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TROPICAL FISH
Fish of special interest this month

<table>
<thead>
<tr>
<th>Fish Name</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow Fin Basha, 3&quot;</td>
<td>7/8 each</td>
</tr>
<tr>
<td>Elephant Nose, 5-7&quot;</td>
<td>12/4</td>
</tr>
<tr>
<td>Leporecula, 2&quot;</td>
<td>27/8</td>
</tr>
<tr>
<td>Marigold Platers, 2&quot;</td>
<td>17/9</td>
</tr>
<tr>
<td>Giant Denises, 3&quot;</td>
<td>6/6 each</td>
</tr>
<tr>
<td>Punctio Filamentosus</td>
<td>7/6</td>
</tr>
<tr>
<td>Knudsen Midas, 1&quot;</td>
<td>13/5</td>
</tr>
<tr>
<td>Polycope / Polycope / Abrobo / Vimak</td>
<td>7/4</td>
</tr>
<tr>
<td>Rook Fish, 10&quot;</td>
<td>36/3</td>
</tr>
</tbody>
</table>

SEND S.A.E. FOR LIST OF POND FISH AND POND PLANTS

<table>
<thead>
<tr>
<th>Guapinol</th>
<th>3-4 each</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Delta Guapinol</td>
<td>19/6</td>
</tr>
<tr>
<td>Black Delta Guapinol</td>
<td>15/6</td>
</tr>
<tr>
<td>Millie</td>
<td>3-4 each</td>
</tr>
<tr>
<td>Black</td>
<td>3/2</td>
</tr>
<tr>
<td>Silver</td>
<td>3/2</td>
</tr>
<tr>
<td>Green</td>
<td>3/2</td>
</tr>
<tr>
<td>Red White</td>
<td>3/2</td>
</tr>
<tr>
<td>Alboro</td>
<td>3/2</td>
</tr>
<tr>
<td>Red Tuxedo</td>
<td>3/2</td>
</tr>
<tr>
<td>Green Tuxedo</td>
<td>3/2</td>
</tr>
<tr>
<td>Black</td>
<td>4/6</td>
</tr>
<tr>
<td>Pelican</td>
<td>3/2 each</td>
</tr>
<tr>
<td>Red Pelican</td>
<td>3/2</td>
</tr>
<tr>
<td>Red Tail Black</td>
<td>5/5</td>
</tr>
</tbody>
</table>

Large Tuxedo: 8 1/2" 3/2 each
Nagar Ad: 7 3/2 each
Barbus Torre: 2/2 each
Che STORAGE: 2/2 |
Albino Tiger: 3/2 |
Ember: 1/2 each
Half Bande: 3/2 each
Goldfish: 2/2 |
Goldfish: 3/2 |
Aphanius: 1/2 each
Barbus: 2/2 each
Tiger: 2/2 each
Cambridge Ad: 2/2 each
Barbus Hassell: 6/6 |
Cherry | 2/2 |

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Fancy | 6/6 each |
Veil | 7/4 |
Veil | 7/4 |
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Guembuti | 8/6 each |
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Pony Fish | 6/6 |
Orange Chameleon | 8/8 |

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Blenny 6 to 8" £1.25
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- 6 Ludwigia
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K 12 Marginal
- 4 Creeping Plants
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- 15/-
- 15/-
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April, 1966
Special News

See Page xi

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- Liquity Sea 1 and 2
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- Wafer Flakes
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House Plants for Fish Houses
by D.M.C. JONES, B.A.

The Cyclamen

CYCLAMEN are among the most popular winter-flowering indoor plants and thousands of them are bought around Christmas when they are in full bloom. Their beautiful flame-like blooms come in shades of white, pink and red. The leaves are heart-shaped and often have attractive silver markings.

Cyclamen enjoy a fairly warm, humid atmosphere, and so the atmosphere of the fish house will suit them very well. The plants should be placed in a well-lighted, draught-free position. Watering has to be done with care, and soft water should be used. The fleshy corm is liable to rot and so the plants should be watered from below by standing them in a deep saucer of water for about half an hour. After this time they should be drained, and any water remaining in the saucer thrown away. They should be fed regularly with a liquid fertiliser while they are in bloom.

When a flower or a leaf dies it should be removed by giving the stem a slight twist and a sharp pull—this prevents any of the stem staying on the corm and setting up rot.

After the plants have finished flowering, water should be gradually withheld and the pots placed outside in a shady position during the summer months. They can be reported in July using John Innes Potting Compost No. 1, making sure that the corm is only partly buried. Bring the plants back into the fish house towards the end of September.

If a temperature of 60-65°F. can be maintained the cyclamen can be raised quite easily from seed. This is an economical and interesting way of acquiring plants. Sow the large seeds, either in the spring or the autumn, in a well-drained seed pan containing John Innes Seed Compost. Space the seeds about half an inch apart and cover them with ¼ inch of compost. Germination will be slow and erratic but the little plants will start to appear after about four weeks.
Farming for Fish

by PATRICK DOBBS, B.Sc.

It is a trite and familiar saying among agriculturists, that an acre of water can be farmed to yield more human food in a given time than an acre of land. The subject is then dropped, usually without any suggestions as to the nature of this food or how it may be produced and harvested. The fish ponds of Demerara provide one answer; not the only answer, for in Japan shrimps are grown, in the United States trout are raised artificially in running water and Lake carp have been cultivated for centuries in the monasteries of Europe.

The flat expanse of alluvial swamp that stretches from the mouth of the Orinoco through the coastlands of the Guianas to Brazil is a formidable impediment to development. The sea is shallow, merging into the land, so that the towns are all, perfecly built on an unstable foundation of mud, and subsidence of roads, buildings and wharves is a recurrent headache. Drainage and sea defence work constantly presents staggering yet unavoidable difficulties and expense. The soils of the coastal plain are made of heavy alluvial clay and acid peat from the decayed vegetation of the water-logged mangrove swamps and jungle beyond. They have a high concentration of toxic salts which is maintained by an upwards pressure of sea water from the ocean floor. Under such conditions farming, though by no means impossible, is difficult. The main crops are traditionally plantation sugar-cane and smallholders' rice. Secondary in importance are bananas, plantains, citrus fruits, vegetable crops and fish; this last, the newest enterprise to be developed and possibly the easiest to carry out.

The main species of fish raised are Tilapia mossambica. A few others, principally carp, have been tried, but none can compare with the tilapia which enjoy world-wide popularity throughout the equatorial belt. They mature early and breed freely; good plump fish eight inches long may easily be grown within a year. They thrive under a wide variety of conditions, living happily in salt or fresh water and withstanding a big range of acidity—necessary in the Guianas where the soil water pH is often below four. They are not easily damaged when handled or left for short periods out of the water, and can survive transportation from pond to pond under inevitably rather rough and confined travelling conditions. The quick changes of water temperature, salinity and acidity, unavoidable on releasing fish in new ponds, upset Tilapia remarkably little.
Ponds vary in size from ten acres to ten square yards. The Congregational school at Stewartville has a small pond for teaching and demonstration. Uluru sugar cane has one for the benefit and amusement of their staff and the Adventure farming company has a commercial pesticide on a big scale. The sides of the pond should gradually slope down to give a depth of three to four feet. The cover is shaded to give refuge from the mid-day sun, a simple bamboo framework with a roof of palm leaves being sufficient. Vines of melon or squash often cover the abode, providing an additional contribution to the feed.

It is a good idea to segregate the fish destined for the male and female ponds at an early age. In this way overcrowding is avoided and specimens can reach their full size, for tilapia breed early and fast and do not remain too long in their full weight in a densely populated mixed-sex pond. A separate breeding pond can be maintained from which young fry can be collected as required. Grasses provide a good site for nesting and encourage egg-laying. When the fish have grown to a length of about six inch the sexes are easily differentiated and they do not suffer ill effects from handling and transfer. Alternatively, the department of agriculture in Georgetown will supply reasonable quantities of sexed fishes without charge. Thin plastic containers are used for transport; before releasing the contents in a new pond the containers are held for a while below the surface of the water still sealed to avoid the shock of a quick change in temperature. The top is then opened quietly and the fish swim out in to their new home.

A small stock of rotted farmyard manure stacked in the water in a wire-netting enclosure gives the fish a food supply. A few water-weeds are also an asset, but a heavy growth will make fish catching difficult. Sometimes termite colonies in rotting wood are slung over the water so area and their eggs keep dropping in for the fish below. Rice dust is the cheapest feed, and the fish grow most quickly where a little is thrown on to the water every day. As with other farm stock it is best to provide about as much food as they can clean up.

