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AND PONDKEEPER

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The pond-raiding kingfisher which is the subject of a letter on page 257 seen after its capture, in the surroundings of tropical aquaria at "The Kingfisheries"

VOL. XVII No. 12 1953

Editorial

THE value of the experimental approach to fish-keeping by the serious aquarist is unquestionable, whether the experiments are done with the altruistic motive of adding to our total stock of knowledge or merely because the pleasures of planning them and performing them help to maintain interest and provide novelty in his hobby for the fish-keeper. By seeing what happens in his aquarium when this or that change is made the aquarist can develop a better understanding of the requirements of his fishes and plants, and his findings may suggest new lines of thought on matters previously conjectural.

Interpretation of the results of experiments is something to be approached with caution, however, and the would-be experimenter needs to be highly critical of his procedures and conclusions. The plan and intent of the experiment may be simple enough—in fact the simple experiment which does not attempt too much is always to be preferred—and the observations made may also be incontrovertible, but the conclusions it is permissible to draw from all this are frequently strictly limited. It is but such a short step at this stage from the fact to the fancy, from the observation to the unproven theory. Usually, if the results lend themselves to the creation of a hypothesis, then further experiments suggest themselves to test it and support or disprove it with unequivocal results.

As well as the danger of building too much on relatively few results there also exists the hazard of concluding that certain events take place in nature because they are seen to occur in the artificial limits imposed in an experiment. Often the experimenter is frustrated in his desire to get at the truth because of the impracticability of desirable experiments, through lack of equipment, facilities or time. Then the issue has to remain a controversial one, with a number of facts to hand but so many more required. This is the position with many of the problems which interest us in aquaria, and while controversy over them can be a healthy recognition of the position, when it is replaced by dogmatic assertions developed from inadequate experiments and faulty conclusions, great harm is done.

Aquarium and Pond Goldfish Varieties

3. The London Shubunkin

THE London shubunkin is not recognised in the Show Standards of the Federation of British Aquatic Societies, but I am dealing with it here as it is quite popular in certain parts of the country, and the National Aquarists' Society usually provide a class for it at their annual show, as well as one for the Bristol shubunkin which I shall describe next month.

The London shubunkin has a shape similar to that of the common goldfish, and has a mottled colouring. The scales are so small as to be almost transparent, and the fish should appear scale-less. Any ordinary scales will show up with a metallic shine and these, although they do not disqualify a fish at a show, may mean the loss of a few points. The gill plates should also be calico or almost transparent and this is where so many otherwise good shubunkins fail. Hard gill plates lose points and they can be recognised by the hard glossy shine instead of appearing as if the actual flesh can be seen within.

A comparison with the illustration of a common goldfish will show the desired shape of the body and fins. It should be shapely and yet sturdy with a good rise from the nose over the back. The tail must not be large and flowing, just a good, firm, well-held caudal fin. The colour should have a good blue base with red, brown, yellow and violet in broken patches thereon with a speckling of black all over the fish. The chief faults seen at shows are large and too flowing tails. This always points to a strong leaning towards the Bristol shubunkin, and will always lose many points. The other fins must not be too well developed. It must be realised that the London shubun in should show no resemblance to the Bristol in shape. The upper curve of the body line should be unbroken with no nasty dip just before the dorsal fin. The belly must not be hollow. In colour the fish must be well supplied with all the essential colours; some fish have one or two only, and lose points for this reason. I have had the privilege of judging the London shubunkins at the National Show of late years and it has pleased me to find a few very good fish therein.

The London shubunkin is a fine fish for the tank or the open pond. They are as hardy as the goldfish and delight in a fair-sized pond, where they will breed with little trouble. Although they are quite suitable subjects for the indoor tank I advise that only the smaller ones are used. Once they reach about four inches of body length they are better placed in a pond. The feeding of this fine fish should present few difficulties. It is a good hardy type which will thrive on ordinary goldfish foods. I do not consider that any special type of food is needed to rear show specimens, and they should be no more trouble to breed and rear than the common goldfish.

