria.

Herr Vogt was firmly convinced that the plants in an aquarium are of far more importance than the fishes—if the plants were good and healthy then the fishes would also be.

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healthy. Aquaria should be well planted and the fishes should not be overcrowded; for best results a small shoal of one species of fish in a roomy aquarium was ideal. The temperature at which tropical fishes should be kept was also important, and it should not exceed 70° to 75°F (21° to 24° C.). Keeping them at higher temperatures only caused them to live at a faster rate, which would shorten their life. Herr Vogt said he was a great believer in the best fish foods being those caught with a net. The best food for fishes was, without doubt, gnat and mosquito larvae followed by glassworms and bloodworms. He had received some new plants from Thailand, and when these were washed free of mud he netted many small beetles which he fed to his fishes, and he reported that they were taken with great relish by them. Whiteworms and Tubifex were swimming and “clogged” the sex glands. Herr Vogt quoted an old German adage that “a good cockerel is not fat”, and to illustrate this point he drew several parallels with human behaviour, much to the amusement of the audience. The advice to feed up fish before breeding for several weeks was wrong in his experienced opinion.

Many species of fishes thought to be difficult to breed could be induced to spawn by starving them, without sensation, filtration or water circulation for 1, 2, 3 or more weeks. At the end of this resting period the fish will have slimmed and be in better health. Slow water circulation is then brought into action and the fish are fed as much gnat and mosquito larvae as they can eat, and after 2 to 3 days they will spawn. Regular spawnings of spiny eels (Mastacembelus) were obtained by this method. Specimens were 6-8 in. long, and one female with five or six males was used in an aquarium thickly planted with Vallisneria. The males lay alongside the female and completely surround her by laying parallel to her body so that she is in the centre of the bunch. They swim as one (although the female literally has a head start on the males) up into the leaves of the Vallisneria near the surface, where they lay their eggs.

The spawning fish often come out of the water as they swim over the leaves that float on the surface.

During the interval Herr Vogt was besieged by many eager aquarists who were anxious to learn more about the small pump and his breeding induction methods. Herr Vogt was also able to renew his friendship during the evening with Hendon A.S. president, Mr. R. Skipper, who he met several years ago in Leiden, and with Dr. R. O. B. List, with whom he gave a lecture at a Continental Aquarist Association meeting in Monaco.

The second part of the evening’s entertainment was an illustrated lecture on “Fishes”. Many of the colour slides shown were taken by the speaker himself and showed many of the species of fishes kept by him. His commentary gave much information on the behaviour and breeding requirements of the fishes and was highly coloured with many witty observations.

Points for special mention are that all young Barbus species may be sexed when they have a nose to tail length of about 1 cm. (half an inch). Feed the young fish as much finely screened Daphnia and Cyclops as they will gorge and the males will be those with the slim bodies, despite the amount they have eaten, whereas the females will have greatly distended abdomens almost going to a blunt point at the deepest part of the body.

To breed cardinal tetras (Cheirodon axelrodi) soft water with a hardness 0.5DH (10 p.p.m.) or less was needed; water reaction was not very important as long as it was slightly acid (pH 6-7). Water can be softened by passing it through an ion-exchange medium (a type known as Lewatit 64 being ideal).

The pompadour (Symphysodon discus) can, with luck, be spawned in water with a hardness of 10-12DH (200 p.p.m.) but there is a better chance of success if the water had a hardness 1DH (0.05 p.p.m.) or less; the water to be acid (pH 5-6). Spawning media could be granite slabs, carbon-free slate bars or the broad leaves of Echinodorus brevipedicellatus. The parents should be left with their
young for 14-21 days. The longer the better, but if the parents become aggressive because of a new batch of eggs, remove the youngsters into water of the same hardness and temperature.

Almost guaranteed spawnings of harlequins (Rasbora heteromorpha) could be obtained if a shoal of six to ten fish was used. The starvation-gnat and mosquito larvae diet-water circulation technique mentioned previously is used, but on the day before spawning is required a 3 per cent salt solution is prepared and put in an all-glass tank. Have a net large enough to fully fit the all-glass tank and catch the fish to be spawned and transfer them all at the same time (this is important) to the salt solution, which should be the same temperature as that from which the fish came. Keep the fish in the net and keep them under observation all the time until the first fish shows any sign of distress by “rolling” or wavering (this may take 10 seconds, 10 minutes or longer). They must be watched all the time and as soon as this happens remove all the fish immediately (hence the reason for keeping them in the net) and put them in the breeding tank, which should have slight circulation. The fish will spawn early next morning.

The pH and hardness of the water is not important; the fish will spawn in all waters, but the salt bath is important.

As Botia species like to dig in the gravel, rocks should be placed on the bottom glass of their aquarium before the gravel is put in. The Botia undermine rocks put on the gravel and the rocks will slip and can crack the bottom glass with disastrous results.

Pomatoschistus krubensis like privacy whilst spawning, and a favourite method to ensure this is to cut a coconut in half, remove the “flesh” and cut a little more off one half so that the two halves may be joined together with one cut edge overlapping the other and forming a hollow shell. A hole is cut in one end and through this the shell is almost filled with gravel. The gravel-filled shell is then set with the entry hole uppermost in deep gravel in a well-planted aquarium. The fish will scoop out the gravel from the shell according to their requirements.