If water is taken from a creek or canal rather than a well or mains supply the inlet pipe must have a fine-meshed filter to keep out predatory species such as the hauri and pirie. The outflow pipe must of course also be filtered, and it is very useful to be able to drain the pond for harvesting or inspection. The fish can be caught by running out the water or by netting. Any predators found are thrown out, for some generally get in the pond despite every precaution; the haul for one can travel fair distances.
Flowering Shrubs at the Pondside

by JAS STOTT

When in bloom, flowering shrubs are wonderful subjects for providing areas of concentrated colour; that is, of course, if the right species are selected for the shrubs. There are so many varieties of flowering shrubs that it is not possible to list them all here. However, I will mention some of my personal favourites.

One of my favourite flowering shrubs is the rhododendron. It is a beautiful shrub that comes in a variety of colours, including pink, red, and purple. It is a hardy shrub that can survive in a wide range of conditions. However, it is important to note that not all rhododendrons are suitable for all regions. Some are better suited to cooler climates, while others do well in warmer climates.

Another popular flowering shrub is the azalea. Azaleas are similar to rhododendrons but are generally smaller in size. They come in a variety of colours, including white, pink, and red. Azaleas are also hardy shrubs that can survive in a wide range of conditions. However, they require more shade than rhododendrons.

Lastly, I would like to mention the forsythia. Forsythia is a hardy shrub that is easy to grow and requires very little care. It is a beautiful shrub that produces a profusion of yellow flowers in the spring. Forsythia is a popular shrub for borders and hedges.

In conclusion, flowering shrubs are a wonderful addition to any garden. They provide a beautiful display of colour and can be used to add interest to any landscape. Whether you are a beginner or an experienced gardener, flowering shrubs are a great choice for any garden.
Breeding the Oranda

by J. Pixton

The Oranda is a very rare but handsome fish. There is some doubt as to its origin, but it is believed to have originated from a cross between a Veiltail and a Lionhead. It has some of the characteristics of the Veiltail, except that the dorsal and the twin caudal fins do not have the same pointed tips. The wart-like growth around the head and gill plates is less pronounced than that of the Lionhead, and some people, including myself, regard this as a distinct advantage.

It is a very delicate fish; indeed rearing should only be carried out by the experienced who has all the equipment needed and a knowledge of feeding techniques. It is not a beginner's fish, as ignorant breeding often gives disastrous results.

A high protein diet, preferably a daily ration of live foods, is a must. A constant supply of live foods is necessary, and a soft acid water at pH 6-8. A good layer of peat in the filter is very satisfactory in getting the water condition right.

The Oranda, like any other fish, must be brought into spawning condition before successful breeding can be carried out, and if the following diet is observed throughout the month of April, there is a reasonable chance that the fish will breed. Of course, the fish will have to be separated during this process and they must be sufficiently mature, say 3 to 4 years old.

Monday: Gordon's formula
Tuesday: Mashed earthworms
Wednesday: White worms
Thursday: Tubifex
Friday: Daphnia
Saturday: Gordon's formula
Sunday: Tubifex

The Tubifex and earthworms should be well washed to ensure no foreign matter is allowed to enter the aquarium. The breeding tank must be set up at least one week prior to the spawning pair being introduced. The tank should not be smaller than 36 in. by 12 in. by 12 in. The maximum size is 1,000 fry can result from a good spawning so the experience of having a large tank can be appreciated.

The gravel must be washed in hot water and rinsed in boiling water. It is then introduced into the tank and the fry added. Also a heater and thermostat should be included in the set up.

I find Myriophyllum the best spawning medium, 15 pieces floating and 10 pieces leaded down at one end of the tank are quite satisfactory, but you may have your own plan on this. The ideal temperature is 75°F and the fish leave the breeding tank at night after it has been set for two weeks. Spawning should take place, after a few days in mid-afternoon. The parents must be well watched and fed with Tubifex.

A few Daphnia introduced after the fish have been fed might offer an alternative to the eggs, but the parents should be removed after the spawning anyway. The eggs hatch in about four days at 75°F and the newly-hatched fry are fed on powdered egg yolk squeezed through a piece of butter-muslin. When the fry are 14 days old, they should be given Tubifex and grown on dry food, micro worms, and sifted Daphnia. Extra care must be taken with powdered food for it will foul the tank easily if misused. For three to four weeks the fry should be given Tubifex and chopped white worms. Another week or two and the fry will take white worms.

If the lighting (which should be about 350 watts in a 36 in. by 12 in. by 12 in. tank) and the food have been administered in the correct amounts, the fry should colour in eight to ten months. Fry born in the April/May period should reach about 1½ inches in the autumn. The fry should be wintered indoors and should also be regularly culled and, with luck, you will get about 10 to 15 good specimens. Only two to three of these will be show specimens.

If it is wished a few drops of methylene blue can be added to the breeding tank after the parents have been removed.

Oranda: Having the flashy head of the Lionhead but retaining the dorsal fin of the Veiltail.
Around the Aquariums

by MIKE SHEEDY

Recent arrivals in the reptile house at the London Zoo include a five-foot alligator and two royal pythons. The alligator was presented to the zoo by the Horniman Museum in Forest Hill, where it aroused much interest amongst the younger visitors. As the animal was getting a little too big and temperamental to be handled safely, the Museum authorities felt the London Zoo would be an ideal home for him.

The two royal pythons are about four feet long and they are on view with other pythons in the reptile house. They had been brought back from Ghana by Messrs J. C. and G. P. Winterbottom of Newcastle, about two years ago when the snakes were very much smaller.

A terrapin, or European pond terrapin, had been found wandering in the Holloway Road and was brought along to the Zoo offices. During the winter months terrapins should be placed in a box filled with leaf mould or light soil and allowed to hibernate in a cool outbuilding, or they may be kept awake in a warm indoor vivarium. As it is unlikely that this one would have survived the winter months out of doors, it is now living in the reptile house in a warm tank with several other terrapins.

The animal stocktaking at the London Zoo, shows that at the 31st December there were 850 mammals and 1,455 birds housed at the Gardens, together with some 4,000 reptiles, amphibians, fish and invertebrates—not counting the ants, bees and locusts, which would be an impossible task.

It may be of interest to our readers to know that the London Zoo maintains its lead in having the greatest variety of mammals of any zoo in the world, totalling 244 species, and is second only to San Diego Zoo in the number of species of birds which it contains which totals 630.

Many improvements have now been carried out at the aquarium at Llandrillo Deer Park, St. Asaph, N. Wales. Built in the 19th century wine cellars, the visitors will find much to interest them. A very wide variety of tropical, coldwater and marine tropical fish, as well as a fine variety of reptiles, such as snakes, pythons, terrapins and unusual mantas, the largest specimens of their kind in any British Zoo.

The aquarium is most interesting, for some of the best specimens containing wine, will be seen in their original state in the cellars, and I might add Mr. Furstie has made a very fine job of the cellars, for I saw them before they were converted into the present state and they were, indeed, in a very bad way, but hard work and patience has at last made it into a fine aquarium with a fine selection of fishes.

On a raw winter’s day it is pleasant to slip inside the warm and colourfull surroundings of an aquarium, and such a place will be found at the Bristol Zoo. Here brilliant jewel fish, red swordtails and striped penguin fish hover in tropical tanks. The pugnacious looking Jack Dempsey fish swim and the strange mouth breeder does its best to look after a huge family of more than 300 babies. The parent fish open their mouths at any sign of danger and the babies swim inside until the threat is over.

Here the big bass and pollack swim in a private salt-water sea that is never ripped by storms, and pipe and chubtied patels reach never troubled by the angler’s line. Yes, if its colour and warmth you want on a bleak day at an English winter, Bristol Zoo has its own using humans.

There is nothing a sea-lion enjoys more than showing off its skill at catching things, and when it can show off its juggling skill by catching herrings or whiting it is even more delighted. That is why Bristol’s Zoo sea-lions are being encouraged to flap up on their concrete platform and catch their afternoon meal. They show the dexterity of a brilliant joker in the films as they catch the fish from the flung by a keeper from a bucket.

It is hoped that Bristol Zoo’s two existing sea-lions will be fully trained by the time two new sea-lions arrive to join them at the end of April. Eventually there will be a quartet of sea-lions on the receiving end of the flying fish.

With some reluctance the Bristol Zoo council have been compelled to increase the admission charge to 4s. for adults and 2s. for children under 14 years. This charge covers everything and there are no extra charges for the aquarium or any other exhibits. Old age pensioners can still go in presentation of their National Insurance pension book on Mondays (except bank holidays), for sennepence.

