

# The AQUARIST AND PONDKEEPER

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The Editor accepts no responsibility for views expressed by contributors.



Valerie Lilley

Valerie Lilley and Colin Thomas (see page 86) are introduced to a young girl, Susan Jones of Kingston, and Colin Thomas of Bedford.

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## Editorial

FROM earliest times one avenue for the exercise of man's ingenuity has been the development of methods for the transfer of fish from their safe and familiar watery environs to high and dry conditions. The methods devised for catching fish have advanced in step with contemporary technical progress; an almost perfect series exists from the use of wooden spears, which must have demanded a considerable degree of dexterity from those wielding them, through the less laborious procedure of using paralysing berries to bring fish to the surface, to to-day's more prosaic and seemingly risky employment of electric shocks.

Such methods as these would, of course, greatly offend Izaak Walton and his followers, but these, with their scarce-changing hooks and lines, form a stagnant by-water to the main flow. Even so, the most ardent admirers of progress among us may feel a trifle uneasy about the latest device described in a news paragraph, a device which takes mean advantage of fish curiosity to deliver them to their captors. It may be described as a buzzing box, an electronic gadget generating impulses beneath the water which fish find irresistible. Fuller details have not been published, and the fact that the method of administering the *coup de grâce* is unmentioned does not alter the knowledge that this surely follows on the treachery.

However, should the buzzing box ever be made available to the aquarist there can be no doubt that it will find humane applications in his hands. Perhaps it cannot be made small enough for use in the aquarium, where so much heartbreak is occasioned by plant-breaking and uprooting sweeps of nets wielded after elusive fish, and it is also unlikely that the inventor could so elaborate his device that it would attract only one kind of fish at a time. But in the large pond at cleaning time it could prove a boon. It may be that the time is coming when the fish-keeper with a net will be looked at in much the same pitying way as those early users of the spear must have regarded their fellows who caught fish with their hands; although it could be, too, that this is just fancy.



# Breeding Lionheads and Orandas in Ponds

by W. H. MACEY



*Oranda goldfish*

**W**HEN lionheads and orandas are reared and accommodated throughout the year in outdoor ponds they are so healthy and strong that they appear to be able to resist all kinds of disease, live to a very ripe old age, and spawn well up to their ninth year or more. They are also very tame and lovable, always ready to take food from the fingers, and grow to an enormous size, weighing two to three times as much as a large shubunkin.

But their most astonishing difference when compared with other fancy goldfish, and one that has its advantages, is that they appear to be able to exist on little or no food, yet when it is given will consume 10 times the amount other fish need. While a shubunkin is enjoying one garden worm, these fish will consume six or more; in addition most fancy goldfish cease to eat when the temperature has fallen below 60° F., while the offspring of lionheads and orandas continue eating until the temperature has fallen below 45° F., and the adult fish will often take a small worm when the ice has to be broken to pass it to them.

Although in theory there should be no difference between these fish whether reared in indoor tanks or outdoor ponds, it is very doubtful if a show specimen could be raised in a pond, due to the much slower development of their main features, the hood and fins. On the other hand, the pond-reared fish is usually much larger: its colour is much richer, it is more robust, and therefore should be more suitable for reproducing its progeny.

If these fish are to become more numerous and popular, the only remedy appears to be to breed with pond-reared fish in outdoor ponds, and to divide the correctly finned offspring into two groups. A few should remain in the pond to replace breeding stock, and the remainder be transferred to indoor tanks, or ponds to be brought along as show specimens.

To breed these fish in outdoor ponds is similar to breeding any other fancy goldfish. They will need more food, and a variety, to bring them into breeding condition, such as chopped earthworms, fresh dead or dying trapped flies, river worms and frog tadpoles if available, and a slice of bread without crust two or three days old, so that it will float for 24 hours or more, renewed daily if not eaten.

Orandas or lionheads paired together or crossed usually

produce a small percentage of oranda offspring, the remainder being misfits, or incorrectly finned creatures, and seldom are there any lionheads among the offspring. Yet the same pairings may, at another spawning, produce a few lionheads, so the discovery of lionheads appears to be pure luck. There are no runts, but some fish change their colour in their second or third summer to a deep bluish black, with a silver under-surface, and may remain this colour all their lives; all develop the hood, and in the case of the orandas the long, trailing fins.

To raise the offspring is more straightforward than raising most other fancy goldfish. A pair of shubunkins may produce over 200 well-coloured offspring, and all have to be reared for several months if the best of the batch is to be discovered. On the other hand lionheads or orandas may produce over 2,000 offspring at one spawning, but within a few weeks the misfits, roughly 80 per cent. or more, can be removed, so that only the very best fish are being reared at a very early stage, and they can occupy all the space available.

The fish spawn in the stock ponds and the eggs are transferred to large enamel bowls and floated in the pond. Meanwhile the rearing ponds are cleaned out, refilled with stock pond water, a little powdered dry lettuce sprinkled over the surface, and a small bag of garden soil placed in one corner.

When the fry are free swimming, a day or two old, 200 to 300 are placed in each rearing pond, 9 feet by 3 feet by 1 foot deep. Then as much Infusoria as possible is given, including a bucket full of water from the stock ponds. The microscopic portions of worms cut by a shredder are given daily, and a piece of bread is always present.

Few offspring colour in the first year in outdoor ponds, and those that do colour are usually weaklings and seldom pass through their first winter. Roughly 20 per cent. colour in their second summer, and they are usually females, about 50 per cent. in their third summer, a mixture of males and females, and the remainder may colour any time within eight years and are all males.

The longer the fish takes to colour, the richer the hue, and even with those fish that colour red and silver in their first or second year there is a difference between those that colour early and those colouring later, the two colours being more distinct in the latter due to the red being of a richer hue.

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## £175,000 Aquarium

**T**HE £175,000 aquarium to be built in Bergen, Norway, will rank with the best in the world, a spokesman of the planning committee said early in May. The aquarium will be run in close association with the new Oceanographical Research Institute to be built in Bergen at a cost of £200,000. While the research institute is being built by the Government, the aquarium is being financed by private subscriptions, and so far £135,000 has been raised. The aquarium will be open to the public.



# My Method of Aquatic Plant Cultivation

by Dr. F. N. GHADIALLY

ABOUT three years ago my main interest in the hobby was the breeding of different species of tropical fish. I looked upon plants as something pleasant to the eye, which provided refuge for my little fish, a medium of support for the eggs of the adhesive egg layer, and something that helped towards getting rid of carbon dioxide and nitrogenous waste products derived from the fish and other sources.

At that time I had all my tanks (approximately 20) in a spare bedroom on the first floor of my house, and the main source of illumination was from ordinary electric light bulbs in reflecting shades. Green water and algae were almost unknown in the tanks. Most plants managed to survive and some slowly multiplied in spite of the constant uprooting and beating they received as a result of my fish-breeding activities.

A series of events occurred, however, which changed all this and since then I have grown literally hundreds of *Cryptocoryne*, thousands of *Vallisneria spiralis* (two of my favourite plants) and a host of others have also grown and multiplied luxuriantly. These plants have won several first prizes at various shows, and *The Aquarist's Challenge Cup* at the 1952 B.A.F.

As time went on it became obvious that I could not, with safety, add many more tanks into the room as there were signs of the floor boards bending and bits of plaster were dropping off the ceiling into the room underneath.

My troubles were, however, only just beginning for at this stage I had my first (and last) real large-scale encounter with white spot. I was late in diagnosing the disease and by then every tank in the place was contaminated. Massive quinine therapy was instituted when smaller doses had failed to effect a cure. This killed off more fish than the disease and most of the plants disintegrated except an Amazon sword plant, and about half a dozen *Cryptocoryne* and *V. spiralis*. Here was the opportunity to move the tanks to a fresh site, and the only available one was a cellar kitchen in the basement, a rather cold, dark, damp place, that did not seem very suitable as a fish room.

## Birth of the Method

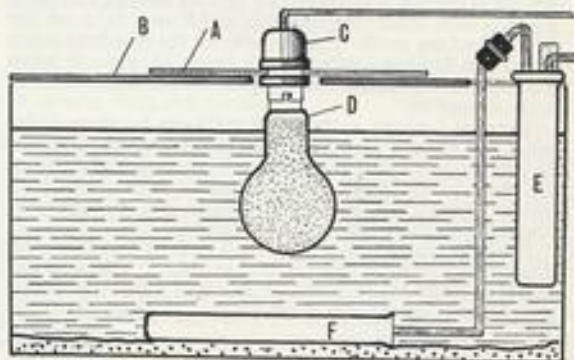
However, as there was no alternative, all the tanks, the 50-odd surviving fish and the few plants mentioned above were moved down and a fresh start made. I was not at the moment very keen to buy any new plants or fish as I wanted to cut off my stock entirely from the external aquarist world where a veritable epidemic of white spot was raging. The beautiful *V. spiralis* and *Cryptocoryne* that adorn my tanks to-day trace their ancestry to these few half-dead plants with which I moved down to my new fish room.

At this stage I had an idea which I feel has been mainly responsible for the luxuriant plant growth I have obtained these past few years. For long I had felt that considerable saving in electricity would result if light shades were abandoned and the lamps immersed in the water. The set-up in use at the moment consists of an electric lamp holder fixed in a hole bored through a piece of cement asbestos sheet approximately 8 ins. by 4 ins. The cover

glass is cut down the middle and allows the lamp to dip into the water almost up to the brass ferrule. The weight of the cement asbestos counteracts the buoyancy of the lamp in the water (see illustration). Thus the heat given off by the lamp is absorbed by the water and not wasted.

The usual heaters and thermostats are provided for the tanks but the lamps are wired independently and not through the thermostat. The wattage of the lamp used is such that on its own, even if kept burning continuously day and night, the water temperature does not rise above 80° F. even in the summer (except on those very rare hot days, when the lights are switched off). This method, started as a mere economy measure, proved to be an eminently successful idea for plant propagation.

The few plants soon began to grow very profusely: broad (about twice normal) thick green leaves appeared from the centre of the *torta* and the old leaves at the periphery died away. Four exceptionally thick runners (about  $\frac{1}{2}$  in. diameter) appeared and a series of beautiful plants began to fill the tanks. Other plants began to grow vigorously too,



A: Asbestos cement sheet 8 ins. by 4 ins. B: Cover glass. C: Lamp holder. D: Lamp. E: Thermostat. F: Heater.

and in about six weeks I had enough plants to allow me to set all my other tanks going.

There seem to be numerous advantages in immersing lamps in the water, which may be enumerated as follows:—

1. Plants seem to grow faster and better.
2. As the lamp is under water it burns cooler, thus giving off more light towards the red end of the spectrum, and it is common knowledge that these rays are more vital for plant growth than those at the violet end.
3. As the lamp burns cooler its life is considerably prolonged.
4. As it gives off its heat to the water both light and heat are utilised. This leads to a considerable saving of electricity.
5. As no electrical energy is wasted the natural tendency to cut down time and intensity of the illumination, for economical reasons, is eliminated. Turning the lamps off only means that the heaters will stay on longer to maintain the tank temperature and there would really be no saving effected by turning off the lights.
6. The light source is brought closer to the plants and thus they receive an increased intensity of illumination.



These plants grow unusually well and most of my show specimens have come from those grown almost in contact with the lamp.

There are, however, some disadvantages, but these do not outweigh the advantages. Slimy green algae soon covers the immersed portion of the lamp and needs constant wiping off. Varieties of algae, which tend to choke the plants, sometimes appear on the leaves closest to, or in actual contact with, the lamp. At one time it appeared that I would have to abandon this lamp immersion scheme because of this nuisance. However, the problem was solved when I hit upon a simple method of biological control.

#### Biological Control of Algae

When I set up a tank now I place a handful of horse hair algae just beneath the lamp. This grows rapidly and, I think, provides competition to other forms of algae at the initial stage when plants have not established themselves. As the plants get going I reduce the amount of horse hair algae, thus increasing the amount of light and nutrition obtainable by the plants. Horse hair algae can be very easily kept under control and as long as it thrives I know that my plants are safe from the attacks of the more noxious varieties that choke them.

Red ramshorn snails further help to keep the leaves clean. They do not mutilate the plants in my tanks. If I do find a few holes appearing in apparently healthy leaves I feed more liberally with dried foods so that there may be a bit left over to feed the snails. I throw away all the very large snails that I can lay my hands on and crush up a dozen or so medium sized ones against the glass for the fish and other snails to feed on.

There is perhaps a danger of the lamp breaking under water but so far I have not had that experience. Contrary to popular belief it is not absolutely necessary to immerse the lamp in the water before switching it on; a recently lighted lamp (two to three minutes) can be gradually lowered into the water without breaking.

Once the plants began to thrive I noticed that they were doing better in some tanks than in others. It appeared that the best results were obtained in tanks with very coarse gravel, while growth was distinctly poor in tanks which had

finer gravel or fine sand. I favour gravel which is far coarser than that in general use by aquarists to-day. A layer of garden soil under the gravel was tried in one tank but the results were disappointing, as the roots went black and rotted away.

Various types and makes of lamp were next tried, but no significant difference was noticed except that clear glass ones seemed to develop a coat of algae quicker than the pearl ones. No obvious added benefit was obtained from using coiled coil lamps or coated lamps and it appears that the cheapest pearl lamp is about the best bargain.

It is a notorious fact that cheap lamps consume more current than the costlier ones for a given output of light, but that does not really matter as the so-called "wasted current" produces heat instead of light, both of which are utilised, hence nothing is wasted when the lamps are under water.