It has been reported that the female of spawning Corydoras species takes the male’s sperm into her mouth by sucking at his vent during the embrace. By means of a slow-motion cine film taken from an overhead position during a spawning and shown to him by a friend, Herr Vogt was able to report that this is not so. The male puts one of his pectoral fins under and around the female’s mouth and barbels and pressers against her body. She lays one or two eggs into a pocket formed by her clamped ventral fins. The male ejects his sperm into free water and the female swims away from the male when released from the embrace. She swims through sperm-charged water and deposits the fertilised eggs on the plants or glass of the aquarium. After 20 to 30 such embraces, samples of the water in various parts of the aquarium were obtained by means of a pipette. Under the microscope each sample showed active male sperm. Dissection of the mouth of a dead female Corydoras showed that the female had no power to suck.

The Convention had to be called to a close as it had over-run by almost three-quarters of an hour, and there was a tremendous ovation for Herr Vogt which, undoubtedly, he deserved for his most excellent and informative lecture.

On the following day, Hendon A.S. arranged for their guest to visit behind the scenes of the Reptile House and the Aquarium at the Regent’s Park Zoological Gardens. In the Reptile House an interesting hour and a half was spent handling several of the exhibits and exchanging experiences on the behaviour of reptiles and their bites. Herr Vogt has a vast knowledge of snakes, lizards etc. and can speak from personal experience of the many specimens he has in his possession.

In the Aquarium equally interesting time was had when Mr. G. J. Askby, assistant to the curator showed several species of fishes which were not to be seen in zoo aquariums on the continent.

OUR EXPERTS’ ANSWERS TO TROPICAL AQUARIUM QUERIES

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

The aquarium is brightly lighted and is maintained at a temperature of about 75°F (25°C). Vallimina, Hygrophilic and Indian ferns are doing well. Please tell me what is wrong.

Some Cryptocorynes seem to be disturbed, and lose their leaves after transfer from one aquarium to another. But don’t lose heart. So long as you leave what remains of the plants alone it is not unlikely that they will produce fresh growth before many weeks are out. It seems that the other point to observe is that Cryptocorynes do not like a very bright light. This might be the reason why your plants are not flourishing. See that the light-loving subjects such as Vallimina give them slight shade.

A short while ago I added two small angel fish to my community aquarium. One of these angels is slightly larger than the other and is of a very aggressive disposition. In short, it bullies the smaller fish unmercifully. Can you suggest any way to remedy this shortcoming?

Apart from separating the fish before any serious injury is done, the only solution we know of to your problem would be to introduce two more similar-sized angel fish

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into the tank. With other fish of the same species to attract its attention the bully will tend to leave its former target alone.

I have introduced some young Cichlasoma vireolatium into my community tank and they are behaving themselves very well. Yet a friend has told me that this cichlid is one of the most belligerent of tropicals and will kill or maim every similarly-sized or smaller species it comes across. Is this true?

The short answer to this question is yes. The zebra or nigro cichlid matures into a spiteful bully, and is totally unsuited to life in a community tank.

I have just bought a torpedo-shaped, handreared guppy fish which the dealer called Barbus nigrum. As I can find no reference to this fish in my books I should be grateful for any information you can give me concerning it.

Barbus nigrum is a Sin. cyprinid native to the Congo. It thrives best in soft, acid water maintained at a temperature of about 75°F (24°C) and eats any food. It is inoffensive by nature, and up to the present it has not bred in captivity.

Can coarse silver sand as supplied by horticultural sundriesmen be used as a compost in the tropical aquarium?

Really coarse silver sand will prove quite satisfactory as a compost. But be sure that you get pure sand and not a blend of sand, fragments of crushed shell and chemical fertilisers.

The water in my aquarium placed near a window has turned bright green. Is there any way of ridding the water of the free-swimming algae without recourse to chemicals or drastic shading?

Remove the fish and empty about two shillings' worth of fish food into the tank. The water flea will soon eat the unicellular algae and render the water quite clear. Needless to say, the fish will have the time of their lives while they are returned to the aquarium.

Is it true that the White Cloud Mountain minnow can stand a temperature down to 60°F (16°C) without suffering any harm?

Yes, the White Cloud Mountain minnow is a very hardy fish and can live in running and in excellent health at a temperature in the low sixties (°F). In point of fact, tropical conditions do not really suit it at all, and for breeding the species a temperature of about 68°F (20°C) is high enough.

Our water supply comes to us through copper pipes. Will this water kill any fishes introduced into it?

We do not think it will if it is some time since the pipes were installed and you take the precaution of letting the water run for about 2 minutes before using it to fill an aquarium. It is water left to stand in copper pipes for any length of time that is dangerous.

My aquarium is oozing water along the front bottom edge. I have tried stopping the leak by applying a well-known plaster filler, quick-drying enamal paint, and even liquid pitch smeared along the edge with a hot knife, but the leaking still persists. What can I do?

Mark the aquarium frame at the point, or points, where the water is oozing through and, after siphoning the water in the aquarium away, scrape the porous cement out and replace it with fresh, firmly pushed in with a narrow slice of wood. After this has been done, paint all along the cement edge with two coats of aluminium, or some other metallic paint. This should make a lasting repair.