The cost of food, wages and salaries, fuel, transport of animals, maintenance and new buildings have all risen and resulted in this inevitable increase.

Recently I had a letter from a reader of The Aquarian wanting to know why snakes are not found in Ireland today, and also if at one time they were found there. I have already written to him and given him my views which I would like to give to other readers of The Aquarian. I think this is a very interesting question and I look forward to some of our readers’ views.

First of all, I myself was born in Ireland and also went to school there. I was taught to believe that St. Patrick drove the snakes from Ireland. I later heard that snakes were gone from Ireland two thousand years before St. Patrick came. I wonder if any of our readers might throw a light on this because you can go from end to end and all over Ireland without finding a snake, no matter how small.

This season I will be presenting Sir Robert Fison’s group of African lions. While I am on tour readers and zoo can still write to me at my home address which is 19 Vine Street, Rotherham, Yorks. The message will be forwarded to me, for I will still continue to send my views to The Aquarian.

**APOLGY**

The Ed. regrets the errors appearing in the subheading of the article on The Suckling Louse (March issue) which should have read: Gymnarchus aymmeri

(T urt, 1683)

THE AQUARIAN
AQUARIST'S Notebook
by P. M. FULLER

ANY readers have expressed to me a desire to know something about the early days of this magazine, about how it came to be produced, its nature to the first period of publication, and the difficulties it had to become established. I hope the following item (the first of two) will partly satisfy this demand. I must say I recorded the debt to Dr. J. R. Vincent of Peterhouse college, Cambridge, who made early editions of the magazine available to me, and furnished valuable assistance throughout the composition of this article.

In May 1928, the first edition of 'The Amateur Aquarist' was published at sixpence. It was described as 'A monthly devoted to the study of aquatic life'. A modest medium, consisting of only 12 pages, it nevertheless contained articles by eminent persons within its own sphere. The editor of the first edition was E. L. Boulenger, F.Z.S., the Director of the London Zoo Aquarium. The managing editor was A. E. Hodge, F.Z.S. (the extent of whose powers is indicated when it is realised that he also designed the magazine's first head-piece). The editor of this issue, F. J. G., wrote on this occasion:

The nature of the journal as to encourage the novice as well
as the student of aquatic life, without delving too deeply
into technicalities, and it will be my endeavour, therefore,
to give prominence to such topics as are of general concern
while eliminating those which are abstruse.

The interesting feature of the first edition was a competition for the best aquariums, a feature which was repeated in the second issue. The aquariums were judged on their appearance and beauty, with a special emphasis on the health and condition of the fish. The winning entries were awarded certificates and medals.

In the second issue of the magazine (October 1928), there was a report on a successful experiment in artificial reproduction of fish. The editor described the method used and the results obtained, which were considered to be promising.

In the third issue (December 1928), there was an article on the care and maintenance of aquariums, which was written by a well-known authority in the field. The article included practical advice for beginners and advanced aquarists alike.

In the fourth issue (February 1929), there was a report on the establishment of a new aquarium in London, which was considered to be one of the largest and most impressive in the country. The article included a description of the aquarium's facilities and the fish on display.

In the fifth issue (April 1929), there was an article on the theory and practice of breeding fish, which was written by a leading expert in the field. The article included a discussion of the different types of breeding methods and the factors that influence the success or failure of a breeding project.

In the sixth issue (June 1929), there was a report on a successful experiment in artificial reproduction of fish, which was considered to be one of the most innovative in the field. The article included a description of the methods used and the results obtained, which were considered to be promising.

In the seventh issue (August 1929), there was a report on the establishment of a new aquarium in London, which was considered to be one of the largest and most impressive in the country. The article included a description of the aquarium's facilities and the fish on display.

In the eighth issue (October 1929), there was a report on the theory and practice of breeding fish, which was written by a leading expert in the field. The article included a discussion of the different types of breeding methods and the factors that influence the success or failure of a breeding project.

In the ninth issue (December 1929), there was a report on the establishment of a new aquarium in London, which was considered to be one of the largest and most impressive in the country. The article included a description of the aquarium's facilities and the fish on display.

This was the beginning of a successful magazine, which has continued to grow and develop over the years.
THE PEARL GOURAMI

by "JAYWARDENE"

A NATIVE of Borneo, the Malay Peninsula, Sumatra and Thailand, the Pearl Gourami (Trichogaster Leeri), is an ideal fish for the "community tank". Although it grows to a length of more than 4 in., it is the most gentle and well-mannered of fishes, even amongst companions one quarter its size. As if this were not enough it is also, when mature, a ready and prolific breeder, breeding in the standard Anabantid manner.

The basic body-colour of the species is an undertone of brownish-yellow overlaid by a network of red-white mosaic-type pattern (which extends into the tail and fins), with a black wavy line running from the eye to just beyond half the body length, whereupon it fades away. An indistinct black spot is present at the base of the dorsal fin. Scales are easily identified by noting the dorsal fin of the species which, in the male, is long and taper to a point, and in the female is much shorter and rounded. Furthermore, the male, once he comes into breeding condition, cannot be mistaken as his whole throat area intensifies to a brilliant rufus-red coloration, considerably enhancing the fish's already natural beauty.

The Pearl Gourami demands little in the way of special treatment though it seems to have a distinct preference for a well-planted aquarium containing acid water. Live food is greatly preferred.

For breeding purposes mature fish only should be taken, separated and conditioned for a fortnight on such delicacies (to fish) as live Daphnia, white worm, Tubifex, shredded earthworm, and limestone, for which they seem to have an insatiable appetite. The size of the breeding tank to be used should be given careful consideration beforehand, as young Anabantids are extremely susceptible to changes in water temperature and/or conditions, and in my humble opinion it is a wise policy to breed the fish in the aquarium in which they are later to be raised. For this reason I have always favoured a 48 in. by 15 in. by 12 in. aquarium, though I realise that lack of space in many instances precludes the use of this size of aquarium amongst many aquarists. However, it should be stressed that in each and everyone the largest possible sized aquarium available should be used in the breeding of this species (and, indeed, with every other member of the Anabantid family) if satisfactory results are to be achieved.

The breeding tank should contain neutral, or preferably slightly acid water, pH 6-8-7-0. The tank bottom should be carpeted with clean compost and a few plants, suitably placed at irregular intervals, will do much to make the fish feel "very much at home". A few stems of some hardy plant such as Elodea densa, cabomba, etc., should be allowed to float in one of the corners to help in the ultimate building of the bubble-nest. Water level should be dropped to 8 in., and temperature maintained at 78°F. It is a generally accepted rule that both fish should be introduced into the breeding tank late at night in order (we hope) to spawn the following morning. In practice I have found this to be essential having had spawnings occur at many different times of the day.

Love-play is preceded by the male building his bubble-nest assisted by the female. This action cannot be mistaken as the fish continually rise to the surface of the water to gulp in air and then move under the floating plants to release their saliva-covered bubbles, which stick to form a compact nest sometimes as much as 4 in. across.

Approximately two hours later upon its completion, the male commences his wooing of the female with the spreading of his fins and the constant circling of his partner. Eventually she takes up a semi-vertical position under the nest and in a quick action is embraced by the male who wrapes himself around her, squeezing out her eggs which float into the nest. This action is repeated several times and upon completion as many as 500 eggs will have been safely deposited in the nest. The female should now be removed from the breeding tank to an isolated aquarium to prevent her from further damage and possible death from attacks by the male.

The latter may quite safely be left in charge of the offspring to add fresh bubbles to the nest in order to maintain its compactness.

Hatching occurs within 36-48 hours, when tiny opalescent-like objects will be seen adhering to the glass sides of the aquarium. It is now advisable to remove the male.

Within a further 48 hours the fry will have become free swimming, and food should now be given their first taste of infusoria. This diet will need to be maintained for a further two weeks or so, after which brine shrimp and micro worm can be fed.

The labyrinth, the auxiliary breathing organ situated above the gills with which all members of the Anabantid group utilise air from above the water, is formed at about the third week. Loomes of fry at this time can be expected to be heavy but can be restricted to a minimum if efforts are made to shield the aquarium from draughts and a tight-fitting glass cover is put in place.