#### The Lamps

Lamps varying in wattage from 15-150 watts have been given a trial. The ideal sizes appear to be 40 and 60 watts. In larger tanks it is preferable to use two 40 watt or 60 watt lamps rather than a single 100 watt lamp. Lamps burn from approximately 7 a.m. to about 1 a.m. every day. On numerous occasions I have forgotten to switch them off at night and they have been left on at times for four or five days without any ill effect to fish or plants. No deterioration of breeding results has been observed during the past few years and the fish seem perfectly healthy and content under these conditions.

At first I used a sleeve made of rubber tubing to seal the junction between the brass ferrule of the lamp and the holder but this has been found unnecessary and has been discarded. Condensation troubles do not arise, probably because the socket is usually fairly warm when the lights are on and the slot through which the lamp passes provides adequate ventilation. As the lamp heats the water at the surface there is a large temperature difference between the water at the bottom of the tank and that at the top. Aerators and/or water circulation can rectify this but even without these no adverse effects are seen. After all, the sun heats natural waters from the surface and not the bottom.

## The Aquarist's Lectures

As promised in our last issue, further details can now be given concerning the September tour of lectures on selective breeding of tropical fishes which has been organised by *The Aquarist*. The distinguished lecturer we are proud to present to our readers is Dr. Myron Gordon, who is a world authority on inheritance in fishes and is geneticist to the New York Aquarium. Dr. Gordon's researches, carried out in his laboratories in the American Museum of Natural History, New York, are known throughout the world of genetical science, and in addition to the numerous learned communications he has made to scientific journals, readers of *The Aquarist* will recall that he has contributed a number of original articles to our pages on matters of fish inheritance affecting the tropical fish breeder.

Dr. Gordon has specially consented to visit Britain to give his lectures under the auspices of *The Aquarist*, whilst he is in Europe for an International Congress. He is a practical aquarist and well aware of the problems of the aquarium keeper, so that his talks, illustrated by lantern projector, will be designed to help the breeder; questions from the audiences at his lectures will be welcomed. Six centres have been selected for the convenience of readers:

Tuesday, 8th September (evening): **Glasgow**. Christian Institute, 70, Bothwell Street, Glasgow, C.2.

Thursday, 10th September (evening): **Newcastle**. Y.M.C.A. Hall, Blackett Street, Newcastle upon Tyne.

Friday, 11th September (evening): **Sheffield**. City Hall, Sheffield.

Saturday, 12th September (afternoon): **Birmingham**. Birmingham and Midland Institute, 1-18, Paradise Street, Birmingham.

Sunday, 13th September (afternoon): **Manchester**. Free Trade Hall, Manchester.

Tuesday, 15th September (evening): **London**. Friends' House, Euston Road, London, N.W.1.

Admission is open to all aquarists but will be by ticket only, and tickets must be obtained in advance—1s. 6d. each person—from "Lecture Bookings," *The Aquarist*, 24, Wood Lane, Isleworth, Middlesex. Tickets are available now, and early application is advised since seating capacity in the halls is limited. Ordering of tickets in blocks for members of societies by their secretaries will be welcomed, although as the charge is purely a nominal one it is regretted that no reduction for purchase in quantity can be allowed.

In addition to the lecture at each centre, time permitting, an aquarists' "Brains Trust" will be in session to answer questions on all aspects of aquarium keeping. Questions are invited in advance from all readers, and these should be sent to the Editor, with a direction indicating the centre at which it is wished for the question to be answered; anonymity of senders will be preserved.



# Three Ideas for AQUARIUM BACKGROUNDS

## 1. Lightweight Internal Fitting Background

by MASON SMITH



Photo 1  
A marine aquarium with the background designed and described by the author  
R. A. Mitchell

**I**NVARIABLY when one designs an "aqua-scene" for a fully furnished tank that is going to be installed in that special place in the lounge, the old problem arises, "How shall we camouflage the back glass? Paint it blue? Try and work out a clever scheme with plants? Or just leave it as plain glass and hope for the best?"

To try to overcome this difficult, and in some cases almost unsolvable problem, I have designed an imitation rock background that can be made by any handyman and which basically consists of a cement formation on a sheet of glass. This background is suitable for any tank up to 24 ins. long by 15 ins. high, but for tanks longer than this it should be made in sections. To start at the beginning I will give you a list of the materials required for a 24 ins. by 12 ins. by 12 ins. tank.

**Materials.** A piece of hammered glass to fit inside, and against, the back glass of your tank. This glass is the type commonly used in bathroom windows. The glass is fitted into the tank by placing it diagonally across the top of the tank, lowering it and then pushing it towards the back; 1 tube of Bostik Sealing Compound 692; 10 strips of aluminium or tin 2 ins. long by  $\frac{1}{2}$  in. wide (do not use copper or brass); 1 packet of Quickset Portland Cement (this is obtainable from most hardware stores and costs

about 1s. 6d.); 6 lbs. of fine, sharp clean sand containing no stones; 6 ozs. of spirits of salts (dilute hydrochloric acid), obtainable from any chemist.

### Preparing the Glass

The piece of hammered glass is laid with its patterned surface uppermost and the Bostik is squeezed on to it in ten spaced places. One of the ten pieces of metal is then stuck with more Bostik on to one of the Bostik spots on the glass, and this procedure is adopted for each of the remaining nine places. These are then left for 24 hours until the Bostik hardens and holds the metal strips firmly to the glass. The strips are then bent over on themselves to act as an anchorage for the cement mixture and prevent it falling off the glass when it has set. Hammered glass is used because the dimpled surface forms a certain amount of adhesion between the cement and itself.

A cement mixture is made of one part cement to one part sand. Both ingredients are well mixed together before the water is added, until the whole is mixed to the consistency of mortar. It is important that this is not too wet, otherwise it will be found impossible to mould it into the formations required. This mixture, when prepared, is turned on to the glass and moulded into a stratified rock design (see photograph), the thickness of the cement being not more than  $\frac{1}{4}$  in. deep. A table knife is the best instrument to use for the actual moulding.

When the background has been moulded to your satisfaction, the edges of the glass are wiped clean and the cement edges slightly bevelled by running the table knife along them at an angle; the background is then left for from two to three days, or until such time as the cement has nearly set. The cement moulding is then brushed in a horizontal plane with a stiff bristle brush; this puts a grain on the surface, which helps to give it a more realistic rock effect. The background is now left until thoroughly set, which should take about four days.

To make the background suitable for putting into an aquarium the free lime has to be neutralised. To do this, six ounces of spirits of salts (dilute hydrochloric acid) mixed with two pints of water is poured over the background. Care should be taken when this is done to see that none splashes on to clothes. In fact, this operation is best done in the garden, so that the acid as it runs off the background

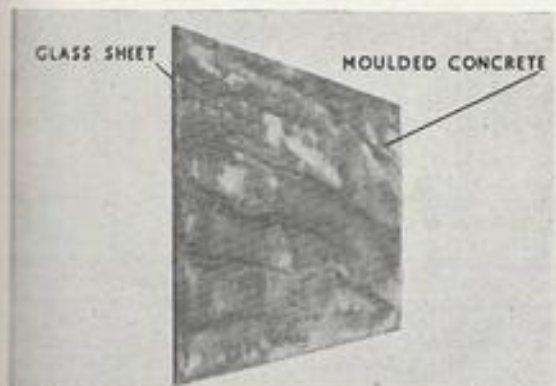


Photo 2  
Perspective view of prepared background demonstrating its thinness  
Mason Smith



soaks into the soil. The background is now left for three hours and then washed in clean water for 15 minutes. The above procedure for curing the cement is not necessary when the background is used for a vivarium.

#### Colouring and Fixing

Colouring the background is done as follows. The cement, while still damp from its wash, is painted with Fixed Drawing Inks, using a soft brush. By mixing the blue and yellow together green can be obtained, and by mixing blue and red various shades of brown are the result. Dark colours should be painted into the recesses of the background; this will emphasise them and the lighter colours such as blue and green painted on the more prominent points. These inks are all perfectly harmless in the aquarium, as I have verified myself by experiment. When

the background has dried thoroughly it will be ready for use in the tank.

Compost in the aquarium will hold the background in position at the bottom of the tank, while a small strip of aluminium bent over the top frame will hold it firmly at the top. Those people who take the trouble to make this background will, I am sure, be highly delighted with the realistic effect of solid rock it achieves, especially if it is used in conjunction with York stone. Planting can be kept to a minimum and still a highly pleasant effect obtained. For cichlid and marine tanks which are normally devoid of plants it is just the thing for camouflaging the unsightly back glass. Algae is attracted by the cement and readily grows on it, to make the effect even more realistic. When tank cleaning time comes it is a simple matter to remove the background and give it a good scrub.

## 2. The Painted Background

THERE are a number of ways of providing a background to an aquarium and the common object is to detract from the glass box effect and try to achieve an illusion of "depth."

One method is to leave the rear glass clear and build a natural scene of rockwork and green leaved terrestrial plants behind the aquarium. This has the disadvantages, however, of taking up space, it is difficult to produce a really natural effect and, of course, the plants will require periodical watering and attention. Specially printed backcloths can be purchased at dealers, but unless these are skillfully designed they are apt to defeat the object and instead to give the impression of the tank "stopping short" at the rear glass.

The simplest backgrounds are made by painting the outside of the rear and end glasses. Many aquarists use one colour, generally either black, green or blue, and providing the tank is well planted with vigorous and healthy plants this method is quite effective. The writer has found that an elaboration of the painted background, where four or more colours are used, gives very good results, especially when coupled with thickets of well grown plants.

Colours used are black, orange, green and white. The sketch indicates the approximate positions of the bands of colour. The paint should be freely applied and "stippled."

## 3. A Home-made "Vista Box"

A COMPLAINT often made about even really well furnished aquaria is that they do not need very keen scrutiny to reveal a lack of depth in the tank that gives an obviously unwanted artificial effect.

Faced with this problem I managed to get several years' satisfactory service out of a simple home-made "vista box" of the type described below. It is shown in its simplest form in Figure 1, and it consists essentially of a box with sloping sides to give a perspective effect. This box is furnished with artificial plants, rocks, etc., that are graded in size (largest to the front) so as to continue the idea of perspective. At the back of this box is a thin sheet of glass that acts as a very dull mirror.

The completed box is stood behind the aquarium and it will be appreciated that on looking through the front of the tank there will apparently be quite a long underwater tunnel stretching back from the front glass. This will be emphasised by the rockwork and plants if they are arranged along the sides so as to lead into the vista box, and some slight artistic skill in furnishing the box will also add to its effectiveness. The dullish mirror will reflect (rather mistily) fish swimming near the back of the tank and will give the impression of some real "monsters" lurking in the background.

The box may be of quite simple nailed construction, but

by ROY WHITEHEAD



That is, do not lay on in sweeping strokes in the normal fashion but apply with a dabbing motion with the brush held at right angles to the surface. The colours should be well intermingled on the edges of the bands and sharp contrasting lines of colour avoided. Pour a little of each colour into separate tin lids so that large quantities of paint are not spoiled. The same brush can be used for each colour without cleaning. The idea is to create a gradual shading from black to white.

If possible the painting should be done before the tank is glazed, otherwise the coloured glazing compound will reduce the illusion. The darker colours are carried well up in the corners of the tank to assist in masking the angles. When thoroughly dry the painted background can be painted with the same colour as the tank frame or a contrasting colour can be used to create a panelled effect.

by NICHOLAS BROWN

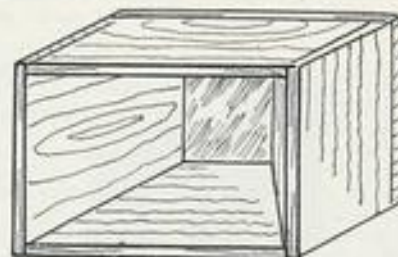


Figure 1.

if it will be in a position where it can be seen, and if timber is available, a good quality wood that may be stained and polished should be used. A very satisfactory box can be made from  $\frac{1}{2}$  in. thick plywood, provided fine nails are used for the assembly. The open front of the box must be of the same outside dimensions as the length and height of the back of the aquarium tank. In depth the box should be not less than six inches but may be nine inches or even more. A plywood back is firmly nailed on to the box.

(Continued at foot of opposite page)



## Kissing Gourami (*Helostoma temminckii*)

**ORDER:**—Percomorphi, from Greek *perke*—a kind of perch, and Greek *morphe*—form or shape.

**FAMILY:**—Anabantoidae—from Greek *anabaino*—to go up.

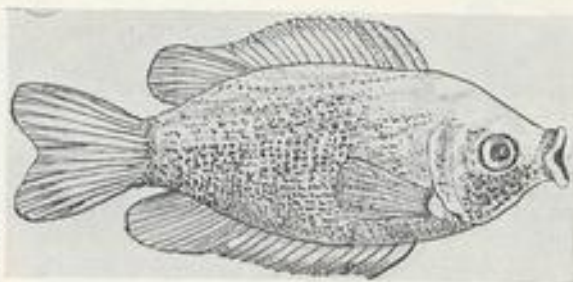
**GENUS:**—*Helostoma temminckii*, from Greek *helodes*—frequenting marshes, and Greek *stomaios*—"mouthy." *Temminckii*—after the collector Temminck.

**T**HE kissing gourami is a labyrinth fish. By this is meant that in addition to gills it possesses an extra breathing organ—the labyrinth, into which it takes atmospheric air in the same way as humans do into their lungs. The oxygen is extracted and passed directly into the blood stream.