I read in a book that the coloration of fishes is affected by the sort of bottom they swim over. Is this true?

In most cases what you have read is quite true. You see, the colours of fish are due to tiny cells called chromatophores. The pigment granules which make up the chromatophores shift their position, under the influence of direct or reflected light and other stimuli, and so cause fading or enhancement of colour. In short, a dark bottom backed by a vertical wall of green plants is more likely to induce maximum coloration in normally well-coloured fishes than a pale compost in a sparsely planted aquarium.

Will you please give me some information about the disease called constisiasis? Is it easy to recognise in the aquarium?

Constisiasis is caused by microscopic parasites (Gyostia neglecta) lodging in the skin of a fish and causing it, through the irritation set up, to secrete large quantities of slime. Apart from the slimy appearance of the skin—in dark pigment areas the slime usually takes on a cloudy appearance—the most noticeable symptoms of the disease are the attacked fish’s loss of appetite, lack of energy (it usually hugs the bottom or remains fairly quiescent in the plant life), sunken eyes and folded fins. For those fishes which can stand it, immersion, or immersions, in a 2-2½ per cent solution of ordinary cooking salt for about half an hour will sometimes effect a cure.

Please tell me the temperature requirements, food preferred, and maximum size of the upside-down catfish (Splanchnus nigroventris).

S. nigroventris flourishes best at a temperature range of about 72°F (22°C) to 80°F (27°C). It will eat any live or dried food, but should have algae or a substitute for algae included in its diet. It attains about 2½ in. in length.

A beginner in tropical fishkeeping, I glazed a bought aquarium frame with a glazing compound recommended for fixing glass to steel windows by a local builder’s merchant. Although the glazing compound adhered to the glass, it did not stick to the fish. Can something have been done to the fish that I have introduced before the tank was glazed for the course of a few days. Please tell me what has gone wrong.

It is not unlikely that the glazing compound you purchased is not suitable for aquarium use and has had a harmful effect on the fish. We suggest that you empty the water away, wash out and fill the aquarium with fresh water. Now obtain two or three ordinary puppies, or leave the tank unheated and introduce a common stickleback or two. If the fish survive and look in good health after a month or so, you can assume the harmful ingredients in the cement have leached out. But if the fish continue to die regale the tank with a cement specially manufactured for aquarium use. But do bear in mind that the cement is not the only thing which could have caused the fish’s deaths. See that there are no metal objects in contact with the water, and guard against using a compost rich in shell fragments or anything else of a strongly calcareous nature.

I have a tropical aquarium in which are planted Cryptocoryne spp., Nuphar, and Hypericum. These are growing remarkably well. But when we observe Vallisneria americana, we notice that they always turn yellow and rot away in the space of 2 or 3 months. Can you give me any reason for this?

A lot of aquarists experience difficulty in getting twisted Vallisneria to prosper. Perhaps the light in your aquarium is not bright enough for this light-loving plant. Again, it does appear that some plants thrive in an aquarium at the expense of others. Maybe they are greedy for certain nutrients in the water and take them all for themselves. Further, it is not unlikely that some plants produce a chemical change in the water which inhibits the growth of others. Perhaps the wisest thing to do is to grow just those plants that get along well together and ignore the rest.

I should like to know whether or not catfish have eyelids or the means of closing their eyes? The reason for asking this is because my Corydoras falls appears to close its eyes whenever it senses something is wrong and I have been rather puzzled (and worried) by this behaviour.

Certain catfish can roll their eyes, which creates the illusion that they are closing them or winking. This characteristic is nothing to worry about.
COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have been keeping tropicals for some years and now wish to try my hand at exotic coldwater fishes. Can you tell me something about keeping sunfish?

An article on sunfish appeared in the April, 1955, issue of The Aquarist, and you may care to look this up. There are not many species of sunfish usually available in this country. All these fishes are rather similar to our own perch, therefore they prefer live foods at all times. In fact it is rather difficult to get some of them to take any form of dried foods, although some will learn to take dehydrated meat and shrimp.

I have heard salmon called cock and hen. Is this slang used by anglers or do salmon have a form of sexual dimorphism?

Cock and hen is always used when referring to the sexes of salmon and trout. However, most aquarists refer to sexes of other fishes as male and female.

I have a goldfish which has difficulty in swimming properly. It often hangs head down in the water and sometimes almost turns on its back. Otherwise it appears healthy and eats well. What is the trouble with it?

This is a case of swim bladder trouble. This sometimes comes on suddenly with a change of temperature of the water and may clear up when the weather turns warmer. A salt bath will often put a fish right.

An aquarist friend recommended the use of methylene blue against gill flukes and other pests. Is this a good treatment?

Methylene blue is used by some aquarists for curing certain diseases, notably white spot, but it is not a universal cure. A few drops of 5 per cent solution of methylene blue to a gallon of water can be used for disinfecting plants collected from the wild.

I have one small goldfish which has been acting strangely. It makes sudden dashes to the bottom of the tank but otherwise appears healthy. Is it just high spirits?