If well fed the Pearl Gourami fry are capable of reaching a length of 1 inch within eight weeks.
FISH VARIETIES for the POND

by

A. BOARDER

When the water plants show signs of new growth the pond can be stocked with fishes. The numbers and types to be used will depend on the size of the pond and the whim of the owner. Some general directions will be offered and then it will be up to the pondkeeper to make his own decision. It should be realised that there is no need to over-stock the pond as it is certain that conditions are right not only will the fishes grow but they may also breed. Another point to consider when stocking is that a newly made pond is not likely to function as well as those in which many fishes have been established. If a few fishes can be maintained in good health then a few more can be added later if necessary.

There can be little doubt that the best fish to start with are goldfish (Carassius auratus). These are so colourful and easy to manage that they are the ideal fish for the new pond. There are now many varieties of this species, some of them, although very handsome and suitable for the tank, are not so suitable for the outdoor pond. Those which should not be kept in the pond all the year round are those fancy types with large and flowing finsage or very deep bodies.

The common goldfish is a sturdy fish with a stout body and short fins; it can be had in gold or red, silver or a mixture of these and sometimes blotched with black. The black on some young fish can soon disappear as this is a stage in the colour change from the first one of bronze to a brighter colour. The beginner is advised to start with small fishes, say not more than three inches in length overall. It is easier to get fish of such sizes established than it is larger ones, the latter having been used to different conditions over a longer period.

A fine variety of goldfish is the Comet. This has a streamlined body with a very long, pointed tail. It is a fast swimmer and a very active fish. Comets do not seem to be very common nowadays but if a few can be obtained they will be a constant attraction in the pond. The colours are often gold and silver, some almost all silver. They can grow to a fairly large size but should suit the ordinary pond admirably.

Another fine type for the pond is the Shubunkin. This is a variety of the goldfish with no hard scales but with a body appearing to represent a fish which has had all the scales scraped off. The outer skin is almost transparent and so allows colours to show through. A good shubunkin
should have a blue base with red, yellow, brown and violet in well defined areas and a black speckling or blotching over the whole fish. As can be imagined, such coloured fishes are very attractive when swimming near the surface. There are two main types of shubunkin, the Bristol and the London. The former is more streamlined with larger finnage whilst the latter is the same shape as the common goldfish but with the shubunkin colour.

The fantail goldfish is a handsome variety which can winter out of doors in most parts of the country, but in areas where very severe and prolonged frosts occur it may be necessary to bring such fishes under cover for the winter. The fantail is a short-bodied fish, oval in shape with well proportioned fins, the main feature being a double tail or caudal fin with double anal fins. The desired colour for each fishes is a deep red but some have silver markings on them.

The following fancy goldfish are not suitable for the beginner to introduce into the open pond, but if they can be brought inside away from the frost they could be kept in the pond for the rest of the year. They are: the moor, a black fish in either the fantail shape or the veiltail; the fantail one is the better fish for the pond as it has shorter finnage but both are not very attractive in the pond as their colour blends too much with the base of the pool and so they may not be seen very often. The veiltail is a highly developed variety with an almost round body with a double large, flowing tail. As the body is so short, the internal organs are somewhat restricted which means that this fish is very liable to swim-bladder trouble when it receives a sudden change to very cold conditions. The extra long finnage is also very liable to attack by fin congestion and fungus.

The Lionhead is a type shaped like the fantail with a large protuberance on the head and gill-plates. It has no dorsal fin and can be obtained in the same colours as the fantail. It is as hardy as this fish and so could be kept in the outdoor pond in most southern parts of the country. The Oranda is another variety with the hood on the head and gill-plates, but this fish is otherwise shaped like the veiltail. The extra long fins indicate that this fish is not for the pond during very cold times. The Celestial is a variety with its eyes looking upwards and as the eyes are rather protruding it is not advisable to include this type in the pond. The position of the eyes may prevent the fish from getting enough food when in the company of other types. The Bubble-eye is another fish which is unsuitable as these bladder-like
Under the eyes could be damaged against rocks or among weeds. Another variety is called the pearl-scaled, but as this feature can appear in any of the scaled varieties it is not wise to use any unless they are types with short fins and normal-shaped bodies.

Besides the varieties of goldfish there are other fishes which can be included in the stock. One of the very best is the Golden Orfe (Lebistes reticulatus). This is shaped like a herring, being streamlined with a pale golden shade. This fish is a very active one and spends long periods swimming about near the surface of the water. It is very rapid in action and grows quickly in suitable conditions. It feeds on all types of food suitable for the goldfish but prefers live food and will even take live worms from the surface. As this fish is so active and fast-growing it is not suitable for the very small pond. It requires a great amount of oxygen and in warm weather could soon be in danger from lack of it unless the pond was of a good size.

The Hi-gut carpa (Cyprinus carpio), is another fine fish which can be kept in the pond but again it can grow very large and easily reach over a foot in length in a few years. It is a slower-moving fish than the Golden Orfe.

There are several fresh water fishes which can be kept in the outdoor pond, some of these are native pond and river fishes. The most important point to watch is that no new fishes are introduced into the pond as they could eat any of the fishes small enough for them to tackle. A very handsome one is the Golden Tench, which is a golden yellow with a black spot on the fin. Although this fish grows to a large size it is not very harmful to smaller inhabitants of the pond. Small specimens can be put in the pond and they should soon grow well. They are very good scavengers and as they are bottom-feeders they may not be seen very often. However they will often lie near the surface of the water in warm weather and will also breed in the shallow parts of the pond.

When their activities are similar to those of breeding goldfish. The Rudd (Scardinius erythrophthalmus) is a fine fish when young. It can be obtained in its ordinary colour which is similar to that of a herring with red fins, or in a golden colour when the red is accentuated, giving it a very attractive look. It is a great attraction in a pond especially if there are several which swim in a shoal. It is more suitable for the pond than the rather similar type of fish, the Roach (Rutilus rutilus), as this fish appears to be very prone to the dreaded fungus disease. I feel that much of the trouble with this fish when introduced to ponds is that it has a very thick covering of mucus and when handled much of this is removed, thus leaving the fish open to attack by the spores of fungus disease. If young Roach can be caught with a net and handled very carefully there is no reason why the pondkeeper should not succeed with this fish, although as it bears such a strong resemblance to the Rudd, there is not much sense in taking chances with it.

The Minnow (Phoxinus phoxinus) is a handsome, small, lively fish which prefers very well oxygenated water but can be kept in the garden pool as long as the water remains in good condition with a good oxygen content. A shoal can look very attractive when swimming near the surface.

The Gudgeon (Gobio gobio) is a very good scavenger but as it is a bottom-feeder it may not be seen very often or near the surface. It is not one of the easiest fishes to keep as it prefers slow running water. The bleak (Alburnus lucius) is a bright little fish which does not grow very large. It is slimmer in the body than the Rudd and bears some resemblance to a streamlined Roach.
home in a well kept pond and is a fast swimmer, eating most foods taken by the goldfish.

The Chub (Squalius cephalus) is a river fish which can grow very large. It is not very different to a very large bleak, but it can be kept in large garden ponds. Small ones only should be added to the pond and care must be taken to remove them when they grow too large.

The Common Carp (Cyprinus carpio) is a fish which is so much like the ordinary goldfish in shape that I do not think it is very useful in the pond. As its colour is such a dark brown it is possible that it will not show up very well in a well-planted pond. It is of course very hardy and if it cannot be kept in good health there must be something radically wrong with the water condition. It feeds on any food taken by the goldfish and can grow to a large size as witness the forty-old pondcarp in the London Zoo.

The Stickleback (Gasterosteus aculeatus) is hardly worth putting in the pond as although interesting when in a suitable tank, it does not show up very well in a fair sized pond. The Pike (Esox lucius) and the Perch (Perca fluviatilis), are carnivorous fishes and could eat any fish small enough to get into their mouths, and so if it is desired to keep these very handsome fishes it is necessary to see that they are not with any smaller fishes.

The European catfish (Silurus glanis), is often recommended and sold as a scavenger for ponds but care must be taken as this fish can grow to a large size, some over 30 lbs. in weight having been caught. They are also carnivorous and will eat any small fish they can get into their huge mouths.

A most interesting little fish from European waters is the Bitterling (Rhodeus amarus) which is unique in laying its eggs within the freshwater mussel (Unio augurina). Although this breeding phenomenon is not likely to be observed if it takes place in the garden pond, a pair of these attractive, bright silver little fishes are worthy of exhibition. A member of the carp family, the Bitterling rarely exceeds a length of three inches so is ideally suited to the small pond.
LIGHT and BALANCE

by AQUARIUS

A successful garden pond is often described as being well-balanced. This term might be confusing to some beginners but it is very important and should be understood. Briefly, a well-balanced pond is one which functions quite adequately with the minimum attention and care of the gardener. It is possible to install a pond and stocking it so that it can run along and remain in good condition for some years. The amount of light which reaches the pond can be an important factor, as without sufficient light many of the water plants will not flourish. It is only there where the water plants are in good condition that they are able to keep a good balance. Such plants as Elodea may not thrive without enough light although some of the underwater oxygenating ones do not appear to be particular.