In its native habitat—the Malay Archipelago—it reaches a length of 12 inches, but specimens kept in captivity, unless in enormous aquaria, seldom exceed half this length. Its coloration is not striking, some being greenish silver, and others almost flesh colour and iridescent.

The most interesting feature is the mouth, equipped with a pair of fleshy, sensuous lips, which are capable of a degree of suction. Occasionally they will approach the sides of their aquarium and fasten their lips against the glass. Or they will do the same to plant leaves. This sucking removes a little soft algae, which the fishes swallow, and so the story has been told they are great algae eaters. Similarly, either by accident or design—no one can tell which—two of them will meet head-on and their lips will cling. They remain for a moment or two in this position, sharing what appears to be an affectionate kiss, break away, and carry on normally once more. Often, however, they live a very long time without doing their star turn, much to the chagrin of their owners.

Sexing is impossible without dissection, which is a poor way of finding out which is male and which female. Sometimes even the fish do not appear to know, as there exists at least one record of two males embracing. After chasing the female for a time, the male curls his supple body round her



Kissing gourami

—his length being at right-angles to hers, and the pressure on her sides causes a cluster of eggs to be released. The eggs are small and greenish-yellow. Being lighter than water they float upwards to the surface, where the movements of the fishes soon spread them round the edges against the glass front and sides—an excellent position for observation by magnifying glass or low power microscope.

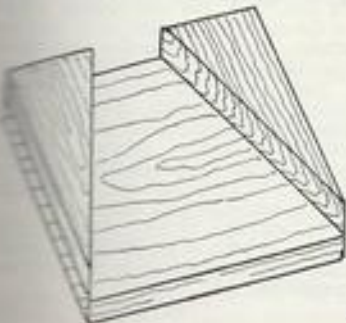
Often the fishes will follow the eggs to the surface and greedily consume them, so it is as well to float them out into a saucer or soup plate where they will be safe until the spawning is complete. Development of the eggs is surprisingly rapid. In the normal spawning temperature of from 82° to 85° F., the fry will break from the eggs in little over 24 hours. They are extremely small, and will eat only the smallest Infusorians, or algae water. Do not make the mistake of fouling the water on the assumption that the young will take no harm because they can breathe atmospheric air. For the first fortnight or three weeks their auxiliary breathing organ is undeveloped and they are solely dependent upon their gills for a supply of oxygen.

Powdered dry food sprinkled on the surface of the water will soon bring the fry up to feed. If growth is to be fostered, spread them out into other tanks, or select as many as you are able to raise properly, and dispose of the others. Overcrowding causes more deaths among fish fry than anything else.

Although often guilty of egg-eating, the parent gouramies will completely ignore the young fishes. Kissing gouramies are seldom seen at fish exhibitions in this country.

(Continued from opposite page)

On the inside of the top and bottom of the box two tapered strips are fitted as on the sketch of the bottom in Figure 2.



These strips are of one inch thick wood and extend the full depth of the box. They taper from nothing at the front of the box to from one inch to four inches wide on the back edge, according to the depth. Two suitable

Figure 2

sized panels of plywood are then cut and nailed to these tapered strips so as to get sloping side walls that give a perspective effect. The back of the box is given a coat of black matt paint and is then covered with a piece of glass that may be held in place by a few dabs of suitable adhesive.

The inside of the box may then be painted dark blue or green and when the paint has dried the box may be furnished. Here, while it is important to aim at the perspective effect, use may be made of materials such as modelling clay, dyed sponge, etc., not normally used for aquarium decoration.

Although the box as described is most suitable for a tank stood against one wall, the idea can be adapted for use with a tank standing across the corner of a room. Here there is often considerable space to spare and the vista box may be made of good depth. It is important not to make the sloping sides too pronounced in too short a depth or the true perspective effect will be lost, even though the apparent depth of the tank is much greater.



# Aquarium and Pond Goldfish Varieties

## 6. Calico Fantail Goldfish

**L**AST time I described the fantail, which was a scaled type of fish, and I now intend to deal with the calico fantail. In shape of body and fins this fish resembles the fantail and the only difference is in the scales and colour. Instead of the normal type of scale which is hard and shiny, this type of fish has such small scales that they are practically invisible. The colour of this fish should be somewhat similar to that of the Bristol shubunkin—but not quite.

If we examine the colour for the latter type as shown in the Federation handbook, we find that the colour should be a blue ground, splashed with black and interspersed with violet, red, brown and yellow. The colour of the calico fantail according to the same book is:—ground colour: blue, mottled with violet, red and brown, speckled all over with black. We see then that the yellow is omitted from the colours required for the calico fantail. As this colour is the same for the calico veiltail and calico oranda and lionhead it would be well to remember this point.

So very few good calico fantails are seen at the shows and this is, in my opinion, because this type of fish is not often specially bred but is the throw-out from a spawning of veiltails. This statement may be queried by some breeders, but I can tell at a glance whether a fish has come direct from a veiltail strain. I have a preference for the scaled red fantail as I know how difficult it is to breed a good strain of these fish, and one will not get a show fish from any throw-out from a veiltail strain. I feel strongly about this point as I am of the opinion that it should not be possible to show a fish in a class when it is a runt from another strain or type.

On more than one occasion at shows I have been asked my opinion of a particular calico fantail and I have said: "This fish is a throw-out veil"; I have had the answer, "Oh! This fish has too short a tail for a veil." There you have it—because it is not good enough for a veil it is fair game to show it as a fantail. I will give readers the signs I look for when examining a calico fantail. First I look at the dorsal fin; if this is very full and rounded it shows veil strain immediately, as the dorsal should be rather pointed and concave. A full, rounded convex fin will belong to the veil

type. The caudal fin or tail shows the same fault in many fishes. Instead of being well forked as in a good fantail the tail is often hardly forked at all and the ends are too full and rounded.

I am often asked how to start a good strain of the calico fantail. This is a difficult problem at the moment as there seem to be very few good strains of pure calico fantails about. If there were it would be comparatively easy to procure a few fry from such a strain and then by breeding from them and selecting over a few years a good strain could be established. One of the longest and worst methods to employ would be to cross a veiltail type of fantail with an ordinary red-scaled fantail. Such crossing might give one or two youngsters with the required points but it is certain that these fishes would carry the genes of inheritance from their parents and so may never again throw a really good fish. The shapes may be all right but the scaling and colour would be very difficult to get correctly. Any calico fish from such a crossing would be almost sure to carry too many visible or hard scales, and it would take years to breed out this fault. The operculum or gill plate should also be transparent or soft, and as this is hard enough to get in a true shubunkin strain it can well be imagined how difficult it would be to get a good soft plate from a crossing with a scaled fish.

The official pointings for the calico differ from those for the ordinary fantail in that 20 points are for colour instead of 10 as for the scaled type. These extra points are found by reducing the points as for the scaled fish as follows:—body 30 to 25, dorsal 10 to 8, pectoral and pelvic 4 to 3, anal 7 to 6. Of course, it would be far better for all concerned if the two types of fantail did not have to compete against each other, but the happy day when I shall see a separate class for the main types of fancy goldfish is not yet in sight. I have seen some exceptionally good red-scaled fantails about at shows for some years now and it will have to be a very good calico one to beat them.

Although this type of fish can be kept in the open pond I consider that it is far safer to bring it under cover, unless the pond is not only a large one but in a warm part of the country.

A. Boarder

## FRIENDS & FOES No. 16

### GAMMARUS

**PHYLUM:**—Arthropoda, from Greek *arthron*—joint, and *podos*—foot.

**CLASS:**—Crustacea, from Latin *crustaceus*—having a shell.

**T**HE fresh-water shrimp is a close relative of the well-known sea-shore "sandhopper." It is quite a usual inhabitant of rivers and streams, but possesses a marked preference for those that are weedy. Watercress beds are particularly favoured, and the shrimps are frequently discovered in perfect health and condition when bunches of cress arrive home after being picked, marketed, and resold to the general public.

Introduced into a garden pool the shrimps quickly establish themselves,



Gammarus

and can seldom be entirely eradicated afterwards. In lily ponds, where I have bred them for more years than I care to remember, they delight in congregating where the lily pads overlap each other. When disturbed they use their many pairs of legs to run over the leaf surfaces (either on their sides, or back uppermost) until they reach the edge, where they turn on their backs and swim briskly to safety.

The female (larger than the male) is

## Freshwater Shrimp

equipped with a brood pouch on her ventral surface, near the head, into which large numbers of eggs are laid. At first black, the eggs change colour as the embryos develop, until they are almost pink. Breeding continues through spring, summer, and autumn.

Food consists of dead and decaying animal and vegetable matter. Large amounts are consumed and changed rapidly to humus. Many pond and aquarium fish appreciate *Gammarus* as a food. Goldfish, platys, swordtails, angels, acaras all seek them out.

In running water, shrimps may exceed an inch in length, but in small pools and stagnant water they seldom exceed half this.

C. E. C. Cole



# AQUARIST'S Notebook



by  
RAYMOND YATES

**D**URING the recent British Aquarists' Festival held at Manchester, I was kept busy answering questions put by visitors at the F.N.A.S. stand. In every instance I asked them where they lived and if they were members of a club, and it was interesting to note the long distances some visitors had travelled to the show. Newcastle and Hartlepool had several representatives, as also had Birmingham and Wolverhampton. North Wales, Chester and Liverpool enthusiasts soon made their presence known and from the other side of England there was at least one enquiry from a Hull aquarist. Many came from isolated villages deep in the heart of the country for whom a show on this scale was an event indeed.

The most surprising thing, however, was the fact that less than one in ten belonged to a club, and it was a pleasure to pass on details to them of their nearest society. In some instances it was possible to introduce them to the secretary of a nearby club, and in this way quite a few new members were obtained for some societies. Most of the enquiries referred to fish diseases or breeding troubles but there were some unusual points raised.

One gentleman from a Yorkshire rural area found planarians constantly in the drinking water supply, with the result that the hobby had become almost a nightmare. Another service which it was possible to give was the identification of certain plants in furnished aquaria and, in some cases, lesser known types of fish. It seems as if there is still plenty of missionary work to be done by keen aquarists in getting more hobbyists into societies. There are roughly 400 clubs in Britain, and since it may be calculated that the total club membership in the whole of the country is far less than the number of copies of *The Aquarist* sold each month, it would appear that more advertising is needed by our clubs to attract these unattached aquarists. If you, who read this article, are not a member of a club and are in doubt as to the whereabouts of your nearest society, will write to the Editor, a copy of *The Aquarist's Directory of Aquarium Societies* will be sent. Do not forget to enclose a stamped, self-addressed envelope.

One very go-ahead society has evolved an excellent method of allowing members to pass on hints and tips from their own experience to other members. On joining, every Oldham Aquarist Society member is given a stiff-backed, loose-leaved folder which contains the society rules and other data. Members are asked to send in notes of their experiences in the hobby and these are duplicated and circulated to all members monthly. There is only one thing omitted from the original write-up—the name of the writer. In this way any member can ventilate his pet theory or views or give details of his experiences, without his identity being divulged.

The fancier will excuse his fish most of their faults but fin-nipping is in a class by itself. Once this trait is noticed in a tank the trouble will remain until the offender is removed. There is no cure for this very bad habit and the only thing to do is to dispose of the fish concerned. The worst offenders are undoubtedly tiger barbs, and even when a large number of these fish is kept together the trouble is always present. Other fish which indulge in this sly sport are black-lined tetras, Buenos Aires tetras, puffers, *serpae* tetras and the bumble bee fish. On occasion the rosy tetra is guilty, but this is rather a rare event.

Most fish are bitten in the tail, but sometimes the dorsal or anal is attacked, and I have had both the ventrals of a *Betta* bitten off. Of course, long ventrals like those of the

angels or gouramies are often bitten if fin-nippers are allowed in their tank. As a rule the bite is from below and behind so that usually it is the lower lobe of the tail which suffers. The fins of most fish quickly make good the damaged part but some varieties rarely recover their former glory and disease steps in. These include the cherry barb, the tiger barb itself, neons and the leeri gourami. If the flesh at the base of the tail is damaged trouble very often follows. With neons the dreaded neon tetra disease can set in.

Leeri gouramies are very prone to fungus infections when their ventral fins (feelers) are damaged. Angels are very wide awake and keep both eyes open for these sly biters, but if kept with fin-nippers their lives become a misery and they continually hold up their ventrals. Catfish and *kuhlii* loach are rarely attacked. Fins once bitten never look the same again and this applies particularly to fighters, the sword of swordtails and the front portion of the dorsal in angels. Give the fin-nipping varieties a tank of their own.

It sometimes happens that the leaves of *Cryptocoryne* plants become covered with a dense mat of algae, and it is quite impossible to wipe this off or remove it in any ordinary way. Most aquarists have either left it as a matter of course or have cut off the leaves which were most affected. Some time ago I noticed that some badly affected *Cryptocoryne* leaves were becoming quite clean. The tank in question had had a quite weak solution of mercurochrome therein for about three weeks. Since then I have had further proof of this cleansing effect. Not more than two drops to the gallon of a two per cent. solution of mercurochrome should be used.

In my notebook in the May issue of *The Aquarist* I recommended the treatment of aquatic plants with a strong dose of acriflavine. This should perhaps have been stated more precisely; a strong dose of this chemical for plants (not fish) is one teaspoonful of one per cent. solution to every 10 gallons, or, at the most, five gallons.