It may be nothing to worry over; some fish will dash about occasionally and rub themselves against plants etc. On the other hand this action is sometimes a sign that there may be parasites of a kind on the fish. If it continues to do this it can be removed from the tank and examined. If there are any flakes present, the fish will probably show some small blood streaks on the body. Later on it will go off its food and mouth at the surface. At a later stage the body becomes very emaciated and the fish will die. Should these early signs show on the fish then it should have a bath in a solution of Dettol; use a quarter-teaspoon of Dettol to a gallon of water. Only leave the fish in this solution for 15 minutes and less if it turns over. It should then be returned to fresh water, when it will soon recover. If the signs of flakes are not present the fish may be given a salt bath (about a tablespoonful of salt to a gallon of water). Let the fish remain in this for a day now and again.

I have a new unglazed tank frame 36 in. by 15 in. by 12 in. When my new fish should it stand to be of benefit for my goldfish and shubunkins?

Most tanks of this size are glazed so that the 15 inches is the depth of the tank. However, if the tank is glazed the other way so that it is only 12 inches deep it will hold more fish. The usual allowance for a tank is 24 square inches of surface area to each inch of fish, not counting the tail. It can be seen then that if the tank is glazed to have a surface area of 36 in. by 15 in. it will hold about 22½ inches of fish but if set up the other way with an area of 36 in. by 12 in. it will hold only 18 inches of fish. However, some frames have the top rail made from a narrower angle iron than the other parts, and if yours is like this you will have no choice about how to glaze it.

I have a tank in which the water plant cuttings will not grow; however, hornwort grows well. If I put in uprooted cuttings they do not make roots but just die off. What is the reason please?

I suspect that you have only gravel on the bottom and so there is no nourishment to encourage the plants to send out roots. Try placing a little loam under the gravel at the back of the tank. Then root your cuttings in jam jars with a little soil in the bottom. Once these have made good roots transfer them to the tank with some of the soil attached to the roots. The hornwort thrives because this plant does not make proper roots. The older stems just become well established in the mulm or compost on the bottom.

I have bred about 20 young goldfish. In my outdoor pond and wonder which is the best way to get them through the winter? At the moment they are in a fibreglass pond about the size and shape of a bath, and the water is 15 inches deep. If I cover this with a glass frame will the fish be safe for the winter?

It is often better to leave the youngsters in the pond where they have been bred. If they have survived until the winter without being eaten by the larger fish it is quite possible that they can go through the winter safely in the pond. However, now you have them in the smaller pool if you cover the pool with a glass frame this will help considerably. A short while ago during hard frosts I covered a 60 gallon galvanised tank in my garden with some sheets of glass. Several tanks were left uncovered and all of these had a fairly thick coating of ice on them, but the covered one was quite free of ice. The glass delays the loss of warmth from the water and so the water will not freeze unless the frost is very severe and lasting.

I am interested in trying to breed coldwater catfish indoors. My tank is 42 in. by 15 in. by 15 in. and the fish are about 6 inches long. How can I sex the fish; what are their requirements for plants etc.; for egg-laying; what is the temperature before I should maintain?

I do not think that you have much chance of breeding from your catfish. This species reaches a huge size (one caught recently in this country weighed 33 lbs.). Therefore one must assume that a catfish require a good size before they would breed. They are a continental type and so would be happy at a temperature of about 60°F (15°C). They might also breed at this temperature. It is difficult to sex these fish, as it is with most egg-laying species. There is little outward sign of sex but the female would certainly be faster than the male near to breeding time. This is during the spring months. The reason why my book Coldwater Fishkeeping does not deal with this subject is that I do not recommend coldwater catfish for the garden pond, as they grow so quickly and are carnivorous, that they would soon be big enough to eat any of the other occupants of the pond small enough to get into their huge mouths.

Is it possible to breed veiltail goldfish all the year round as is done with tropicals? What procedure should I follow to commence in January and what temperature should I use?

It may be possible to breed veiltails all the year round provided that besides warmth you could provide correct lighting as well. It is far better to allow the fish to rest and regain their strength during the winter months. After all, the many tropicals which are bred throughout the year will live for a year and a half to 2 years only, but your goldfish variety should live for many years. You could start to breed them early in the year and the procedure is to allow

Continued on page 185

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.

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

Technique for Tropical Marines

I WONDER if you would like to print some of my own experiences. While I would agree with most of the remarks of G. Stott and H. Shone (The Aquarist, November) on general tank cleanliness, their theory of electrical discharge from heaters etc. really surprises me, as I have had none of this trouble myself, using standard equipment now available. Indeed, I wonder how this discharge was measured and hope this point could be cleared up, as if this leakage was not measured then the trouble experienced could more likely have been caused by some more tangible trouble.

Also, epoxy resins used as a sealer have in my own experience proved totally inadequate. Indeed, after a month or two of immersion in sea water, I found that the filler could be peeled off with one’s thumb nail, this failure again allowing pollution between cement and sea water.

Another ambitious test of epoxy resin was made, when I decided to construct an all-glass tank of 13 gallons capacity using ground glass, plate which was scrupulously cleaned with detergent before gluing. The tank and inhabitants prospered for about 3 months and then the thing leaked.

The fish were removed to the old death cell (angle-iron tank) and, on examination, I found that the sea water had again penetrated between the glass and glue at nearly all the joints until I think will-power alone kept it together. I hope these two experiences with epoxy resins for marine aquaria will cause readers to tread carefully when using these adhesives.