If the pond has been sited in a sunny part of the garden and not over-shadowed by trees or shrubs, it is probable that the water-plants will thrive well. On the other hand if much light reaches the water it can encourage the growth of green algae which makes the water thick and green so that fishes cannot be seen. This algae is a single cell plant which thrives in good light. Where light is limited it will not grow. As most water plants need the shade should be provided for them and then when they no longer grow they will choke out the algae partly by shading and partly by using up the nutrient and also by algae.

When the pond is newly made there is a great danger of many free-floating algae forming as the water plants have made enough vigorous growth to counteract the sun. It is always possible to provide some shade, even in the early stages of the development of the pond. Before the water-lily leaves have had time to give some of the surface, some cover from the sun may be provided by adding a quantity of floating aquatics, such as waterlily leaves. This soon spreads over the surface of the water and can help to keep the water clear. It also provides food for many fishes including goldfish. If this gets too rampant and covers almost the whole surface, the detrimental effect can be flushed off with a strong jet from a hose.

Another deciding factor in the maintenance of a good balance is the number and types of fishes that have been added and the water plants were growing when they were introduced. It is probable that all will go well. If too many fishes were added before the plants had begun to grow, or were in too few numbers, then it is possible that the pond will not function at its best. It cannot be expected that a newly-constructed pond can be planted and stocked in a short space of time and function perfectly. Some patience must be exercised as it would be very unusual for such a pond to remain in a perfect condition. There are several factors which will operate to keep a proper balance and some of these are only likely to emerge when everything in the pond is in harmony.

One point which may soon upset the new pond is when the owner cannot refrain from feeding the fishes as soon as they are put in the pond and every day thereafter. Such a practice can soon lead to trouble. Until the water has settled down and the plants are active, it is unwise to start feeding the fishes. Apart from the fact that the fishes may now have been disturbed when they were moved, it is probable that they can find plenty to eat around the water plants. Most fishes will not eat any soft vegetation and there is likely to be plenty on the newly-set plants.

To get a good balance in the early stages of development of the pond it may be necessary to over-plant for a time. Once the water plants are growing well it is possible to remove some or prune the others so that a better balance is effected. This refers mainly to the underwater plants which play a very important part in maintaining a good water condition. The condition of the water should be inspected soon after it has been stocked. Its smell should be noted. A clear water has no appreciable smell and does not look cloudy in any way. A slight green tinge should not be a cause for concern as this is very usual in the early stages, but if the water takes on a muddy hue, or bluish green, it then is a cause for concern. It may be necessary to change a large amount of the water and refill with fresh. A sure sign of trouble is when the fishes become changeable at the surface. There is little oxygen in the water when this happens and in the early mornings it is advisable to inspect the pond and to look for numbers of bubbles at the surface. The weather at the time may have something to do with this as it is possible that the water will not be well oxygenated and a run from the hose with fresh water should soon improve matters.
WHEN the pondkeeper is ready to stock the pond it will be necessary to consider one or two problems before ordering. If the pond is expected to provide a home for several different types of fishes its stocking will be different from the case where breeding is anticipated. In the first place it can be stated fairly conclusively that if many fishes are left in the pond they will breed but if the stock contains many varieties of fancy goldfish the resultant youngsters will be runts or cross-bred. In many ponds goldfish breed every year but so many get eaten by the parent fishes that few remain in the pond to grow on. If one requires to breed a special variety of fancy goldfish it is essential that either only one kind is put in the pond or that breeding is done in a controlled manner by removing the spawners to another pond or container so that any fry bred will be true to the parents. All goldfish of any variety can breed together and so it is most important that if good strains are to be bred from they must not be allowed to mix with other varieties.

A study of the list of fishes suitable for the pond can be made in the article on fishes for the pond. A choice can then be made and a few of each type required obtained. Remember that small fishes are likely to establish themselves more quickly than older ones. They are also cheaper to purchase. With a very new pond it will be a wise plan to try a few fishes first and then if there is no trouble with these, more can be added. The water can be tested with these few, or by adding some water plants (Daphnia). These crustaceans will not live for long in impure water. Another good test is to introduce some water-snails, although this might not always be advisable in a large pond. For one thing they might not be easy to find after a day or two, and they might not be wanted in the pond. The addition of snails is an individual taste for the pondkeeper. Some, such as the large pond snail (Litona stagnalis), can eat a quantity of the fine soft leaves of the choice water plants as well as eating much of the food given to the fishes. Another point against introducing these snails is that if dried foods are placed on the surface the snails will get to it and what they don't eat they will foul up with slime. The ramshorn snail (Planorbis corneus), is not as likely to attack growing water plants. Snails can also eat the eggs of fishes but against this the young snails can be eaten by fishes. On balance I do not advise keeping snails in the pond if any breeding is intended.

When new fishes are procured it is most important that they are thoroughly inspected before they are put in the pond. If any pests are present it may be very difficult to get rid of them later on. A wise plan is to quarantine the fishes for about a fortnight before they are allowed to go into the pond. This may not be easy as the pondkeeper may have no place in which to do this. Also most would be very hesitant to see the fishes swimming about in the pond. One of the worst pests which could be on the fish is the fish-house, (Ceratium). This appears as a small jelly-like creature about a quarter of an inch across and sticks to the fish sucking its juices and causing red wounds.

It is fairly easy for an experienced aquarist to tell if a fish is healthy. Most fishes will keep their fins extended when healthy and a lowered dorsal fin, the one on the back, usually indicates that all is not well. The fishes should be bright of eye and active. They should be swimming in their tank at various levels and not mooring at the surface of the water. This latter action may be only temporary as the water in the dealer's tank may be warm so that the fishes and there may be insufficient oxygen for them. Such fishes should soon become normal again if kept in your pond.

If the fishes appear to be active and healthy they should be in good condition. The evening is the best time to buy but any time will do as long as the introduction is a safe one. The water in the carrying can or aquarium must be kept cool. It is easily done. Just let the carrying can fly in the water for a time until the water becomes the same temperature as the pond water. Then allow the fishes to swim quietly. Do not give any food for some days until the fishes have settled down. When feeding do not get the idea that only a little food is given at first. If this is used up fairly quickly some more can be given but not much at a time. The amount of food given will depend on the temperature of the water. During winter the fishes will be more active than in summer. It is difficult to feed too much food when the water gets colder and so the appetite diminishes during the coming of the winter.

For a fair sized pond the owner may like to have the different varieties of fish and the following kinds make a good beginning — a few common goldfish, koi, fantails, comets, golden tench, golden molly and orfe and hi-go. The number of each will depend on the size of the pond but always allow plenty of room. A pond of about $100
The introduction of scavengers will seem almost a must to most beginners but this is not as important as some might have us believe. I consider that a goldfish can act as a scavenger as well as any of the usually recommended fishes. If a goldfish is healthy and hungry it can eat almost anything and I am certain that anything in the shape of food which fell into the pond would be taken. Sometimes the presence of a green tinge in the pond will indicate that no very large worms which fall in will remain to die and foul the water.

It has sometimes been recommended to add freshwater snails to the pond as it is stated that they help to keep the water pure. This is a happy thought but it does not keep that way. No mussel could live long in a freshly constructed concrete pond. Mussels must have plenty of mud or silt in which to move around and feed. If this is not present they would soon die and a decaying mussel would foul the water as quickly as anything else I know. It should be considered that when introducing British freshwater fishes to the pond that they are not all very fortunate. Most of them have protective colouring on their sides so that they are not conspicuous from above the water and thereby are less prone to attack from predators. This means that the fishes are not likely to show up in the clear pond. They may look very fine in a glass-sided tank where their silvery sides will be obvious but in the pond this is quite a different matter.

Once your fishes are settled in the pond their feeding will be the most important task. Although it is probable that you will find plenty to eat there, it is advisable to add some foods from time to time. This is important if anything is needed. Fishes require plenty of food to help growth and development of eggs and are if they are expected to spawn well. The food can be live or dead and it is a good plan to use a little of each, so at least to give live food on one or two days each week. Dead foods are numerous and it would be rather difficult for many home sufferers to be eaten by anadromous in addition they will eat garden worms, broken eggs, maggots, Tubifex, white worms and Daphnia.