I am very fond of the Malayan snail and keep quite large numbers of these in my tanks. The other day I was surprised to see a huge bunch of these snails all locked together near the front glass, roughly two inches long and one inch high. The effect reminded me of a large caddis fly raft. The snails had found a dead swordtail and had covered it so completely that it was quite impossible to see any part of the fish at all. No dry food had been used in this tank for some time and it may be that the snails were feeling the effects of semi-starvation (owing to their numbers) and for this reason lost no time on the dead swordtail.

## Post-Mortem Examination of Fishes:

W. Harold Cotton, F.R.M.S., F.Z.S., 39, Brook Lane, King's Heath, Birmingham, 14. (Phone: Highbury 1693)

Specimens should be sent direct to Mr. Cotton with full particulars of circumstances, and a fee of 3s.

It is important that the following method of packing fish be adopted:—Wrap fish, very wet, and loosely in grease proof paper and then in wet cloth. Re-wrap in grease proof or wax paper and pack around with cotton wool in tin box. Despatch as soon as possible after death, with brief history of aquarium or pond conditions.





*A page for  
the beginner  
contributed  
by  
A. BOARDER*

**D**URING the month of July particular attention must be paid to the warmth of the water in tanks containing coldwater fish. During a hot spell it is possible for the temperature of the water in an indoor tank to reach 80° F. or above. If this happens the fish will be anything but comfortable, and if there is any tendency towards overcrowding, some of the fish, and especially the larger ones, may soon be in trouble. A thundery night can cause trouble not only in the tank but also in the open pond.

Some fish appear to need more oxygen than other types and it is noticeable that golden orfe will be among the first to die where there is a deficiency of oxygen or a surplus of foul gases in the water. It is advisable to remove some of the water from a tank and re-fill with fresh tap water; if it is cooler than that which has been taken out it will not harm the fish in any way—they will appreciate the new water. The garden hose can be played into the pond for a time so that the water is freshened up. Where a fountain has been fitted it is a good plan to let this play during very hot weather. A small motor or electric pump can be fixed so that it pumps water from the pond to run down a rockery stream into the pond again, and the water can pick up fresh oxygen whilst travelling in a shallow state.

Remember that during the warmer parts of the year the fishes can eat far more food than when it is cold, so if you want your fish to grow well it is essential that food is given fairly frequently. The fish are able easily to digest the food as long as the water is warm and a little food can be given each hour. As long as the fish eat up every scrap of food given soon after feeding time, you will have no need to worry. They will not over-eat, but be careful not to give so much food at a time that a lot of it remains uneaten. This uneaten food soon goes foul when the fish will not touch it. It then starts to pollute the water, especially the lower strata of the water, and the fish will not go there to feed, with the consequence that the food turns very foul and the water becomes unsafe for the fish.

For your fish in the pond you must realise that although the fish may be eating much more than when the water was cold, there are sure to be more natural foods in the pond. Therefore, unless your pond has more than its quota of fish, you may not need to feed at all for some time. Most fish eat some water plants and as long as the pond is well established there are bound to be all kinds of live foods to be found there. Water snails are good food for most fish when they are very small—before their shells get too hard. Green tench are especially fond of young snails, and at times even suck the older ones out of their shells. The larvae of many types of flies also provide food for the fish as well as worms which find their way into the water at night. Before giving much food to fish in a pond, it is a good idea to place a very little food on the water to see if it is taken fairly quickly. A piece of dry brown bread is a very good test, as if hungry the fish will soon be up at the top after it.

I am sure that many ponds do foul in the warm weather solely because the fish have been given too much food. Do

not think that fish will die over-night if they are not fed repeatedly. As long as they have plenty of room they will continue to grow and thrive, and can always find something. I have a rainwater tank to catch the rain from a small greenhouse. To ensure that no larvae of mosquitos would hatch I placed a young goldfish into the tank last summer. I forgot all about the fish throughout the winter, and the fish has not been fed by me since it was put there. There are no plants in the tank yet the fish has now grown larger than any of the young fish which have been fed, but which have not had as much space.

You may find that the water plants have made such lush growth that a good pruning is necessary. In the tank this is fairly easy to do. I think that the best plan is to shorten some of the shoots of the plants and then later on the others can be dealt with similarly. This ensures that there are enough growing water plants at all times and it does tend to thin the plants out. Where a gap has formed this can be filled by anchoring some of the cut-off pieces to the compost, either by placing a piece of lead strip round the stem or placing a stone over the end of the cutting. In the pond more drastic treatment may be necessary. The water plants will have grown apace and unless you thin them out considerably you are likely to have the whole surface of the pond covered with leaves before long. Remove the older water lily leaves as soon as they appear to be losing their brightness, and also remove the old flowers. The decaying leaves and stems of lilies can soon cause pollution. Any of the oxygenating plants which are becoming too dense must be thinned out a good deal, as if not they can become such a mass that the fish cannot find anywhere to swim.

You may now find some small fry which have been bred in the pond. It is a good plan to feed these fish with small foods in a shallow part of the pond. They get used to being fed there and so will congregate to feed and be safer from the older fish, as well as being able to get enough food. Older fish are all bullies when hungry and so the smaller ones do not get much chance amongst them. Many people who find small fry in their pond immediately try to catch them all up and place them all in a small tank and wonder why they die. The reason is that as a rule the fish have been used to plenty of space and when they are placed in a smallish tank they soon go wrong. Once the older fish have spawned it is well to give them plenty of garden worms. I always break these in two before feeding, as all goldfish types have great difficulty in swallowing a large piece of worm.

When going away on holiday do not give the fish any more than their usual daily feeds, and then if left without for a fortnight or more they will come to no harm. You are more likely to lose the fish if you put a lot of food in the tank before you leave than if the food was withheld. As a rule a well-meaning neighbour will surely over-feed the fish, and so take my advice and leave the feeding to take care of itself. See that the tanks are in as cool a position as possible before going away, as the water will remain purer and the fish will not need as much food.



## IN THE Water Garden—by Dr. W. E. SHEWELL-COOPER

ONE of the most beautiful pools I ever saw was at Eltham Royal Palace. It was rather long and narrow, but it was set in the middle of a very beautiful rose garden. The effect of the colour being reflected in the water, coupled with the scent of some of the most fragrant varieties, would have to be seen (and felt!) to be believed. It is not thought *de rigueur* to mix what may be called aquatic gardening with roses, but nobody to-day minds much about man-made regulations in the garden. Those who lived in the palace, and for whom I acted as horticultural adviser, liked pools and roses together and the entire effect, as I have said, was very cool and beautiful.

To-day rose growing is quite a different proposition from what it was 15 years ago. We now know about the mulching system which saves all forking and hoeing, and incidentally makes almost certain that the trees are never attacked by the black-spot disease. The best mulch to use is sedge peat, because it is absolutely weed-free, pest-free and disease-free, and not only has 14 per cent. of immediately available humus, but 70 per cent. of additional organic matter as well—which is finally available as humus. This special type of peat which is obtainable comparatively cheaply, can be applied all over the ground to a depth of two inches or so in May. If in the following season, as so often occurs, the worms have pulled in a good deal of this organic matter, a further dressing is applied up to a depth of one inch, this time, only.

In addition to the peat a fish manure is used, at the rate of three ounces to the square yard. Be sure to purchase the type which has a 10 per cent. potash content, and if readers have any difficulty in getting this locally, I shall be happy to supply addresses. The result is that the garden owner does not have to buy any garden manure at all, neither is there any work to do in connection with the roses, other than the pruning and a certain amount of spraying. It has been discovered, however, that under this system, there are a minimum of pests as well as diseases, and so very often there isn't any spraying to be done!

There is a lot to be said for growing the *Polyantha* roses. These of course are many-flowered, as their Latin name suggests, and it is true that they are characterised by densely clustered heads of blossom. You can have a very dwarf type, which is often called the pompon polyanthus, or there are the new hybrid polyanthus which have been produced as a result of a marriage between the H.T.'s and the pompoms, while, of course, the third group is really the rambler type with which we are not dealing with the present time.

Among the hybrid polyanthus I can very strongly recommend Frensham, an outstanding red which does not fade. It bears its semi-double flowers almost continuously. Fashion is another which should be included: it is a coral salmon with large double flowers borne in big clusters. Orange Triumph bears large clusters of small double flowers of a brilliant orange shade. Most will want to include the three Poulsens—Else, the bright rose pink; Karen, the vivid scarlet; and Kirsten, a bright scarlet whose blooms are borne in large clusters.

When you come to the dwarf polyanthus or pompoms, whatever you do plant Paul Crampel, the vivid glowing orange; Ideal, the reliable dark scarlet; Ellen Poulsen the cherry rose; Natalie nypels, the large flowered clear pink; Cecile Brunner, the soft rose miniature; and Coral Cluster, a coral pink which bears interesting tight double flowers. You can plant the pompoms as close as 15 inches apart, but it is better to have the others 18 inches square. The actual planting won't be done until November, but I am writing about this rose garden now so that, if necessary, readers can



Photo:

H. & V. Joel

make plans and, what is quite a good thing, go to a nursery nearby and see the polyanthus roses actually flowering.

As to pruning, it is always a good thing to cut the branches hard back in the actual winter of planting, and then, with polyanthus roses, to prune somewhat more moderately the following season. Aim, however, to keep the centre of the bushes open somewhat, as well as pruning back quite hard branches that tend to cross one another. Most people prune during the last of week of March in the south, and about the 10th April in the north. Latterly, however, many have been doing the pruning in the winter with great success, and it is a system that is well worth trying.

May be that the H.T. roses will be preferred, and it is a good thing to stick to the scented types. Include Madam Butterfly, a flesh pink; Lady Sylvia, a deeper pink; Picture, a clear rose pink; Edith Nellie Perkins, a pale salmon pink with coppery shading; Mrs. H. Bowles, a glowing rose pink; Violinista costa, a rose pink with flame and orange shading; Lal, a salmon pink with deeper centre; Golden Dawn, a pale lemon yellow; Mrs. Sam McGredy, a coppery orange flushed with bright red; and President Hoover, a mixture of gold and orange yellow splashed with deep cerise.

Those who do not mind spending a little more money in order to have the newer varieties should grow Trigane, a vermilion red with the reverse of the petals chrome yellow; Independence, a cinnabar red of outstanding merit; Pigalle, a French purple fused with magenta shades, and producing enormous attractive blooms; Grand'mere Jenny, a glorious orange and pink with good sized blooms and fragrance, and Super congo which is quite outstanding as one of the new dark reds because the petals have a golden yellow base which shows up the intensity of the black scarlet of the flowers. Plant any of these roses 18 inches square, give them a good mulching with the sedge peat, feed them with the fish manure as directed, and wonderful displays of roses will be produced each season for many years.



## OUR EXPERTS' ANSWERS TO READERS' QUERIES

As a newcomer to tropical fishkeeping, I would appreciate your advice on heating my 36 ins. by 15 ins. by 12 ins. aquarium. Would it be better to employ two 75-watt heaters placed at opposite ends of the tank rather than the one 150-watt heater I am using at the moment? I have a thermostat to control the temperature of the water.

Two 75-watt heaters placed close to the bottom of the water, and at opposite ends of the aquarium, would certainly give better distribution of heat than one 150-watt heater. Moreover, if one heater should burn out, the other one would continue to function and so prevent too sudden a drop in the temperature of the water.

My aquarium water always looks cloudy. A friend whose aquaria always look crystal clear, told me to cut down feeding to three times a week. But surely there must be ways of preventing cloudiness other than by half-starving the fishes?

You may not have sufficient plant life to trap fine particles of sediment or inhibit the development of free-swimming algae, the cause of "green" water. On the other hand, you may be feeding the fish with too much starchy dried food. This will often cause a milky appearance of the water. Furthermore, it will often result in a fuzzy scum covering the leaves and stems of the plants. Perhaps you have fishes which stir up the bottom? In this case, your remedy is to keep the bottom scrupulously clean. You can do this by frequent use of siphon or dip-tube. Better still, install a small air-pump and filter.

Could you please give me some information on conditioning and spawning nigger and tiger barb?

Feed the fish with plenty of much-liked live food, and keep them in a clean, well-lit aquarium kept at a temperature a degree or two above normal. If you separate the sexes by dividing the aquarium into two compartments with a piece of glass, so much the better. When the male's colours look very bright, and the female's sides look bloated with eggs, then is the time to place them together. The breeding aquarium should have plenty of fine-leaved plant life to catch the eggs, and the water should be on the shallow side, say, about five or six inches deep. If the weather is dull, brighten the interior of the aquarium with electric light.

I am keenly interested in breeding beaon fish, but though my fish have spawned several times, the fry always die a few days after hatching out. Can you give me some advice?

Perhaps your baby fish did not get enough small live food. Next time your fish spawn, have in readiness two or three jars of Infusoria and a culture of micro worms. Directly the fry become free-swimming, introduce cupfuls of water containing Infusoria into the aquarium twice or thrice every day for about a week. During the second week, introduce some micro worms as well as Infusoria, and gradually lead the fry on to such things as screened *Daphnia*, dust-fine dried food and the like. Some breeders have great success with pea-flour or dried yolk of egg. Do not keep the fry in too high a temperature. A temperature above 80° F. will often result in fatalities.

I am very fond of guppies, and have nine females and 14 young ones in a 24 ins. by 12 ins. by 12 ins. tank. How many guppies could I keep in this aquarium without overcrowding them?

Your aquarium should support 40 or 50 guppies without running any risk of overcrowding. You could keep more, but all fish grow best and develop better colours when they have plenty of room to move around in, and no shortage of oxygen.