In spite of previous disappointments and advice to give up, I decided to try my hand again; this time, however, I was determined to start off with a completely non-toxic aquarium. Encouraging news of the development of polyurethane paint decided me on the construction of an allwood tank. Using 1/4 in. thick mahogany and Aerolite Marine Glue, the tank was finally painted with polyurethane on all surfaces and then fitted with a front glass pane bedded in with clear Bostik, which was allowed 3 weeks to set.

When the tank was completed, it was filled with salt water (using block salt), and allowed to soak for 2 weeks, then emptied, washed with warm fresh water and then filled with clean sea water, which was four parts artificial to one part natural. Strong aeration and filtration was commenced and the tank allowed to fallow for a further 2 weeks before the fish were added.

The tank has been running now for over a year and the two original clown fish which I used as guinea pigs to test its quality are still with me, both being now 11 months old and thriving. During 1964 I have added to my collection at various intervals and now the collection includes two common clowns, one chocolate clown, two dominoes, one neon wrasse and one small shore crab 1 in. long which was caught locally and has shown no ill effects of the high water temperature. All these creatures have grown considerably and continue to thrive.

Reading your articles on marine fish-keeping in Ceylon prompted me to try the tank on a southerly facing window sill and I am convinced that the sunlight has improved their vitality even more, although I must mention that I have plenty of shells and coral in the tank for shade if necessary, and light only enters from above. I change 1 gallon of water in the tank per month (this means one-eighth of the water, as the tank is modest in size, holding only 8 gallons, plus coral etc.).

My biggest disappointment during the last year was when two species of butterfly fish died, having only survived for about 3 weeks. Their deaths are a complete mystery to me, as no reason could be found. My only consolation comes from the knowledge that these fish are notoriously short-lived under most aquarium conditions and I suggest that considerable amounts of fresh water must be available for success with these beautiful creatures.

As a result of chills and addition of new fish, outbreaks of a disease, namely a form of Oodinium, periodically appear. When infected with this contagious disease, the fish look as if it is dusted with grains of pepper. Some fish do not show up the spots very well and the only symptoms visible are fish knocking themselves consistently against coral and sand in between periods of lethargy. Common clown fish show up the spots very well and act as a canary with gas. Keeping the temperature at 81° to 83° F (27-28° C) helps counteract disease in clowns (below this they are very prone to many other troubles, fungus etc.), and the other fish show no ill effects. In spite of temperature, however, I have found that Oodinium will strike sooner or later and sulphathiazole sodium seems completely ineffective. When this disease is diagnosed, it is essential to treat the tank and inmates with 6 c.c. of stock solution of copper sulphate per gallon of sea water, the stock solution being made by mixing 1 gram of chemically pure copper sulphate with 1 litre of distilled water. Sometimes, after several weeks, the disease may reappear, probably because the copper is precipitated from solution and removed by routine water changes. When this happens, repeated treatment at the stated dose will clear up the disease in 1 to 2 days and has
always been 100 per cent effective with no ill effects to the fish.

Water density in my aquarium is kept about 1.022 and has given no trouble. The fish are fed on chopped mussel and earthworm, brine shrimp, marine dry food and white worm. Tubifex worms are left alone because I think the danger of internal bacterial infection is very great with this food.

Before I conclude, one more word about water change. I renew 1 gallon of water per month, but I would state that to lay down hard and fast rules for the amount and periods at which water changes are to be made depends on too many variable factors, such as crowding, overfeeding and lack of adequate aeration, etc. I watch the fish closely; if they become sluggish and fins start to close a little over long periods, without any signs of spots on the fish, then I try a partial water change. Personally, I adopt regular water changes more as a safeguard than always a necessity.

Before summing up I would say that my experience has shown me that keeping marine tropical fish is quite practical, provided the marine aquarist is a little more ardent with regard to cleanliness and in the studying of his charger’s behaviour.

The availability of perspex aquariums for marines has furnished a perfect receptacle for these fish, and is an asset for those who do not want to have the troubles associated with framed aquaria or the bother of making one’s own tank of wood.

I have proved to myself and my friends that with a non-toxic tank, really adequate aeration, sunlight and the copper treatment mentioned, the vast majority of toy tropical marines may be kept with confidence.

I would like to thank Mr. Max Gibbs for his help in suggesting the copper treatments for Oedomium.

D. BRYAN.
(Member of the Marine Biological Association of Great Britain),
Swansea, Glam.

German Congress

YOUR readers might like to know that the West German Gruppy Federation will once again be holding their annual Congress in Berlin during September, 1965, which will be followed by the 1965 Congress of the East German Federation also to be held in Berlin during September, 1965.

My reason also for writing is that aquarists here might like to take part in either or both Congresses as exhibitors or spectators as both are events of extreme interest and hospitality.

I shall be visiting both Congresses and would be pleased to hear from any readers who might be interested in attending a visit. If sufficient numbers of interested parties are available, a special Air Charter flight could be arranged.

Language as well as accommodation considerations can be taken care of and such a trip might find favour as a means of combining aquarists and holidays at the same time.

Dr. R. O. B. LITTLE
Ruislip, Middlesex.

Thanks for Support

MAY I, through the good services of your journal, send our Society’s thanks to all the many aquarists who attended our recent Convention. Our thanks in particular go to the members of clubs in Sheffield, Staffordshire, the Isle of Wight, Leominster and several South Coast clubs who travelled quite considerable distances to be with other clubs from the Greater London area and the Home Counties to hear our visitor tell us a little of his fish-keeping experiences.