The art of maintaining a pond in good condition is knowing when or when not to feed. The pond can function well alone but if too much attention is given to it in the stages of over-feeding, trouble will surely ensue.

Taking a stick among the marginal growth of blanket weed is the most sure and quickest method of removing the bulk of this pest.

**FRIENDS OR FOES**

When the pond is initially stocked, fish may be the only intended occupants but other life-forms will very rapidly make their appearance. Some of these will develop from the eggs laid by winged insects, some from eggs deposited by amphibious creatures and others may be introduced along with aquatic plants. Some of these creatures will constitute a threat to the pond fish while others can be regarded more favourably as food for the fish. While it is essential to carefully examine all plants for foreign bodies before placing them in the pond it is also of great importance to keep a continual watch upon the pond for signs of visitors and to be able to tell friend from foe.

The greatest threat from the foes is directed towards fry and young fish so that intending breeders must be especially alert. Voracious predators such as dragonfly-larvae, great-diving beetles and their larvae and water-boatsmen are fairly easily detected because of their size and they can be netted and removed as and when observed, but smaller pests such as hydra are both difficult to see and to remove and it is such creatures as these which should be sought among plant foliage before planting.

The great-diving beetle, a handsome insect of some 1½ inches in length, usually arrives after dark and seeks the deeper regions of the pond where it can stalk and swiftly attack any soft-bodied creature of a size it can manage—a size often exceeding its own. Equipped with very sharp mandibles, it is able to tear and devour its prey quite quickly and be ready for further victims. However, needing to make contact with the upper atmosphere for its air supply, the water-beetle has to make periodic trips to the surface where it raises its abdomen above the water for this purpose and it is on such occasions when a swift dip of the net will secure it for removal. Its larval form is a greater menace for it has a greater appetite (being a larva and requiring to carry out its body-building while in this stage) and must spend its larval existence within the one body of water unlike the adult beetle which can take flight at any time for pastures new.

The water-boatsman, a rapid-swimming bug, has also to surface for its air supplies at periodic intervals and can be netted in the same way as the water-beetle. Care should be exercised when handling this insect as it will readily
Great-diving water beetle (Dytiscus marginatus) use its “beak” (the sucking mouth-part) on one’s flesh and the effect is quite painful although not lasting.

The larval forms of dragonflies present a somewhat different problem. Fully equipped for life under water they have a tracheal system enabling them to take their oxygen requirements from the water and their appearances at the surface are not frequent. While they are capable of rapid movement for short distances when disturbed, they resort to a different technique for catching their prey. There is a waiting game and they lurk among the submerged foliage making unerring grabs at passing prey by means of a device which shoots out from under the head and draws the victim back to the waiting jaws. Once in the pond their detection is difficult and usually occurs by chance.

Hydros, those tiny polyps related to sea-anemones, can be a scourge among shoals of tiny fry and their dual method of reproduction ensures a rapid multiplication of their numbers when the feeding is good. Since they usually arise from the introduction of plants their eradication must be ensured when the plants are obtained. To do this, and at the same time cleanse the plants of other possible small pests, the plants should be immersed in a container filled with a weak solution of potassium permanganate for some hours at the end of which the offending intruders will be found to have dropped to the bottom of the container when the plants can be lifted out carefully, rinsed thoroughly and placed in the pond.

News may make their appearance in the pond during early summer and while these engaging little batrachians are harmless so far as adult fish are concerned, a small number of them can decimate a shool of fry in a short space of time. Their eggs, laid singly among the submerged plant foliage, need not constitute a great threat since most of the tadpoles which emerge will be preyed upon by the fish. Better by far to concentrate on reducing the number of adults when they first appear in the pond in the breeding season.

Frogs, and more rarely, toads, may annoy your pool with their presence and can, in the main, be regarded as more beneficial than harmful. Adult frogs prey entirely on terrestrial and aerial life-forms so can be regarded as quite harmless and their tadpoles are consumed by the fish. The same applies to toads although their tadpoles are not relished by fish so would complete their metamorphosis and leave the pond while the eggs anyway threaten nothing!

Mosquito larvae, daphnia (water fleas), aphids (water bugs), and freshwater shrimps (gammarus) can all be looked upon as friends inasmuch as they all represent potential fish-food providing a useful variety in the diet.

In the main, the foes far outnumber the friends when fish fry are concerned but a motto of “destroy and ask questions afterwards” isn’t recommended as a good one especially in these days of increasing rarity among so many of our erstwhile common life-forms. A better plan when a creature appears in the pond which defies identity is to place it in a lidded vessel of water until it can be identified when judgment can be pronounced. By this means possible rarity may be preserved and knowledge acquired for the future use.
OUR EXPERTS’ ANSWERS TO TROPICAL FISH-KEEPING QUERIES

What can I do to rid my tropical aquarium of a blue-green algae which has spread from the rear glass on to the compost? I am one of the unfortunate people who do not wish to remove the fish from the tank or introduce any chemicals to the water.

We suggest that you scrape the growth from wherever it is adhering to and then siphon the pieces away. Next, introduce extra larger plants to compete with the algae for food (derived largely, of course, from the waste products of the fish and light). Expendable and vigorous-growing plants such as Elodea densa and hornwort (Ceratophyllum) are ideal for this purpose. Finally, remove any inorganic rock and/or compost which is now calcium-free, keep the bottom clear of uneaten flesh or dried food, and ensure to top up the aquarium every now and then with well-water which has been strained through moist, undisturbed and algae-inhibiting peat.

Some years ago I bought a handsome marked fish called a flying fox, from a man where I now live. He said his species comes from, what its inhabitants are in the way of food and temperature, and it will make a suitable occupant for my community tank.

The flying fox, sometimes called the silvery fox, is a member of the family Ctenopoma, and is said to be fairly widespread over Sumatra and Borneo. It attains a length of about 9 in. in the wild state, but only about half this size in the aquarium. Like most of the cyprinids we keep in captivity, it will live with other fishes without molesting them and will thrive on a mixed diet which includes some mixed greens and/or mossy algae. A temperature in the neighborhood of 75°F (24°C) suits it best.

I should be grateful for the names of some Fish-in-a-Box that would live sensibly with plant daisies, blue and green algae, and very hardy in a large community tank.

You can hardly do better than make a choice from the following species: Aphanogeton americanus, A. carteri, Cichlasoma nigrolineatum, and Haplochromis semistriatus (not entirely reliable when large), and Triops africanus.

Is it possible to make a durable and non-toxic tropical aquarium from wood?

The short answer is yes if the proper joints are made and well-seasoned hard wood such as mahogany, teak or oak is used.

What small character hardy barbs and catfish possessed of attractiveness, and, when kept under good conditions, would you advise me to introduce into my newly set up 40 in. by 12 in. by 15 in. tropical aquarium?

As your tank will support about three dozen of the smaller tropicals, we suggest that, for a start, you introduce small schools of nemo tetras, pretty tetras, flame fish and mollies. For the rest, we recommend such hardy species as the checker-barb, Stiebeck's barb, Schubert's barb, Cummings's barb and one or two of the spotted or beaded Corydoras catfish.

Many queries from readers of ‘The Aquarium’ are answered by our experts each month, all aspects of the fancy hobby being covered. Not all queries and answers can be published, and a stamped self-addressed envelope should be sent in so that a direct reply can be given.

I wish to obtain healthy young Turbot from a newly purchased pair of spotted mollies. What sort of conditions and food suits this fish best?

Aim to keep the fish at a temperature of about 72°F (22°C) to 75°F (24°C) in well-planted neutral to moderately alkaline water, which slightly saturates the addition of a small quantity of Tafnol's Sea Salt. Further, see that plenty of mossy green algae or blots of cooked spinach or bruised lettuce leaves are included in the diet.

The only plants that grow well in my electrically illumined tank are various Cryptocorynes. Other plants such as Vallisneria and Cabomba just withers away. May I have your comments, please?

Obviously your lighting arrangements are at fault. Cryptocorynes spp. will prosper in quite a poor light, but Vallisneria and Cabomba must have a bright light for at least eight hours every day.

The water that I draw from the mains is hard and alkaline. I would like to know a way to make it softer and less alkaline for my fish.

Boiling your hard water will render it softer. The alkalinity can be reduced by straining it through moist sphagnum moss or peat.

Can you tell me whether it is possible to grow tropical aquarium plants under fluorescent light?