I have been told that the addition of some sea-salt to my aquarium would improve the quality of the water and tone up the fish. Is this true?

Most fishes benefit by a little salt in the water; but not all

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

species. Catfishes, for instance, do not seem to like it. About two teaspoonfuls of evaporated sea-salt to a 12-gallon aquarium would be about right. But once salt has been introduced, do not add any more otherwise you will end up by pickling your fishes in brine.

Please could you give me some information on the blue-eyed livebearer?

We presume you refer to *Gambusia punctata*, a native of Cuba. This small livebearer is better-tempered than the general run of *Gambusia* species, and might be risked in the community aquarium, though it does like to chase after timid fishes. It is a very attractive species, which must be seen under a good light to be appreciated. Its sides shine with a lovely blue light, and its blue eye is quite unique. It likes live food, and will stand a temperature down to the middle 60s. It is not so prolific as the other members of the genus.

I set up a community aquarium about six months ago. Everything has gone along very well, but a friend has just told me that my two angel fish will grow too big for the tank (24 ins. by 12 ins. by 12 ins.) and wreak havoc among the smaller fishes. Is this true?

With plenty of meaty food your angel fish should grow to a good size, but it will be a long time before they constitute a danger to the other fishes in your aquarium. They will, of course, snap up livebearer fry; but so, too, will the other fishes. We suggest you plant plenty of *Vallisneria* along the back and sides to provide bolt-holes for nervous species, and do not worry further about the angel fish unless you see them definitely causing any trouble. We must add, however, that angel fish look better and often flourish better when they are kept by themselves.

I am stripping the rust from an old aquarium frame, and wonder what you would recommend as a good undercoating to prevent the water from attacking the frame?

We have always found aluminium paint to make a good rust preventive. Several thin coats make a better job than one thick coat. Aluminium paint dries very quickly, and is very useful for sealing a slight leak between glass and frame.

I have an aquarium 48 ins. by 18 ins. by 18 ins. and have installed two 200-watt heaters controlled by a thermostat rated up 400-watts. Now I have been told that I should install another heater, and a thermostat capable of handling the larger wattage. I should appreciate your views.

Unless your aquarium is kept in a very cold room, we think 400-watts more than ample to heat it. In our opinion, two 150-watt heaters would have sufficed. It is usual to have the thermostat rated higher than the heaters. This gives a margin of safety. Of course, during the warm days ahead, you will not need to burn much current.

One of my angel fish keeps one ventral fin bent back so that the tip almost touches the base of the tail-fin. Should I cut the fin back and allow it to grow again? At the moment, the way the fin is carried makes the fish look ugly.

Do not tamper with your fish's ventral fin. Angel fish often carry the fins in the way you describe, but not all the time. If you watch the fish carefully, you will find that every now and again, the fin will be moved to a different position. There is nothing wrong with the fish.





Photo:

Perma black mollies

Laurence E. Perkins

Can you please give me some information about breeding black mollies?

These fish are livebearers. A gravid female should not be moved if you can possibly help it. Keep her in shallow water to which has been added about a teaspoonful of sea-salt to every gallon of water in the aquarium. Have plenty of vegetation crowding the surface of the water, and feed the adult fish with live food, the peelings of mossy algae scraped from the sides of other aquaria, or some proprietary cereal food such as Bemax.

Some time ago I installed fluorescent lighting over one of my aquariums. The plants have not grown anywhere near so well as they do in my other aquariums lit by ordinary electric light. Why is this, please?

It has been noticed that plant life does not grow very well under the white light given off by fluorescent tubes. The

tubes which emit a warm yellow light seem to achieve much better results. We suggest you change to one of these.

I think the foliage of the common water starwort (*Callitriche verna*) is most attractive, and wonder whether it could be acclimated to living in the tropical aquarium?

We are sorry to disappoint you, but water starwort will soon die down in warm water conditions. Even in the cold-water aquarium, it will fail to grow unless it is given a very bright top light, natural or artificial.

I do not seem to be having much success in fishkeeping. I have coldwater and tropical aquaria. Although I change most of the water in them every two weeks, and add Epsom salts every now and again, the fishes, both coldwater and tropical, continue to become mopey and die. What do you think is wrong?

Emptying so much of the water away and refilling with fresh may cause some of the trouble. There is no need to do this unless the aquarium has become polluted, and pollution is unlikely unless you allow uneaten food to remain in the water, dead fish to lie on the bottom, or decaying vegetation to accumulate on the sand. Adding salt every now and again would not improve matters. Every time you add salt, you increase the salinity of the water, and your fish will not take well to living in something like brine; Epsom salts are very laxative into the bargain. We think you should stop changing the water, but concentrate on keeping the bottom clean, feeding the fish on live food, lean meat and the like, and check up on such things as temperature, metal in contact with the water, or drippings from a metal hood. Metals such as copper, brass, zinc or bronze will soon poison the water and kill the fish.

## COLDWATER FISHKEEPING QUERIES *answered by* A. BOARDER

I have a rockery built up at the rear of my fish pond with a brick wall at the back. I wish to hide the wall with a hedge up to seven feet high. What do you recommend for this?

Evergreen hedges are usually the best for cover, although beech and hornbeam are good as they hold their leaves all the winter, and although they turn yellow and brown they are quite attractive. Of the evergreen ones the yew makes the strongest hedge but takes a long time to grow. It stands trimming well but the leaves are poisonous to some animals. *Lonicera nitida* is a quick-growing evergreen but it gets rather straggly as it gets older. The best one I can think of for your purpose is *Thuja lobii*, a type of arbor-vitae. This is a strong growing conifer which can be trimmed with shears and soon makes a dense hedge. You could, of course, plant some ivy at the base of the wall and this will soon provide the cover required and not give so much work in maintenance.

Can you name me a small water lily which will cover only about three feet area?

Two very good ones for your purpose are:—*Nymphaea pygmaea alba*, and *N. pygmaea helvola*, the latter yellow and the other white. Remember that these small growing types must not be planted too deeply in the water or they will not thrive; a depth of six to ten inches is enough.

I have made a pond in the garden and it will not hold water. I built a brick wall for the outside and a sandstone one for the inside. The bottom is of broken paving stones cemented in. Can I treat it with anything to make it water-tight?

The best thing you can do is to float the whole inside with a mixture of three parts sharp sand to one of fresh cement. Try to float it about half-an-inch thick at least, all in one continuous operation, so that no part starts to dry off before the next is added. The sandstone may be porous and there may be some cracks between the pieces through which the water seeps.

Every year I get trouble with fungus on my goldfish in the pond. I try to keep everything clean but it still appears. Some laburnum leaves fall into the pond and some cement dust blows into it. Can this cause fungus?

I do not think that the laburnum leaves or the dust would cause fungus but either can so upset the fish that they would be more liable to contract the disease. The causes of fungus can be present in most ponds but the fish have a protective covering which tends to keep them safe from attacks. It is when this mucous covering becomes broken or deranged through ill-health or damage that the fungus takes a hold. The cement dust can make the water too heavily impregnated with lime, which would tend to destroy some of the mucus. Keep as many as possible of the leaves out of the pond as they can be very poisonous in water.

I enclose a cutting from a north London newspaper. What is your opinion of it? The cutting reads, "An R.S.P.C.A. inspector was called to an unusual case last week. A lorry driver asked him to take charge of a mother and baby toad which had narrowly missed being run over. The mother was a big fat toad and on her back was a new-born baby, which she carried Indian fashion."

Frankly I am amazed that such an account should be published. Apparently the reporter and editor had never kept tadpoles when at school. The big toad was a female and the smaller one on its back was a male. They were making their way to some water for the purpose of breeding. Male toads are much smaller than females and in the breeding season they attach themselves to the females and stay on them until they lay the eggs, which are fertilised by the male as laid. Once the female has laid her eggs she takes no further interest in them. I have noticed that most female toads making their way to the spawning waters pick up a male *en route*. With frogs I think that many male frogs get to the water and await the females, as although I see some pairs approaching the pond, many more pairs of toads are seen going to the water.



I am desirous of greening up a couple of shallow ponds in preparation for breeding shubunkins. I believe I can do this by adding boiled water weeds. Is this correct?

The green water will be very useful for rearing the fry in the early stages. The method you mention may be all right but if you leave water in strong sunlight in the open air, the green will soon form, as the algae appears to be air-borne. The method I use is to clean out the tank and fill with tap water. I then place a yearling goldfish in the tank but place no water plants therein. The goldfish is there to eat any pests which may get into the water and prey on the algae. This algae is the tiny plant which thrives in open water and gives it the green appearance. Water fleas and the larvae of mosquitos feed on the algae, as well as the larvae of many midges. The goldfish can be fed occasionally. When water is wanted for fry it can be siphoned out through a net. Water plants in the tank or pond will starve out the algae.

I have some goldfish which have some trouble, as their fins are being eaten away. What can be done with them?

The fin-rot is a form of fungus and this can be cured by using the salt treatment—a table-spoonful of sea salt to a gallon of water and leave the fish in for about four days. When cured add fresh water and start to feed with earth-worms chopped up. The injured fins will grow again, but may show some knot where the new growth commences.

I have recently set up a coldwater tank, 18 ins. by 10 ins. by 12 ins. and put in soft water as advised. I added plants and three goldfish under three inches long. The fish immediately went to the top and one has since died. Where have I gone wrong?

In the first place your tank will only hold seven inches of fish, and any tank under 24 ins. by 12 ins. of surface area is more difficult to keep in good order. By soft water I suppose you mean rain water. Most rain water, especially if caught from a roof, will certainly not be pure enough for goldfish. It can contain soot and other injurious matter and so tap water is far safer. Your plants had little or no roots you say; this is usual with newly purchased plants. Most aquarists are too impatient to get the fish into the tank as soon as it is set up and planted. They would do far better if they waited until the plants had started to grow before putting the fish in.

Two fish would be enough for your tank and whatever you do see that no food is given until the fish are swimming about with their dorsal fins well erect, and are sucking up mouthfuls of compost from the bottom in search of food. Unless fish are in good health they will not eat, and any attempt to force them to do so will only end in failure to keep the fish alive.

Last autumn I put a three inch catfish in my pond. I now want to catch it as I want to put in some small shubunkins. I have thought of removing the other fish and angling with a worm, but am afraid of harming my newts, which are good scavengers. I have read that it is harmful to water lilies to empty the pond. What do you suggest?

If the catfish is one of the European coldwater types it can grow very large. I remember that Lord Rothschild put some in the Tring reservoirs many years ago and although few were ever caught one or two were found dead which weighed near 20 pounds. I should empty the pond. This is the quickest way to catch the fish. The water lilies will come to no harm as long as the pond is not kept empty for too long. You could angle with a worm tied on a fishing line with no hook. Let the fish get a good hold, then it can be pulled gently up to near the surface before it lets go. Be ready with a net to put under it as soon as you see it. You say your newts are good scavengers. This is a new idea to me. I should have thought that the newts would eat all the food given to the fishes. They are voracious feeders especially on anything which moves; even small fishes are eaten by them. I would far sooner have their room in a pond than their company.

I have read of gill flukes in *The Aquarist* and now have a case on my hands. Is it infectious and what dilution of Dettol is necessary to clear a shubunkin?

The gill flukes can move from fish to fish. They are like a tiny transparent leech. Place the affected fish in a solution of one cubic centimetre of Dettol to a gallon of water and only leave the fish in for about 10 minutes. You must watch the fish all the time and if it turns over in great distress remove it to clear water, when it will recover.

I have a large tropical tank in which I try to grow *Vallisneria*. Although the other plants grow well this plant will not do so no matter what I try. Do some plants have a bad effect on others?

My own experience is that *Vallisneria spiralis* grows better in a coldwater tank than a tropical one. I grow it in a cold tank in a living room and find that it is the best plant for my purpose. It never seems to get out of hand and yet has lived for over four years and thrived. You say your other plants grow well, perhaps the trouble is that they have got such a strong hold in the compost and have so spread their roots around that there is no chance for the *vallis*, which is strangled out. You would not think of planting a specimen in your garden in the middle of a thicket of other plants which had their roots through the whole patch. Try a piece of *vallis* in a tiny pot first and let it get well established in some garden soil. When the plant has made good growth the pot can be sunk in the tank and hidden by rocks.

I have a two feet tank in a window facing west, with three adult fantail goldfish and several baby fish in it. The water has suddenly gone green. Is there anything I can do? I do not want to move the tank from the window.

The green forms through excess light. If no light at all reached the tank the water would remain quite clear. You must reduce the amount of light getting to the water. The best method would be to paint the side facing the window and also both ends with a dark green paint. Place a cover over the top, and if you have a weak electric light bulb fitted this can be put on now and then for illumination of the tank. A tiny water plant known as algae is the cause of the trouble, and although not harmful to fish it does discolour the water. I have found that this growth is encouraged where over-feeding has been going on. Go steady with the food, especially dried types and the green may clear as soon as you cut down the light.

I have a comet goldfish which does not look too good. Its tail has been eaten away. I put it in some permanganate of potash but it is no better. What shall I do with the fish?

The fish has tail rot, which is a form of fungus. This can be cured by placing the fish in a solution of one table-spoonful of sea salt to a gallon of water. In four or five days the fish should be cured.

Is it safe to place a small paraffin heater under a 30-gallon tank to help out the electricity? If I put a piece of asbestos sheeting under the base of the tank will the glass crack?