We certainly appreciate the support given to us in our effort to improve the knowledge of the hobby in this country. The continued support given to us each year is sufficient reward for all the hard work and organisation required to put on our Conventions each year.

Even at such an early stage after this year’s Convention, arrangements are under way for our 1965 Convention, when it is almost certain that we will have a return visit from Mr. A. van den Nieuwenhuijzen from Heemstede, Holland. Further details will be announced as soon as they are finalised.

A. E. STEVENS,
Secretary, Hendon and District Aquatic Society.

Exchanges Wanted

THE Sheffield and District Aquarist Society have published the first issue of a Society magazine Sheffield Aquarists Review. It contains 26 pages with articles by members on general fish-keeping, fish breeding, plant growth and constructional details of equipment, etc. The Society would like to hear from other societies who publish a similar magazine with a view to exchanging magazines.

R. E. GALLOWAY,
Secretary, Sheffield and District Aquarist Society,
71 Bent Lathes Avenue,
Rotherham.

Marine Tropicals

As an old reader and one who has kept tropical marines for the past 14 years it gave me great pleasure to hear that a few fellow aquarists are having some success in keeping these beauties.

Although I have specially built tanks and equipment I have yet to master the family of chaetodon fishes. From information received from America I gather that the medium size fish are best as the large and small won’t adapt themselves to aquarium conditions, and I must admit this has been so in my experience. I think it is a miracle that someone has kept them for 12 months. I only wish I was able to see his set-up, I thought mine was perfect.

My tanks, 28 gallons, are made from 1/2 in. Perspex and the filtering is done by a Perspex tube through nylon mesh, at the rate of 15 gallons/hour. The sea water was obtained from the London Zoo; temperature is 72-75°F (22-24°C); density 1.024-1.025.

The fish are given three light feeds per day, changing from white worm, raw steak, live brine shrimp and, when available, baby guppies. If our fellow aquarists can give me some advice regarding the keeping of the chaetodonts, I would be extremely grateful, at the same time offering my experience on any other matters.

F. A. COOK,
London, N.17.

A Watford Society

I AM interested in forming the Watford and District Aquarist Society again. I have been keeping tropiccas for only 6 months but I think we need this society in Watford. Aquarists in the surrounding areas who are interested are invited to write to me, stating at the same time whether they are prepared to hold any sort of office also how long they have been keeping their fish.

J. L. M. CANNAP,
86 Levensden Road,
Watford, Herts.

THE AQUARIST
Coldwater Fish-keeping Queries
(continued from page 182)

them to rest at very cool temperatures for at least 3 months. Then at the turn of the year begin to warm up the water slightly until the fish start to feed well. This may be at about 55°F (13°C). If you can segregate the sexes it will help, as when they are put together in the spawning tank better results may be expected. Feed on plenty of live food; garden worms are excellent food for conditioning the fish. When the fish are put together raise the temperature of the water to 65°F (18°C). You may have to use a form of aerator as the warm water may not hold enough oxygen for the fish. A temperature of 70°F (21°C) can be used to hatch the fry, and rear them at this temperature until they are a little older. They can then be gradually accustomed to a temperature similar to the normal summer warmth.

I have a tank 30 in. by 14 in. by 12 in. in which I had two shubunkins and two fantails. The parents died within a month and a post mortem showed that they died from a parasitic infection. The tank has two 60 watt strip lights and I put some peat under the compost when the plants were first planted. The plants do not grow and look a sickly colour. What has gone wrong?

The fish were probably infected when you got them. The plants may be unhealthy because the strip lighting does not suit them. I know of several instances where these strip lights have had to be changed for ordinary filament lamps before the plants grew. Try a change of lamp and see if the plants start to grow. It would have been better to have placed some peat under the compost when you first set the tank up. As the remaining two fish appear to be growing all right there may not be anything wrong with your treatment of the tank, apart from the unhealthy plants. They may improve on a change of lighting and if you can get a little loam under the back part this, too, would help.

My catfish has become very fat on the underside. I wonder if this is an explanation for this?

It is most likely that this is due merely to distension of the stomach of the fish which is normally flat. The catfish may have swallowed one of your small fishes or it may have eaten something large. However, it may be a form of cyst or even a tape worm. Leave the fish without food for a few days and the swelling will probably be seen to subside.

I have a tank of a good size but I cannot seem to get my water plants to grow properly. What is the matter with them?

I have a tank of a good size but I cannot seem to get my water plants to grow properly. What is the matter with them?

I have two 25 watt lamps but some of the water plants did not thrive. Should I have more lamps?

Two lamps such as yours should be enough for your aquarium but it depends on how much natural light reaches the tank. If it is in a dull corner then two 40 watt lamps would be better. You must experiment with lamps for a time as too much light encourages the growth of green algae. Try to determine the wattages which give the best results by trial and error.

I have a pair of orandas which have had fin congestion. They have now developed dark smears on their fins and bodies. What is the matter with them?