Certain plants seem to grow quite satisfactorily under marine fluorescent light. Among these are the Cryptocorynes, Lagenandra, Sagittaria, and the aquatic mones technically known (generically speaking) as Vesicularia and Fontinalis.

Please give us some information on the cultivation of the Grindal worm.

This tiny whiteworm needs warmth, and an ideal place to house a culture is in an airing cupboard where the temperature does not fall below about 65°F (18°C). A shallow box or plastic tray almost filled with yellow loam or leaf-mould mixed with a little clay is needed to house the worms. The soil should be kept moist, but not wet. It should also be covered with a piece of glass and a sheet of thick paper or card on top to exclude light. Feed the worms every other day on about a teaspoonful of milk. Pears or fine oatmeal mixed to a creamy paste with warm milk.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I am making a garden pond and as there are a number of small ducks about, I wonder if you could suggest a wire meshing to make screens to cover the pond?

I made screens some years ago with wire netting on frames which have been in use with no ill effects to the fish. Fresh galvanising can be dangerous to fishes but depends on the amount of water in the pond. However, there is a plastic square mesh netting on the market which would be quite safe.

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the fin is extended. This shallow water ensures that there is usually plenty of oxygen in the water, and it is possible to keep a fish in such a solution for at least a fortnight whilst it is undergoing treatment. You can then lightly wipe the eyes every day with cotton wool dipped in equal parts glycerine and iodine. The fish should respond to this treatment.

Please could you recommend a book on feeding and the care of goldfish in a coldwater aquarium. We seem to be having trouble with our fish?

Get the book "Coldwater Fishkeeping" at 9s. 6d. post free from The Aquarist. This book gives you all the information you need to be able to succeed with your fish.

I have recently set up a coldwater tank and notice that there are bubbles on the top of the water in the mornings. What is wrong?

The bubbles are a sign that the water is impure and the fishes have been gasping at the surface for more oxygen. You have other insufficient plants for the number of fishes or you have been over-feeding and the uneaten food has polluted the water. Change most of the water and go steady with the food.

I have been unsuccessful in keeping sticklebacks and gudgeon in a coldwater tank. I have fed them on many types of food but none love the fish. Where have I gone wrong?

It is difficult to say where you have failed with the information given. You may have over-fed and this could cause the water to become polluted. These types of fish like a well oxygenated water and as long as it has plenty of swimming space, there is no reason why they should not thrive.

I have had two goldfish in a bowl for nine years. One has grown to 6 inches but the other is only 5 inches. I know that these bowls are frowned upon by experts so do you think this is a record?

Goldfish can live to 20 years or more, but it is unusual to keep them as long as this in a bowl. The one fish has not grown as well as the other probably because there is not enough swimming space. It would be much better to give them both a proper set-up tank. You would want to live in a small cell with no furnishings I am sure.

I have made a pond 20 feet by 9 feet by 2 feet deep. Can I put six golden orfe, 12 inches long, four Higoi 12 inches long and eight goldfish 6-10 inches long?

Your pond is of a good size and should be able to accommodate the fishes you mention with no trouble. The orfe and Higoi can grow to a large size in time, but you must always reduce the numbers of fishes if it appears that they have grown too large for the pond. You must also watch points in hot weather as the golden orfe are not happy in a water which gets too warm and so lose much of its oxygen.

Macropodus opercularis concolor

by L. B. Katterns

When one has been keeping fish for many years and is handling many thousands annually, it is surprising how some possessing great merit from the aquarist’s point of view will pass almost unnoticed, until one day something happens to focus attention on this fish and one’s picture completely changes.

In my case, such a fish has been the Macropodus opercularis concolor or the so-called black paradise fish. These fishes have been passing through my hands in quite fair quantities for some years and, frankly, I have often wondered why there has been such a steady demand for them and it is only recently that I have realised what I have been missing all this time.

A consignment arrived somewhat unexpectedly and not having a tank ready in which to quarantine them I was forced to place them in rather a dirty and dirty tank; normally they would have been put into a clean light tank in order that any trouble developing would be easily seen, and under such conditions they remain rather colourless and are anything other than black, the fins remaining transparent and devoid of all colour. Where fish are concerned I am rarely surprised as I have come to the conclusion that the impossible does sometimes happen but on this occasion I confess that I was really amazed.

Instead of finding a tank full of rather drab fish as expected, I was confronted with one of the most beautiful sights I have ever seen in an aquarium. The fish had taken on a dark, smoky, black body-colour and the fins were almost indescribable. The caudal and dorsal were covered with a chequered pattern of tiny dark-blue squares and edged with greenish blue which could only be described as fluorescent, the pelvic fins being a vivid orange making a striking contrast against the dark body-colouring. The females which have a much shorter fin development show the same colouration but to a lesser degree.

The Black Paradise Fish is much smaller than the more common M. opercularis but is identical in shape and disposition and according to some American writers the two have been crossed but there does not appear to be a great deal of information on this point.

The breeding habits vary only a small degree, the black variety making a much smaller nest and spawning in eggs. Several pairs in a large aquarium give better results than individual pairs in smaller tanks and I would suggest that a tank having 3 sq. feet of water surface with no more than 4 in. of water would be ideal for three pairs of fish.

The whole surface should be thickly covered with some form of floating plant having roots long enough to touch the bottom; water lettuce (Potamogeton) is excellent for this purpose. If this method is adopted, each pair must take over one corner as its own territory and make its nest and it is more than possible that there will be some pairs spawning at the same time. If a close watch is kept it will be noticed that the females do not spawn immediately next only. Once fry can be seen swimming freely remove the oil plants and the parents fish and cover tank with pieces of glass to maintain warm, moist air above the water. Let us neglect to do this that causes the loss of so many highly desirable fish in the early stages of their development, for it needs one mouthful of dry or cold air when the incubation is forming to cause death.

Low temperatures can be tolerated for some considerable time but for breeding purposes 75° F. seems to give the best results. The water conditions are not so important as with many other fish.

Feeding presents no difficulties as these fish will take almost anything but a little live food is advisable. Can be fed on bloodworms in the conditioning period, and a few days on infusions is essential in giving the fry a start. This may be followed with brine shrimp and then on to some of the finer prepared foods. Thus treated the fish grow very rapidly indeed.
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.

Problem after Problem

You may care to print the following as a "follow up" to my article "Facing the Big Freeze Up" published by you in the January issue. So far this winter has been kinder to us here in the south than a recent three week spell gave us temperatures down to 

5°C. Ice formed on the pond and the aerator was in continuous operation throughout the period. At first the sub-heater was not lit in the pump house. As the temperature fell and the area of open water decreased, I decided to light the heater and was pleased to see the clear areas increase again. A further hazard became apparent at this stage: the local cats and seagulls spotted the goldfish swimming about so a guard of wire netting had to be laid over the hole until the thaw came.

A. J. Gilbert,
Bitterne, Southampton.

Answer Please

Where can I purchase a glass fry tube? In the old days it was possible for about half a crown to buy a suitable affair rather like a large glass tobacco pipe which could be used to fish out fry from a tank without harming them. These days when I enquire of shopkeepers they never seem to have heard of such things or if they have made suggestions like "cut out the end of a net and replace it with a plastic bag, it works just as well". Maybe it does but what satisfaction there was in scooping out fry with the glass fry tube!! Please, do you know if any of your advertisers stock them—it is a very small item but very frustrating and I would far prefer one on the market at any 5s. to some of the gimmicky equipment selling for pounds.

Reinald W. Collett,
Dorking, Surrey.

Film Shows for Aquarium Society

I usually ask your indulgence once a year to allow me to inform your readers that I am still willing to travel almost anywhere to give my film show lecture to Aquarium Societies. Clubs or Societies which do not hold membership of the Federation of British Aquaria Societies often find great difficulty in obtaining lecturers, this I know from letters I receive. Only your magazine can inform them of people available.

My programme of films is virtually the same as last year. The three which are all my own productions are as follows: Tropical Aquarium Fishes, Blue Gouramis, Malindi Fishing, S. African Clawed Toad, Stick Insects and Praying Mantises for the Fish house, Fighting Fishes of Sumatra.

April, 1966
A Further Record of a Rare Freshwater Medusa in Britain

by EDMUND L. SEYD, M.A., B.Sc., F.L.S.

In December 1965, Mr. Gerald Barbrook, the Aquarist of the Cannon Aquarium, Manchester Museum, noticed some small transparent objects floating in one of the reserve tropical tanks of the Aquarium. Under the microscope these were seen to be specimens of the minute "jellyfish" Craspodactyla snowi, described by Landreth, the only species of freshwater medusa in Britain.