You can certainly use paraffin heating for your tank. I know an aquarist who used nothing else, and he was breeding angels when it was rather a feat to do so. The glass will not crack unless the flame actually strikes it when the glass is very cold.

What depth of soil should be necessary for marginal plants at the pondside?

If the pond has been so constructed that the plants can run their roots into the actual pond then little soil is necessary. If the roots do enter the pond they will help to keep the water in good condition. If you are planting the marginal plants in a separate division where the roots cannot reach the pond then I suggest from 9 to 12 inches of loam. Some plants can be put in large pots which can then be lowered into the pond. These do quite well and soon send out many roots into the water.





## BOOK

## REVIEW

### Underwater Explorations

*Under the Red Sea* by Hans Hass. Jarrolds, Hutchinson House, Stratford Place, London, W.1. 16s.

**T**HE daring submarine investigations of Dr. Hans Hass of Vienna have attracted attention all over the world. It was in the spirit of sport that he undertook to try conclusions with the sharks during his expedition to the Caribbean Sea which are described so vividly in his first book—*Diving to Adventure*.

On his return from this expedition he developed a new technique of research and equipped the craft "Sea Devil" for fresh voyages of discovery. Equipment and vessel were both lost owing to the war. But Hass did not despair. He turned up alone, with only two boxes containing his diving apparatus and submarine cameras, in Port Sudan on the Red Sea, determined to explore the shark-infested coral reefs and to penetrate submarine depths never before reached by any human being. The gamble succeeded. The courageous investigator, like a fish, entered a world of breathtaking beauty and manifold perils.

He visited the dead city of Suakin, dived down to pearl-banks, trod the decks of sunken vessels overgrown, as in the tale of the Sleeping Beauty, by a trellised hedge of coral. He defied bloodthirsty barracudas and the assaults of sharks. He encountered a fabulous monster. In the midst of a shoal of great "sea devils" he swam right up to the very jaws of these huge beasts in order to photograph the parasites inhabiting their gaping throats. The description of the natives and the British colonial officials is full of humour. The biological data obtained, not from books and aquarium study, but from observation of the state of nature, are most instructive.

This book of his experiences, which includes 81 first-rate photographs, forms the documentary record of a performance without parallel.

R. E. BILLINGS

*The Silent World* by Captain J. Y. Cousteau with Frédéric Dumas. 148 pages. 64 pages of photographs (16 pages in full colour). Hamish Hamilton Ltd., 90, Great Russell Street, London, W.C.1. 18s. net.

**D**URING the last few months, a small flood of books about the sea has been let loose on the reading public by the more enterprising publishers. But as the books on the same subject written by Miss Rachel Carson (*The Sea Around Us* and *Under the Sea-Wind*), and published about a year ago, set such a high standard of scholarship, scientific accuracy, and literary skill, I felt it would be nothing short of a miracle to come across anything like either of them again before the end of the present century. And so it was with some feeling of doubt that I picked up one of the latest sea books to be hurried off the press—*The Silent World* by Captain Jacques-Yves Cousteau, a gunnery officer in the French Navy—and settled down to examine it.

But, after I had read the first 20 or so pages, I knew beyond doubt that I held in my hands a book in a thousand: and I could hardly lay it down for the rest of the day, or rather until I had finished reading it. For what I read

fascinated me, and excited my imagination as few books had done before.

Captain Cousteau began goggle-diving and spear-fishing in the Mediterranean some time before World War II. But it was not until 1943, during the German occupation of France, that he developed the "aqualung" diving apparatus for which he is chiefly known. With this apparatus, which in essence is a self-contained compressed-air lung, a nearly naked man unencumbered by lines to the surface, can swim down to 300 feet and stay there for up to three hours at a time.

Apart from the author's remarkable experiences with fishes and other creatures of the deep, there is a lot in the book about sunken ships, some of them with their contents in an excellent state of preservation after hundreds of years in the sea. In one Roman argosy, Captain Cousteau and other members of his diving team came across a millstone with which the ship's cooks had ground the grain carried in amphorae, a number of bronze and iron nails worn thin by time, Athenian marbles, and yard-long pieces of Lebanon cedar covered with the original yellow varnish (intact after 20 centuries of immersion).

Of the much maligned monsters of the deep, Captain Cousteau says: "Save for the shark, about which we are still puzzled, the monsters we have met seem a thoroughly harmless lot. Some are indifferent to men; others are curious about us. Most of them are frightened when we approach closely."

When Frédéric Dumas, close friend of the author, and the most experienced diver in the world, with more than 2,500 descents to his credit, seized an octopus one day, the cephalopod was terrified. After this initial personal encounter, Captain Cousteau and his co-divers would go after any octopus they found. They found them quite submissive, and sometimes playful.

Once the divers came upon an octopus city. "We could hardly believe our eyes," records Captain Cousteau. "Scientific knowledge, confirmed by our own experiences, shows that the octopus lives in crannies of rock and reef. Yet here were strange villas, indisputably erected by the octopuses themselves. A typical home was one-roofed, with a flat stone two feet long and weighing perhaps 20 pounds. One side of the stone had been raised eight inches and propped by two lintels, a stone and a red building brick."

While on the subject of octopuses, Captain Cousteau tells an amusing story of an octopus which was let loose in a library.

(Continued overpage)



Photo from "Under the Red Sea"

"Three gold dots motionless faced the current"



"It raced up and down the stacks, hurling books on the floor, possibly a belated revenge on authors."

Many of the photographs in this book were taken under the sea. For these pictures, Captain Cousteau used a camera specially constructed to withstand the great pressure, and, of course, absolutely watertight. The pictures in colour are the kind you can look at again and again, and never cease to wonder at the marvels of nature. There are some wonderful photographs of sharks accompanied by pilot fish; of a shark having its caudal fin touched by a diver; of an amazed shark, starting back after having its snout banged by the camera; and a rather gruesome picture of a human foot found inside a shark's stomach.

If you can afford to buy this book do so by all means; if you cannot, hurry along to your public library and ask to have it reserved for you. It will give you some of the finest reading the publishers have offered for a very long time.

JACK HEMS.

#### Natural Fish Diets

*An Angler's Entomology* by J. R. Harris. The New Naturalist Series. 268 pages, 103 photographs in colour; 24 black and white photographs; maps and line illustrations. Collins, 14, St. James's Place, London, S.W.1. 25s.

THE title of this book is perhaps a trifle unfortunate, for it hides the fact that its contents are of more than passing interest to the student of freshwater insect life as well as to the fisherman. The serious angler, who is certainly well catered for in Part Three of the book, entitled "Flies and Fish," may or may not care to have the detailed entomological information in Parts One and Two ("Ephemeroptera" and "Other Flies"). These sections are undoubtedly of most interest to the aquatic naturalist, and their value is increased greatly by the clear diagrams, photographs and colour plates (from colour photographs) which accompany the text.

Chapters on classification, anatomy, development and the general natural history of common water flies and their larvae (including many of the forms commonly used as live foods for aquarium fishes by aquarists, and also those indefatigable house-builders the caddis "worms") open the book. Their distribution is described and illustrated in pictures and in an appendix of annotated maps of Britain, and there is a short chapter on collecting the insects. Although addressed to the angler, aquarists will read with special attention the chapter called "Tastes of Fish."

A key is provided by means of which the angler's natural flies may be identified, and the book has a bibliography and a detailed index. As readers of other volumes in The New Naturalist Series will have come to expect, this new addition is excellently produced and a pleasure to read. The pleasure is heightened by Mr. J. R. Harris's lucid and direct style of writing. If you are a pond naturalist you are recommended to browse through *An Angler's Entomology* to see how much it has to offer; if you are also a fly fisherman there can be no doubt the book will be a possession to prize.

#### Tropical Fish Breeding

*Successful Breeding*. Bulletins Nos. 2, 3 and 4 of the Federation of Northern Aquarium Societies. Edited by C. Graham. G. T. Iles, Belle Vue Gardens, Manchester. 6d. each.

THE Federation of Northern Aquarium Societies has hit upon the happy idea of collecting together in printed form practical details of breeding procedures for various tropical species by approaching prizewinning aquarists at the British Aquarists' Festival, 1952, who exhibited the fishes. Replies to a questionnaire prepared

and sent out by Mr. G. W. Cooke, have been skilfully condensed and tabulated by the Bulletin Editor, Mr. C. Graham. Each Bulletin consists of four pages and deals with five species. It is stressed that the breeding methods given are not claimed to be the only ones applicable but that they are ones known to have yielded good results for the individual breeders who supplied them.

Bulletin 2 deals with *Aphyosemion bicittatum*, *Hemigrammus unilineatus*, *Aplocheilichthys lineatus*, *Mesogonistius chaetodon* and *Brachydanio rerio*. Bulletin 3 deals with *Callichthys callichthys*, *Apistogramma ramirezi*, *Hyphessobrycon serpaes*, *Colisa lalia*, and *Danio malabaricus*. Bulletin 4 covers *Hyphessobrycon gracilis*, *Rasbora maculata*, *Aphyosemion australe*, *Badis badis*, and *Pterophyllum scalare*.

Descriptive and other notes on each species are included in the Bulletins, which are clearly printed on stout paper. They are distributed free to member societies of the F.N.A.S., but are also available from the above address at the price given, and special rates for bulk orders from societies will be supplied on application to the secretary, Mr. G. T. Iles.

## Films

*Brown Acara*: 16 mm. silent; running time 14 minutes.

THIS film is the first we have seen to portray a fish subject in the practical way that is bound to appeal to the aquarist. Its "action" is all within aquaria, and some very revealing shots of the courtship, mating and spawning of brown acara, with a progressive moving pictorial history of the rearing of 145 young fish of this species, illustrating the remarkable parental care that is given to them, are wedded together by brief, clear captions which provide the narrative. Drawings in line are also included to show details of the set-up breeding aquarium. Editing of the film is up to the best standards, and the photographic technique itself is admirable; good examples of the proper use of the movie camera as a recorder of aquarium events are given, for example, by the shots of the vibrating mass of newly hatched fry in the gravel pit made for them by the parent fish. Dr. F. N. Ghadially, president of the Sheffield Aquarists' Society, is to be heartily congratulated for producing a film which can be recommended to any aquarists' society planning a "film evening." Enquiries concerning its hire should be addressed to Dr. F. N. Ghadially, 10, Sheldon Road, Sheffield, 7.

*Under the Red Sea*: "U," distributed by Associated British-Pathe Ltd.

A NEW view of fish life—in the waters of the Red Sea—is granted to the aquarist in a film made on expedition by Hans Haas and his colleagues with special underwater equipment. Sounds made by the fishes are recorded as well as their appearance in natural surroundings at depths down to 150 feet, and despite attractive intrusions of the human form in the shape of Miss Lottie Berl, secretary (and now wife) to Dr. Haas, the fishes are allowed to be the stars of the film. The spoken sound commentary is a weak feature of the film, burdened as it is with attempts to thrill the audience at the expense of zoological accuracy. "Under the Red Sea" has now been released to cinemas all over Britain after its initial screening at the Astoria Cinema, London.

MR. L. R. BRIGHTWELL informs us that a short film of his marine aquarium hermit crabs living in artificial glass shells (see *The Aquarist*, March, 1951) has been made by Countryman Films Ltd. This film is to be shown as part of a news reel at cinemas.



## OUR READERS

### Write—

Readers are invited to express their views and opinions on subjects of interest to aquarists. The Editor reserves the right to shorten letters when considered necessary and is not responsible for the opinions expressed by correspondents.



#### Club Disappointment

DURING May, together with some members of other N.W. London clubs, we paid a visit to a well-known and extensively advertised aquatic breeders' establishment—a visit having been arranged some three months in advance. It involved a journey of about 200 miles and was, therefore, somewhat expensive.

On arrival we found 90 per cent. of the tanks empty, the fishes left being lumped together into two or three tanks for sale at what were described as "knock-down" prices. These fishes appeared to be runts and too aged to survive a change of water for any length of time. In various outdoor pools the picture was even worse—dead fishes in various stages of decomposition floated on the foul waters, whilst many of those unfortunate enough to be still alive were coated with fungus. The catering establishment to which we were referred was poor.

We have thoroughly enjoyed visits to other establishments, but to help clubs to avoid the more unscrupulous merchants who look upon club visits as a welcome opportunity to extract as much money from them for as little as possible, would it not help if a central pool were set up from which clubs could obtain information regarding refreshment facilities in the neighbourhood, and breeders' establishments graded perhaps by means of "stars," as are garages and hotels by the motoring organisations? Local clubs could provide the required information.

Perhaps the F.B.A.S. would give a lead and consider this matter, and so avoid the spectacle of club members being led up the garden path to gaze upon a stagnant pool.

M. HOLLINSHED, Secretary,  
Wembley Aquarist Society.

#### Coal in Aquaria

SINCE you published my letter in *The Aquarist* (April) on the use of coal in aquaria I have had many letters asking for details of the amount of coal to be used. My full address was not published, however, and letters have travelled all over the country before reaching me, and I fear some may have been returned.

Perhaps you will publish my address, as I am willing to help any aquarist, and I would also like to say that the amounts of coal I have used are:—for 18 ins. by 10 ins. by 10 ins.—10 lb.; for 24 ins. by 12 ins. by 12 ins.—20 lb.; for 36 ins. by 15 ins. by 15 ins.—30 lb. The coal should be sieved and what is left in the sieve should be well washed and used for the aquarium. I do not use gravel for any tank now.