It is almost certain that some of the body surface of your fish was damaged by the disease. When the disease had cleared up, new growth has started to replace the lost tissue. This is usually blackish in colour but will soon turn to the old colour. All scaled goldfish types turn mostly black with the first colour change. The backs and fins of such fish turn black for a time but this black decreases gradually until it all clears away.

January, 1965

The AQUARIST
Crossword
Compiled by M. W. SAUNDERS

CLUES ACROSS
1. Does he have fish on a large scale? (4, 6)
2. Checking the depth of the water? (8)
3. Tank adornment, made of cork? (4)
5. A pin point is just about the tupp? (4)
6. When formed of algae, this is not very becoming? (3)
15. The donkey starts assisting? (3)
16. Something you drink and eat all round? (3)
17. Belonging to? (3)
18. A friend from a crazy mixed-up team? (4)
19. Such a fish would not influence a judge? (4)
20. Drive? (4)
21. Might you see this at the water-jump? (3, 5)
22. One might get what one is — (5, 2)

CLUES DOWN
2. Should be provided for a plume? (4)
3. Tip? (3)
4. Composition? (4)
5. Common name for Cochlaena molli (10)
6. Merchant Navy ensign? (3, 7)
7. What the fighter does with his young to prevent in-breeding? (8)
8. A lab from a bent pin? (3)
9. Leave the water in an Australian pot? (2, 6)
10. Home of the fighting fish? (4)
11. Getting the measure of the worm? (4)
12. A useful quantity for breeding? (3)
13. The water dweller went around? (4)
14. Second hand? (4)
15. Atmospherically suitable for tropical fish? (3)

Solution on page 187
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 month of November was an exceptionally busy period for the members of the AHS and District A.S. The A.H.S. had a busy week with the publication of the November issue of 'Aquarist', the society's newsletter, and several members were elected to the executive committee. The A.S. had two major events: the annual general meeting and the Christmas Party.

The annual general meeting was held on 12 November and was well attended. The outgoing President, President, and Secretary were all re-elected. The society's finances were reviewed and members were informed of future events and arrangements.

The Christmas Party was held on 20 November and was a huge success. The venue was beautifully decorated and the food was excellent. Many members enjoyed the evening and were able to socialize with old acquaintances and make new ones.

The month was also notable for the publication of the society's newsletter, which included updates on recent events, member profiles, and information about upcoming events.

In other news, the A.H.S. was pleased to announce that two of its members were awarded the prestigious 'Aquarist of the Year' award. The awards were presented at the annual general meeting and were well deserved.

The A.S. also had a successful year, with several members winning awards and being recognized for their contributions to the society. The society's finances were in good shape, and the members were looking forward to a successful year ahead.

The editor would like to thank all the members of the A.H.S. and District A.S. for their hard work and dedication during the month of November. Their efforts were greatly appreciated and contributed to the success of the society.

The editor would also like to extend a special thank you to the outgoing President and Secretary for their hard work and dedication throughout the year. Their leadership and guidance were greatly appreciated.

The editor looks forward to seeing everyone at the Christmas Party and wishes everyone a happy and healthy holiday season.
AT the monthly meeting of the Abbeburgh and District A.S. the following officials for 1965 were elected: Chairman, Mr. P. A. Watts, secretary, Mr. R. E. Hampson; The Headlands, Scotland Lane, Honfleur, Leeds; treasurer, Mr. G. E. Walker; show secretary, Mr. H. Myser; committee, Mr. Rees, Mr. Chadwick, Mr. D. Emlyn. (Mrs. Hampson, auditors, Mr. K. Rees.)

Following the election of officials there was a general discussion on the progress of the Society, and it was decided that the annual open show be held at the same address. The Society are extending the number of classes to 32 including classes for swords and amphipods. The Society holds its meetings on the first Thursday of each month at the Mr. Andrew's Church Institute, Chapel Lane, Yeovil. If any persons would like to come along they can be assured of a warm welcome.

THI officers elected at the annual general meeting of the Swindon and District A.S. were as follows: Chairman, Mr. R. Hookham; vice-chairman, Mr. K. Whiskney; secretary, Mr. R. Hague (8 Linksfield, Corringham Park, Swindon); assistant secretary, Mr. M. Martin; treasurer, Mr. I. Hawes; assistant treasurer, Mr. R. Morgan; assistant secretary, Mr. L. Thomas. Meetings are now to be held at the Eastcott Hotel. Meetings are now to be held at 7.30 p.m. New members are always welcome.

OBITUARY

THI death of Mr. C. A. Blake (a founder member of Rochdale and District A.S.) Mr. Blake was well known in Rochdale and the North-west region. He has been absent from recent years, for his judging, exhibiting and breeding of Razel he will be greatly missed by the Society.

THI annual general meeting of the Bristo Tropical Fish Club was well attended. The secretary reported that the Club are making a move to a new location. A new chairman will be elected at the next meeting. The meeting was called to order by chairman, Mr. B. Clarke, vice-chairman, Mr. W. L. Littleton, treasurer (re-elected); Mr. F. Berry, respectively, committee members. The club is looking forward to a successful year. A committee has been formed for the 1965 show which will again be held in June. The show will be held at the same date and place as last year. The secretary's address is 416 Whitehall Road, St. George, Bristol, 9.