The first record of this species was made in 1860 by Mr. James Sowerby, secretary of the Botanical Society of London, who found some specimens in the tanks of the giant water-lily (Victoria regia) in the Royal Botanical Society's Gardens at Regent's Park. Since that date it has appeared in tropical aquaria at Sheffield (1893), Birmingham (1920), Boscombe (1929) and Edinburgh (1933). More recently it was found in large numbers in a tank of tropical microcosm at Chatterhouse School (Clegg, 1897).

The species has also been recorded in open waters. In 1928, 1929 and 1948 it was found in the Exeter Ship Canal; in 1933 and 1935 in a colliery reservoir in Monmouthshire; in 1949 in Witcombe Reservoir, Gloucestershire; and in 1956 in the Rochdale Canal (Kidd, 1956). In aquaria Craspodactyla snowi has only been found in tropical tanks in which the temperature range was 70°F, upwards. In the Cannon Aquarium the temperature of the tank in which the medusae were found is maintained at 78°F. It is therefore not surprising that the medusa has only been recorded in open waters during the summer months and in most cases these waters appear to have been artificially warmed by hot water from industrial processes.

Craspodactyla snowi has been recorded abroad in France, Holland, Germany, Austria, Czecho-Slovakia, U.S.S.R., China, Japan, Canada, U.S.A. and the Panama Canal Zone.

There has been some confusion over the name of this medusa. It was not Craspodactyla snowi (now Craspodactyla snowi) by Ray Lankester in a communication to Nature on 17th June, 1880, but a week later Allman also published an account of the species in Nature under the name of Limnocaecium victoriae, which he had proposed at a meeting of the Limneological Society. On the day that Lankester's name was published, Lankester withdrew his name and the species was known as Limnocaecium victoriae for the next 30 years. In 1916, however, the International Commission on Zoological Nomenclature ruled that the name Craspodactyla snowi had priority over that of Limnocaecium victoriae.

Further confusion arose because the connection between the polyp stage, which was later discovered, and the medusa was not understood and the polyp was given a separate name of Microhydra ryderi Potts. This name still stands as the correct name for the polyp stage of C. snowi.

The small polyp, 0.5-2.0 mm. long, has an apical mouth surrounded by nematocysts but unlike the freshwater form...
Aquarist's Notebook

Compiled by L. BRADLEY

CLUES ACROSS
1. Tennis racquets are crystalised (4, 7).
2. Used to fight diseases in the aquarium (11).
3. Cell to gentlemen (6).
5. Group, e.g. eggs laid in cocked fashion (7).
6. Dead whale (7).
7. Animals like the modern? vegetarian's answer to smiling on a man's finger (9).
8. A species of fish belonging to the family Nemipteridae (4).
9. Two of a kind (4).
10. A species of freshwater fish (7).
11. Description of an aquarium completely stocked with fishes (7).
12. Fat fish (4).
13. Emperor of Russia (4).
14. Hypostoma callitroga eurystoma (5, 9).
15. Arinella callida (5, 9).

CLUES DOWN
1. 50 to 1 that the guppy is this variety (4).
2. India sea (6)
3. Fish as in picture, perhaps (4).
4. More than 100,000 of them come down (7).
5. Concerns a species (11).
6. A group of large freshwater mouth (11).
7. At a height (9, 3).
8. Homoptera acuta (9, 3).
9. If one dies this then one lives on (9).
10. Where 23 acres can be found (5).
11. Don't get out of bed (5, 2).
12. Bears sleep, found wild in the highlands of Scotland (5, 4).
13. Ale (4).
14. An example in pounds and shillings to keep one going (4).
15. Find the vehicle in the quiet ramshackle town (4).

Solution on page 16
from AQUARISTS’ SOCIETIES

Monthly reports from Secretaries of aquarists’ societies for inclusion on this page should reach the Editor by the 12th of the month preceding the month of publication.

AT the monthly meeting of the Garforth and Ossett A.S., a fortuitous event took place with Mr. Keith Burnellough, the successful host, being present with his aquarium, which was a surprise to the assembled membership. The event was of particular interest as it involved the presentation of a trophy to the recipient, Mr. J. Durrett, for his efforts in the promotion of the society. The trophy was presented by Mr. J. Durrett and was enthusiastically received by all present.

THE first annual general meeting of the Chester and Macclesfield A.S. was held at the Zetland Hotel, Chester, on 1st March. The meeting was called to order by the Secretary, Mr. J. W. Armstrong, and was attended by Mr. T. Davidson, Mr. D. J. Armstrong, Mr. R. Johnson, Mr. D. J. Armstrong, Mr. J. W. Armstrong, and Mr. T. Davidson. The Secretary’s report for the year ended 31st December was read and adopted, and the treasurer’s report was presented by Mr. J. W. Armstrong. The minute was read and adopted.

MEUBRS OF THE INDEPENDENT A.S. took part in the annual competition for the best aquarium in the country, which was held in conjunction with the Royal Horticultural Society’s annual show at the Royal Agricultural Society’s Showground, York. The competition was open to all members of the society, and the entries were judged by a panel of experts. The judges were Mr. T. Davidson, Mr. J. W. Armstrong, and Mr. R. Johnson. The results were announced at the meeting, and the winners were presented with certificates and prizes. The competition was a great success, and the society was delighted with the result. The society is hoping to hold similar competitions in the future.

THE first annual general meeting of the Garforth and Ossett A.S. was held at the Garforth and Ossett A.S. headquarters on 1st March. The meeting was called to order by the Secretary, Mr. J. Durrett, and was attended by Mr. J. Durrett, Mr. J. W. Armstrong, Mr. T. Davidson, Mr. R. Johnson, Mr. D. J. Armstrong, and Mr. J. W. Armstrong. The Secretary’s report for the year ended 31st December was read and adopted, and the treasurer’s report was presented by Mr. J. W. Armstrong. The minute was read and adopted.

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January 8th, Northumberland A.S. held its 3rd Annual Dinner and Dance at the City Hotel, Newcastle, on Friday evening, January 8th. The guests were entertained by Mr. J. H. Miller, President of Northumberland A.S., who gave a welcome address. After dinner, a dance was held, and the evening concluded with a speech by Mr. J. H. Miller.

The table show at the March meeting was held at the Abingdon Hotel, Oxford, on Friday evening, March 11th. The guests were entertained by Mr. J. H. Miller, President of the Oxford A.S., who gave a welcome address. After dinner, a dance was held, and the evening concluded with a speech by Mr. J. H. Miller.

A new and varied programme has been arranged for future meetings. For further information, contact the secretary, Mrs. E. Brown, 37 Hocklington Road, Brandon Park, Nottingham.

A recent meeting of the South London Section of the B/S/S was held at the South London Field Club, Brixton Hill, on January 10th. The guests were entertained by Mr. J. H. Miller, President of the South London Section, who gave a welcome address. After dinner, a dance was held, and the evening concluded with a speech by Mr. J. H. Miller.

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NEW SOCIETY

The Mid-Sussex Aquarium Society was formed on the 17th February with a membership of 28 from which the following officers were elected: Chairman, Mr. H. Earle; Treasurer, Mr. D. Deans; Secretary, Mr. J. Holmes.

AT the annual general meeting of the society on the 17th February, the following officers were elected: Chairman, Mr. H. Earle; Treasurer, Mr. D. Deans; Secretary, Mr. J. Holmes.

A MEETING was held by the Thames and District A.S. recently at the ADC Club, London. Many members were present, and the meeting was discussed by Mr. J. Holmes, who gave an illustrated talk on Killifish. The meeting was well attended and the chairman, Mr. W. L. Gartside, took the chair.

AT the February meeting of the Thames and District A.S. the speakers were: Mr. A. E. Goodall, who gave a very interesting talk on the study of microscopic stages of the development of the mouth and the development of the mouth of the Zebra Danio. Dr. F. F. Fox showed some very interesting slides of the mouth stages of the Zebra Danio, and Mr. J. Holmes gave an illustrated talk on Killifish. The meeting was well attended and the chairman, Mr. W. L. Gartside, took the chair.

NATIONAL NATURE WEEK

IN connection with the National Nature Week which is being held during the 23rd and 30th April, the Blackpool and Fylde A.S. approached the Education Department recently with an offer of assistance in the setting up of some talks. It has been arranged to use the property of the Institute to provide spaces for these talks, covering British fauna, plants, and animals which should be of interest to children.

The Exhibition will be held at the Art Gallery and will be open from 20th April to 4th May.

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