C. NEWLAN, Secretary,  
British Railways Aquarist Club,  
369, Milkwood Road,  
Herne Hill, London, S.E.24.

#### Methylene Blue

CAN you spare a little space to record my objection to the statement of Mr. Raymond Yates in *The Aquarist* (May) where he says that methylene blue kills all plants? This may happen with a saturated solution but not in the concentration generally used (i.e. for gill worms, "itch," etc.).

I have used methylene blue at twice the strength advised for gill worms—one or two cubic centimetres of a solution of 15 grains of methylene blue in three and a half fluid ounces of water for every gallon to be treated (Hervey and Hems), and I lost no plants whatsoever. Two treated tanks were 24 ins. by 12 ins. by 12 ins. and were pitch black for almost a week, and it was nearly three weeks before the water regained its normal clarity. The plants present were *Vallisneria*, *Hygrophila*, *Cryptocoryne*, *Acorus*, *Echinodorus*, and *Ludwigia*. Not one of these appeared to suffer although for a time they took on a blue tint. It has been said that the great advantage of methylene blue is that it can be used in established tanks without removing fish or plants, and I fully endorse this.

J. R. BROOKS,  
London, S.W.1.

#### Dangers of Copper

HAVING read the letter written by Mr. R. A. Richens (*The Aquarist*, May) I feel that in the interest of beginners it would perhaps have been better if this letter had not been published. That copper salts are poisonous is a fully confirmed scientific fact that is known to any student of biology. There is, however, an explanation why the fish in the pools constructed by Mr. Richens have not suffered adversely.

Whether the copper, when it comes into contact with water, will form sufficient quantities of poisonous salts depends upon various factors such as the pH, degree of hardness, electrolyte content, etc., of the water, and it is quite feasible that with the type of water obtained in the place where these pools were constructed little copper entered into solution. The amount of organic matter present in the water is yet another factor of some importance, for this will tend to combine with these salts and remove them from solution. However, it would indeed be foolish of any aquarist to introduce copper (or its alloy, brass) in any form in a pond or aquarium, as it is an entirely unnecessary risk to take. Water conditions can change at any time, naturally, or through the intervention of the aquarist, which might result in the liberation of toxic copper salts, causing serious injury or death to life in the pool.

I know an aquarist who used an ex-W.D. thermostat with a copper sheath in a 38-gallon tank containing a fine collec-



tion of plants and some angel fish. For about 18 months all went well; then he acquired some scats, bumble bees and puffers and for the benefit of these fish he added two teaspoonfuls of sea salt per gallon of water (in divided doses) to this tank. The results were disastrous. Most of the plants died and disintegrated in a few days and all the fishes (except the puffers, which had been removed earlier) were dead. Needless to say, a moderate quantity of sea salt, such as was used in this case, is harmless (perhaps even beneficial according to some aquarists) to plants and fish, and death resulted from the formation of toxic copper salts due to a disturbance of electrolyte equilibrium in the water.

Further, on examining the thermostat it was found that the submerged copper sheath, which had previously presented a tarnished, dull black-brown appearance (due to the coating of copper oxide), now showed a bright coppery hue, clearly indicating that copper had gone into solution. Since then this tank has been set up afresh with more or less the same variety of plants and fish. Sea salt has been added but an external thermostat is now in use in place of the old one and the tank is in perfect condition. In conclusion all that one can say about Mr. R. A. Richens is that he has been lucky (so far at least) but not very wise!

F. N. GHADIALLY, M.D.,  
Pathology Department,  
University of Sheffield.

#### Aquarium Rubber Suckers

WITH reference to the letter published in the May issue of *The Aquarist*, under the heading "Toxic Rubber Suckers," we wish to express our concern over the publicity given to this letter inasmuch as it can do great harm to the sale of articles that are fixed by means of rubber suction discs.

In our own case, as sole agents for "Limpet" thermometers, we use thousands of rubber suction discs and we have not had one single complaint that any of these have proved toxic. You must, however, appreciate that your readers would automatically associate all types of rubber suction discs with that one mentioned in Miss Gurney's letter and it could well turn them from the purchase of a thermometer such as the "Limpet" for all time.

We have, therefore, taken the same steps as Miss Gurney and sent a sample of our own rubber suction discs to Mr. W. Harold Cotton for analysis.

Appended is a copy of Mr. Cotton's report:—"The green suction disc which you sent to me has been subject to a rigorous toxicity test of 72 hours at 55°/60° F. and 76 hours at 75°/80° F. in aquarium waters. In neither case was there the slightest trace of toxicity and the rubber from which this disc is made appears to be chemically inert and should be safe in all circumstances."

M. J. E. BROCK,  
Robmay, London, N.8.

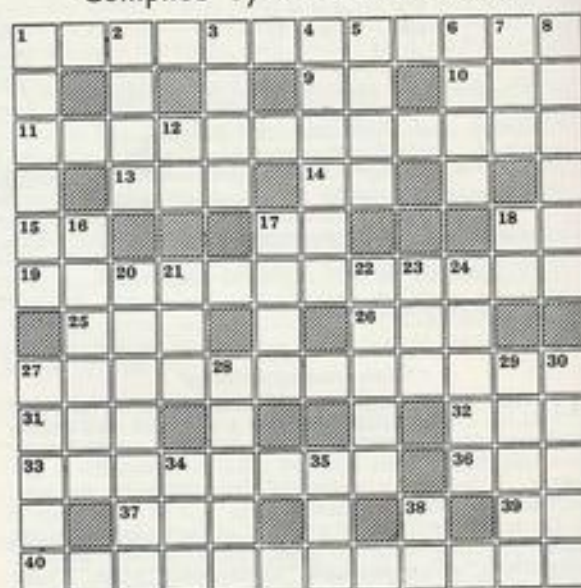
#### Bubble Trap

I RECENTLY attempted to breed my pair of dwarf gouramies but with little success, as every time the male built his nest it dispersed over the surface of the water. This went on for some days and I came to the conclusion that they were not going to reproduce. It then occurred to me that if I placed one of the plastic feeding rings in the place where he was trying to build his nest he might build it in the ring. He seemed to sense that he was meant to build it there and proceeded to construct an enormous affair which did not break up. The result was a large family which showed no signs of their artificial nursery. I can recommend this treatment for all poor nest-builders.

W. P. J. SMITH,  
Newcastle-upon-Tyne 3.

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



#### CLUES ACROSS

- |    |                                      |    |   |
|----|--------------------------------------|----|---|
| 1  | <i>Lobelia dormana</i> (5, 7)        | 25 | Loose, slack (3)                                |
| 9  | King Emperor in a small way (1, 1)   | 26 | Not recommended for troubled aquarium water (3) |
| 10 | And this is the answer (3)           | 27 | Common aquatic beetle (12)                      |
| 11 | Like <i>Betta</i> and gouramies (12) | 31 | Girl in limped aquarium (3)                     |
| 13 | The answer seeps in (3)              | 32 | Alias orfe (3)                                  |
| 14 | This is a Scotch one (2)             | 33 | Voracious water beetle (8)                      |
| 15 | Exclusive British order (1, 1)       | 36 | A short month (3)                               |
| 17 | Little angel? (abbrev.) (2)          | 37 | Tail of scolare (3)                             |
| 18 | Denoting presence in catfish (2)     | 39 | Shorter tail of same for sapper (1, 1)          |
| 19 | <i>Pistia stratiotes</i> (5, 7)      | 40 | Royal Marine by the sound of this plant (5, 7)  |

#### CLUES DOWN

- |    |  |    |   |
|----|--|----|---|
| 1  | <i>Salix</i> , waterside tree (6)                  | 18 | Form of current (1, 1)                                  |
| 2  | Water containers, used for water lily planting (4) | 20 | Rapping sound (3-1-3)                                   |
| 3  | These fish are the most valuable (4)               | 21 | Devonshire river (3)                                    |
| 4  | Fancy (6)  | 22 | Natterjack is one of these (5)                          |
| 5  | Anglers get this from fish and mosquitoes (4)      | 23 | Bird of Tittlebat (3)                                   |
| 6  | Bog (4)  | 24 | Brown gummy vegetable substance found in peat (5)       |
| 7  | Little Angelina loses her fish (3)                 | 27 | If the bereaved is black she may be fish or negress (5) |
| 8  | Describes leaves growing close to the stem (6)     | 28 | Fish taking flies (5)                                   |
| 12 | Yeast (2)  | 29 | Worship (5)   |
| 16 | White spot is one (6)                              | 30 | Not ever (5)  |
| 17 | This block is usual in labs (4)                    | 34 | Anger (3)   |
|    |  | 35 | A world wide organisation (1, 1, 1)                     |
|    |  | 38 | Degree for doctor fish? (1, 1)                          |

#### PICK YOUR ANSWER

- Which is the smallest of the following barbs: (a) *B. phutuo*, (b) *B. tetrazona*, (c) *B. titaya*, (d) *B. weohleri*.
- Featherail is the popular name of: (a) *Belontiella signata*, (b) *Hemigrammus unilineatus*, (c) *Phenacogrammus interruptus*, (d) *Polycentrus schomburgkii*.
- Cichlasoma cacteri* is native to: (a) Colombia, (b) Honduras, (c) Paraguay, (d) Texas.
- Corydoras hastatus* attains a length of about: (a) 1 in., (b) 1½ ins., (c) 2 ins., (d) 2½ ins.
- The fish louse (*Argulus*) has: (a) 4 legs, (b) 6 legs, (c) 8 legs, (d) 10 legs.
- The flowers of *Ludwigia muleri* are: (a) Blue, (b) Red, (c) White, (d) Yellow.

(Solutions on page 86)

G. F. H.



## AQUARIST AT HOME:

# Master David Shields

(HALIFAX)

Interviewed and photographed by JAS. STOTT

A CONSIDERABLE number of aquarists' societies now have junior sections. Among these young members are many who take a really deep interest in the hobby. They are getting off to a good start by learning young and, although it is natural we shall lose some of them as they grow older, others will take this interest with them into manhood. Not only are they learning the art of fishkeeping in the right school by being members of a society but they are growing up with an invaluable insight into the organisation which goes into the running of a society; here is the possibility of excellent material for potential officials and, therefore, we should do all we can to encourage those juniors who show signs of increasing and retained interest.

May I then introduce to readers, this month, a junior who is not only extremely interested but is ambitious, with a definite aim in view. He is Master David Shields of Handel Street, Halifax, who started fishkeeping in a serious way 14 months ago after joining the Halifax Society. He entered the junior class for furnished aquaria in the Halifax annual show last year after only two months' experience and secured a second prize. With a little persuasion from Mr. A. J. L. Rashley, the chairman of the Halifax Society, David entered a furnished aquarium in the junior section of this year's B.A.F. and, although he admitted to me that he felt a little nervous about all this, he was nevertheless determined to "have a really good go" and, already society-conscious, added "don't want to let the society down."

David, who is still at school, is in charge of the school aquarium and from what I hear this is kept in excellent condition. He has four tanks of his own, the largest is 24 ins. by 12 ins. by 12 ins. and the smallest is 18 ins. by 9 ins. by 9 ins. His collection, so far, consists of neons, beacons, penguins, *Pristella* and black widows.



One of David's ambitions is to possess a really good collection of characins, in which he is particularly interested. His first venture into fishkeeping was with coldwater fishes but he soon changed to tropicals, offering as they do, a greater variety of species suitable for aquarium life.

When I called to see him for this interview early in April, he was busy with plans for his furnished aquarium exhibit at the B.A.F. Having set aside one of his tanks he had been trying out, for several days, various designs of rock-work and layout. At the time of my visit his proposed design was more or less completed. I was impressed by his methodical approach and his realisation that a preconceived idea is essential to the effort.

Although at the moment fishkeeping is David's chief hobby, after completing his schooling in 12 months' time, his ambition is to make a career of it and he hopes to get a job in a zoological establishment.

## Readers' Letters

(Continued from opposite page)

### Fighting Fit

AFTER reading Mr. J. Caldwell's letter in your April issue I thought your readers might wish to know another method of making their fighters "show off." The backs and sides of my aquaria are all painted green, and when I have visitors, I black out the room as far as possible and switch the aquarium lights on. This makes the front of the aquarium take on the qualities of a mirror, so that the fighters can be shown off to their best advantage.

J. R. GROOM,  
London, N.16.

### Blanket Weed Removal

WHAT I find useful for removing blanket weed growing in glass tanks is the ordinary dinner fork. All one has to do is to put the fork in the middle of the mass and twist a few times, and quite a lot of blanket weed will be extracted.

K. BUTTON,  
Hayes, Middlesex.

## Holiday Lighting Arrangements

THE holiday season is upon us, when aquarists must leave their pride and joy. However, an easy arrangement can be made to ensure adequate lighting in the absence of the owner. This is done by purchasing a three-way, two-pin, five amp. adaptor, the male sockets of which are fixed to the female socket from the thermostat. The heater plug is pushed into any point on the adaptor. A two-pin, five amp. plug is attached to the lighting circuit and pushed into the adaptor. The remaining point will control the lighting for a coldwater tank. This arrangement suits my purpose, but a more elaborate circuit was given in *The Aquarist* in November, 1952.

Additional adaptors may be purchased, the male point of one adaptor being put into convenient sockets on the first adaptor, but it would be unwise to overdo these additions. By the above method, using two adaptors, one heater, one tropical tank light and three coldwater tank lights can be controlled by the thermostat.

D. R. MARSH,  
Mangotsfield, Nr. Bristol.





## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

A copy of *The Aquarist's Directory of Aquarium Societies* will be sent free to any reader on receipt of a stamped, self-addressed envelope.