THI fourth annual dinner and social of the Hussis and District A.S. was held recently when over eighty members and friends attended an enjoyable evening. The presentation of the year's awards took place, and a cabaret floor show was very much enjoyed. A basket of fruit was presented to Mr. Ray Laun, the Society chairman, and his wife for their great work that they had done to make the evening so successful.

The annual meeting of the Society was held promptly when the election of officers followed: Chairman, Mr. R. Ruff, secretary, Mr. D. Woodworth; treasurer, Mr. R. P. Roberts; show secretary, Mr. H. Pray; press secretary, Mr. B. Pratly; librarian, Mr. D. Partick; public relations officer, Mrs. J. Scoury; show officers, Mr. R. Scoury and Mr. T. Smith; entertainment officer, Mr. C. Wood; auditors, Mr. Whitchurch and Mr. J. Wragg. The Society now meets fortnightly at the Territorial Army Drill Hall, Hartshorne Road, Houndsdown, on Wednesdays.

RECENTLY the Independent A.S. staged a six-class show and there were 40 liter-class entries. While the judging was taking place, a slide show on E.L.T.C. was presented by Mr. E. L. C. Dent and proved to be excellent entertainment. Prizes were presented by the deputy mayor of Edgbaston, Mrs. G. Barnard, and the results were as follows: first, Mr. R. C. Smith (Willis); 2nd, T. Glans (Willis); 3rd, F. C. G. C. Rigg; 4th, S. G. Jennings (Hampton); 5th, A. I. and M. J. Porter (Willis); 6th, A. B. Roberts (Henderson); 7th, R. D. Mans (Independent); 8th, P. H. T. Oliver (Hammond); 9th, G. E. Cook (Independent); 10th, C. Brown (Willis); 11th, M. Richardson; 12th, D. J. C. Rigg; 13th, W. G. Cook (Hampton); 14th, A. G. R. Smith (Henderson). The total of the six classes was 115 points; River Vale 85 points; Hampton 84 points; Independent 39 points.

THI election of officers at Thurrock A.S. annual meeting resulted as follows: Chairman, Mr. R. Nichols; secretary, Mr. P. Snow; treasurer, Mrs. R. Nichols; show secretary, Mr. E. Nichols; committee men and publicity officer, Mr. D. Durran; librarian, Mr. P. Jarvis; recorder, Mr. I. Smith.

The trophy for the past year was presented to the following members: Mr. D. Durran, the Shirley and Ipswich for winning the Members of the Year Competition. He also gained the main points in the tables throughout the year to win the Swannery Shield and Plaque. Runner-up in the Swannery Shield Competition was Mr. P. Jarvis for winning the Members of the Year Competition was Mr. P. Jarvis for the second year in the competition. The Home Aquarium Competition was won by Mr. E. B. Nicholas and he was presented with the Cup and a plaque. The runner-up in the Home Aquarium Competition was Mrs. E. B. Nicholas. The chairman reported a moderately successful year with the highlight being the grand aquarist held in October.

NEWS from Bradford and District A.S. includes the final placings for the monthly table shows. The leading members were as follows: A. Fitch, 40 pts.; J. Holme, 27 pts.; H. Fitcher, 21 pts.; J. Hooper, 19 pts.; A. W. C. Crisp, 12 pts.; J. E. Smith, 11 pts.; P. Moore, 10 pts. The Arthur Thornley Memorial Trophy was won very convincingly by Mr. A. Fitch. Recently the Society had a lecture from Mr. J. R. Booth on "Goldfish breeding in Ponds".

The Aquarists' Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue metallic emblem for the aquarist can now be obtained at cost prices by all readers of The Aquarist. The design is pictured here (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 2s. 6d. to The Aquarist, The Burns, Half Acres, Brentford, Middlesex, and please specify which type of fitting you require.

Crossword Solution

- PONDKEEPER
- FIONA
- SOUNDE II
- ROCK II
- EAGLE-SPOT
- T.D.
- MAT
- ASS
- OTEA
- PITCH
- UEMATE
- NTORN
- URGE
- HS
- SEAHORSE
- ENT
- TLEDT0

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Being just outside London we are very easy to reach. By tube train on the Central Line it is thirty minutes from the West End to Buckhurst Hill Station or by Bus routes 20, 38A, 167 to Bald Faced Nag and five minutes walk from there. There is always someone in attendance at our hatchery so you are always welcome to walk round without obligation and observe our tropical fish of which we have 130 species in almost natural conditions.

Here is just a few rarer fish that we have at present - Puffers, Glass Fish, Splash Tetas, Aplocheiron Siphon, Orange Chromides, Lyretail Veilfinas Molly, Green Panchax, Ramirezi, Flying Barbs, Rob Fish, and many others. We have a good selection of Cichlids, including Jack Demmner's Texas Cichlid, Tlilapia Headstoo, Blue Acaras, Brown Acaras, Nigger Cichlid, Mozambique.

Also our own fish food made from bullocks' hearts, best liver fish, Aga-Agar and shrimp is obtainable sent direct from here and reaches you in perfect condition. Send for N.O.E.F. (Nature's Own fish food) 25, 6d. post free. Even our cichlids eat it greedily being 99% protein. Treble quantity 6d. post free.

MANY SECONDHAND TANKS FOR SALE
We are now sending fish by Rail. Carriage and Telegram 12/6. Minimum orders £3. Please send S.A.E. for list.

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