### New Societies

**British Marine Aquarists' Society.** Secretary: M. P. Thomas, 35, Meols Drive, Hoylake, Cheshire.

**Stourbridge and District Aquatic Society.** Secretary: F. V. Hillman, Brockmote House, Chaddesley Corbett, Kidderminster, Worcs. Meetings: Alternate Thursdays, 7.15 p.m., at St. Thomas's Church Hall, Stourbridge.

**Horsham and District Water Life Society.** Secretary: E. G. Fankhurst, 223, Crawley Road, Horsham, Sussex.

### Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: **Ashton-under-Lyne and District Aquarium Society** (Mr. L. G. Taylor, 1, Stamford Road, Mossley); **Colne and District Aquatic Society** (Mrs. E. Hooper, 34, Glen Street, Colne, Lancs.).

### October Lectures

A SERIES of lectures on aquarium-keeping to be given by Mr. A. Boarder has been arranged by the Borough of Wandsworth at the following libraries in the Borough on the dates given: 2nd October: West Hill; 8th October: Balham; 15th October: Tooting; 22nd October: Clapham; 29th October: Streatham. Further lectures will be given in the early part of 1954 on 4th February: Streatham; 11th February: Tooting; 18th February: West Hill.

### Aquarist's Calendar

2nd-4th July: **Coventry Pool and Aquarium Society** show and exhibition of tropical and coldwater fishes at Swan Lane Garage, Ford Street, Coventry.

9th-11th July: **Burton-on-Trent and District Aquarists' Society** annual show, 10 a.m.-9 p.m. at R.A.P. Association Club Room, Market Hotel, High Street, Burton-on-Trent.

11th July: **Gravesend and District Aquarist Society** exhibition of tropical and coldwater fishes at the Anglo-Saxon Hall, Berkeley Road, Gravesend, Kent. Open 12.30 p.m.

18th July: **Frimley, Camberley and District Aquarists' Society** show in conjunction with Camberley Agricultural Show. Details from secretary, Mr. J. A. Willis, 9, Sherwin Crescent, Farnborough, Hants.

21st-25th July: **Shelf and District Aquarist Society** open show of furnished aquaria, tropical and coldwater fishes at Shelf Church School, Shelf, nr. Halifax. Show schedules and entry forms from Mr. L. F. Nash, 28, Rothsey Terrace, Great Horton Road, Bradford, Yorks.

23rd-25th July: **Bath Aquarists' Society** open show at the Pump Room, Bath.

28th July-1st August: **Bournemouth Aquarists' Club** annual show and exhibition at Princes Hall, Grand Hotel, Bournemouth. Schedules and entry forms from Mrs. Fenton, c/o Haskins Bros. Nurseries, Coy Pond Road, Westbourne, Bournemouth.

1st-3rd August: **Southall Aquarist Society** annual show at the Southall Borough show. Details from Mr. R. Savage, 87, Marlborough Road, Southall, Middlesex.

3rd-8th August: **Hendon and District Aquatic Society** annual open show of fishes and aquaria. Schedules available from Mr. B. Calrow, 6, Asholme Avenue, Edgware.

6th-8th August: **Portsmouth Aquarists' Club** annual show at R.E. Drill Hall, Portsmouth. Schedules and information from Mr. G. F. Elverston, 24, Bertie Road, Milton, Portsmouth.

20th-22nd August: **Romford Aquarist Society** annual show at The Lambourne Hall, Western Road, Romford, Essex. Schedules and information from Mr. A. H. Palkus, 37a, Wallinger Avenue, Gidea Park, Romford, Essex.

2nd-5th September: **Kingston and District Aquarist Society** annual show at the Y.M.C.A. Hall, Eden Street, Kingston, Surrey. Show secretary, Mr. A. Beckett, 13, Plough Road, West Ewell, Surrey.

3rd-5th September: **Southampton and District Aquarists' Society** annual open show. Show secretary: Mr. E. C. Golenworthy, Westways, Roney Road, Nursing, Southampton.

3rd-12th September: **Nottingham and District Aquarists' Society** annual show and exhibition at the Albert Hall Institute, Derby Road, Nottingham.

8th September: **Glasgow**—Lecture by Dr. Myron Gordon (for details please see page 70).

10th September: **Newcastle**—Lecture by Dr. Myron Gordon (for details please see page 70).

11th September: **Sheffield**—Lecture by Dr. Myron Gordon (for details please see page 70).

11th-12th September: **Bethnal Green Aquatic Society** fourth annual show with open classes and the London area fighter championship open class. 11th, 7 p.m. to 10 p.m.; 12th, 2 p.m. to 8.30 p.m. at the Bethnal Green Institute, 229, Bethnal Green Road, London, E.2. Schedules obtainable from Mr. W. Richardson, 98, Warner Place, Bethnal Green, London, E.2. Closing date 14th August.

12th September: **Birmingham**—Lecture by Dr. Myron Gordon (for details please see page 70).

13th September: **Manchester**—Lecture by Dr. Myron Gordon (for details please see page 70).

14th-19th September: **Blackpool and Fylde Aquatic Society** annual show with open classes. Schedules and full details from Mr. W. Robinson, 3, Denwood Bank, Warton, Preston, Lancs.

15th September: **London**—Lecture by Dr. Myron Gordon (for details please see page 70).

18th September: **British Herpetological Society** London Group meeting "Young and home bred reptiles and amphibians," 7 p.m., at Linnaean Society's Rooms, Burlington House, Piccadilly, London, W.1.

23rd-26th September: **Oldham and District Aquarist Society** third annual show at Regent Street School, Regent Street, Oldham, Lancs. Show secretary, Mrs. Vera Tripp, 187, King Street, Oldham, Lancs.

24th-26th September: **Banbury and District Aquaria Society** annual show at Banbury Town Hall. Schedules and details from Mr. R. A. Butler, 225, Warwick Road, Banbury, Oxon.

24th-26th September: **East London Aquarists' and Pondkeepers' Association** "coming of age" exhibition. Open classes—Club

furnished aquaria for Coronation Trophy (to be won outright). Senior and junior individual furnished aquaria for the Essex championships. Full particulars from show secretary, Mr. F. A. Petto, 52, Humberstone Road, London, E.13.

26th September: **Federation of British Aquatic Societies** general assembly, 2.30 p.m. at Friends' House, Buxton Road, London, N.W.1.

Early notification of dates of coming aquarists' events for free insertion under the above heading is requested to ensure inclusion in good time.

### Nat. Aquarium Exhibition

PICTURES taken at the sixth National Aquarium Exhibition held in London by the National Aquarists' Society last month are shown on the opposite page. This year's special award, the Coronation Cup, was awarded for fighting fish exhibited by the Twenty Club. Other awards were as follows:—

**Class 1.** Common goldfish: 1st—M. R. Price; 2nd—M. Clutton; 3rd—M. R. Price. **Class 2.** Bristol shubunkins: 1st and 2nd (Miss) D. Morris; 3rd—J. B. Plumb. **Class 3.** London shubunkins: 1st—S. G. Freeman; 2nd—A. E. Adcock; 3rd—A. B. Lester. **Class 4.** Fantails: 1st—W. C. Webber; 2nd—J. H. Dacombe; 3rd—W. C. Webber. **Class 5.** Veiltails and moons: 1st—J. H. Franklin; 2nd—W. E. Smyth; 3rd—F. D. Balham. **Class 7.** British C. W. Fish: 1st—G. S. Leveridge; 2nd—R. C. Harvey; 3rd—J. R. Ward. **Class 8.** Foreign C. W. Fish: 1st—E. G. Harris; 2nd—A. G. E. Tesson; 3rd—R. A. Harris. **Class 9.** A. V. Male swordtails: 1st—C. G. King; 2nd—R. W. Hall; 3rd—D. E. and F. E. Taylor. **Class 10.** A. V. Female swordtails: 1st—R. W. Hall; 2nd—C. Loudon; 3rd—M. J. Fletcher. **Class 11.** A. V. Male platies: 1st—J. H. Franklin; 2nd—J. Harris; 3rd—Mrs. N. Russell. **Class 12.** A. V. Female platies: 1st—F. H. West; 2nd—B. Deamer; 3rd—F. H. West. **Class 13.** A. V. mollies: 1st and 2nd—C. Loudon; 3rd—W. T. Cliffe. **Class 14.** Fighters: 1st—C. Loudon; 2nd—W. A. Richardson; 3rd—W. T. Cliffe. **Class 15.** A.A.V. Labyrinth: 1st—R. W. Hall; 2nd—F. H. West; 3rd—K. D. Owen. **Class 16.** 1st and 2nd—J. H. R. Leggett; 3rd—F. H. West. **Class 17.** Barbs: 1st—E. F. Russell; 2nd—W. Norcross; 3rd—M. A. Green. **Class 18.** Catfish: 1st G. W. Murford; 2nd—J. R. Herbert; 3rd—J. H. R. Leggett. **Class 19.** Hypoclineryon: 1st—W. T. Cliffe; 2nd—R. H. Fuller; 3rd—F. H. West. **Class 20.** A.O.V. Characin: 1st—A. Whatford; 2nd—

(Continued on opposite page)

### Crossword Solution

W	A	T	E	R	L	O	B	E	L	I	A
I	U	A	R	I	A	N	D				
L	A	B	Y	R	I	N	T	H	I	A	N
L	S	E	E	A	E	R	A				
O	M			S	T			A	T		
W	A	T	E	R	L	E	T	T	U	C	E
L	A	X	A	O	I	L					
W	A	T	E	R	B	O	A	T	M	A	N
I	D	A	I	D	D	I	D	E			
D	Y	T	I	S	C	U	S	N	O	V	
O	A	R	E	N	M	R	E				
W	A	T	E	R	S	O	L	D	I	E	R

PICK YOUR ANSWER (Solution)

1 (d), 2 (c), 3 (b), 4 (a), 5 (c), 6 (d).





Above: General view of the main display in the Royal Horticultural Hall at the National Aquarium Exhibition last month. The National Aquarists' Society stand is seen to the left of the picture



Above: In charge of a "Guess the number of fishes" aquarium at the exhibition was the National Aquarists' Society's Press Officer, who is seen here inviting visitors to have a go

Below: Grouped by the National Aquarists' Society stand are some of the society's officials. Left, Mr. R. E. Churchman (librarian), Mr. C. R. Macdonald (competition secretary), Mr. L. B. Katters (president). Extreme right is Mr. F. G. Odams (treasurer). The picture in the centre of this page shows the stand of Windmill Products, to whom the A.T.A. Cup for the best dressed trade stand was presented



Below: Behind the counter of "The Aquarist" stand at the exhibition are seen Mr. A. Boarder (left) and Mr. J. Carnell (right), well-known F.B.A.S. judges and lecturers, who answered fish-keeping queries put by visitors on coldwater and tropical subjects respectively. In addition to a small display of fishes, reptiles and amphibia the trophies won by Hendon and District Aquarists' Society at this year's B.A.F. formed part of the stand's attractions.



Photos:

J. H. R. Leggett; 3rd—A. G. Hill. Class 21. Cichlids; 1st and 2nd—M. A. Green; 3rd—D. Cannon. Class 22. 1st—R. E. Churchman; 2nd—F. A. Arhens; 3rd—A. Hart. Class 23. A.O.V. Tropicals; 1st—J. R. Thompson; 2nd—A. Kimber; 3rd—R. B. Churchman. Class 24. 1st—E. A. Davey; 2nd—R. C. Harvey; 3rd—E. S. Roach. Class 25. 1st—P. Hills; 2nd—K. F. Nutt; 3rd—J. Rudkin. Class 26. 1st and 2nd—H. Basterbrook; 3rd—A. B. Lester. Class 27. 1st—E. S. Davey; 3rd—W. G. Leak. Class 28. 1st and 2nd—E. S. Lloyd; 3rd—

W. A. Richardson. Class 29. 1st—C. Farmer; 2nd—T. A. Marshall; 3rd—C. Farmer. Class 30. 1st—E. A. Davey; 2nd and 3rd—L. J. Wilson. Class 31. 1st—C. Farmer; 2nd—H. C. Sharpe; 3rd—G. S. Rutt. Class 32. 1st—G. E. Tansley; 2nd—G. S. Rutt; 3rd—W. R. Burwell. Class 34. 1st—J. Harriss; 2nd—F. H. West; 3rd—J. Julian. Class 35. 1st—R. Gilbert; 2nd—W. A. Bone; 3rd—F. Bates. Class 36. 1st—R. C. Harvey; 2nd and 3rd—J. H. Discombe. Class 37. 1st—A. B. Lester; 2nd—R. W. Hall; 3rd—K. F. Nutt. Class 38.

1st—A. B. Lester; 2nd—C. L. Wood; 3rd—S. W. J. Franks. Class 39. 1st, 2nd and 3rd—H. Julian. Class 40. 1st—C. L. Wood (Plantaman Trophy); 2nd—(Mrs.) P. V. Edgar; 3rd—A. E. Falkus. Class 41. 1st—Hendon A.S.; 2nd—Leyton A.S.; 3rd—West Middlesex A.S. Class 42. 1st—Stoke Newington A.S.; 2nd—Bethnal Green A.S.; 3rd—West Middlesex A.S. Class 43. 1st—J. Mansell; 2nd—T. S. Hobday; 3rd—P. Barry. Class 44. 1st—W. C. Webley (Irene Trophy); 2nd—R. C. Harvey; 3rd—J. H. Franklin.

Valerie Lilly



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