The reason why this type has been left from the Show Standards is that it is thought that the Bristol is a more highly developed fish and more difficult to obtain as a show specimen. This is probably right, as can be realised when looking over classes of the two types. More good Londons may be seen than Bristols. In trying to establish a strain of these fishes for show purposes it is necessary to concentrate on the correct-shaped fish an any which bear resemblance to the Bristol, especially in tail shape, must not be used. Keep the strain pure and never try to get a special needed point by cross breeding. A system of selection from the one strain will in time produce the required specimens.

A. Boarder

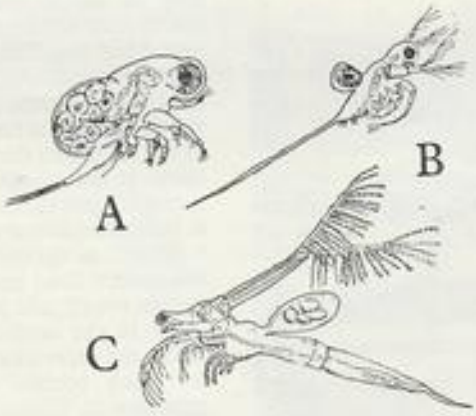
FRIENDS & FOES No. 12 — Carnivorous Cladocerans

POLYPHEMIDAE AND LEPTODORIDAE

PHYLUM:—Arthropoda—from Greek *arthron*—foot, and *podos*—foot.
CLASS:—Crustacea, from Latin *crustaceus*—having a shell.

ANY or all of the carnivorous cladocerans may be taken with a catch of *Daphnia*. To any but the most casual observer, however, their marked dissimilarity of shape and habits will very soon become apparent. All are carnivorous, ignoring the staple diet of *Daphnia*—algae—and feeding upon minute organisms which are weak enough for their jaws to seize. Anything with a shell is safe, however. I have not tested them, but imagine that fishes—even quite small ones, will find them delectable titbits.

Polyphemus pediculus is the sole British representative of the genus *Polyphemus*. Its most conspicuous feature is its eye—tremendous for its size, which seldom exceeds 1/12th of an inch. An adult female of this species can carry up to 25 young in its brood pouch. The four pairs of legs are uncovered by the small carapace.



A. *Polyphemis pediculus*
B. *Bythotrephes longimanus*
C. *Leptodora kindti*

There are two British species of *Bythotrephes—longimanus* and *cederstromi*. The size of these can reach one-eighth of an inch, excluding the extremely long spine on the extremity of their bodies.

Weirdest shape of all is that of the sole representative of the family Leptodoridae—*Leptodora kindti*. Not only is its shape fantastic—it grows to almost half an inch in length. Yet in spite of this it is extremely likely to be overlooked, being commonly considered one of the most transparent creatures in existence.

C. E. C. Cole

Building Your Own Fish House—5

by CUTHBERT L. NICHOLSON

THOSE of my friends who are following these articles must be working very slowly and enjoying the business of construction. Perhaps it is better that way, for though fish production may be delayed the bills will come in more slowly. Energetic aquarists who have written and asked me how to build the tanks will now be one jump ahead. I have enjoyed giving a few personal tips to the trusting ones who are following the design. I would like to deal, in my inexpert way, with glazing this month and to start you on the way to tank construction.

Painting and Glazing

When you erected the roof timbers you slid a piece of glass up the timbers to make sure there was sufficient clearance and to ensure the timbers were parallel. The next job is to paint the woodwork. It is much easier to paint the woodwork before the glass goes in than afterwards, so give a full number of coats. You will use a lot of paint, for the area is large. If you have used railway sleepers you may need to apply a coat of shellac first to seal in the blackness that might otherwise penetrate the paint.

When the final coat has dried, nail or screw glass hooks in the centre of each space on top of the wood surround. The illustration shows the hook, made from a piece of strip metal bent to shape and having two holes drilled in the flat

Shuttering for the concrete tanks to be made inside the house is shown ready for the pouring of concrete

Glass placed in position during glazing of the pitched roof. Putty has been laid in the rebates of the wood frames

end for fastening. I do not consider these hooks are essential, for glass will usually stay in without their help, but I recommend their use. Now work a handful of putty and with a good putty knife cut out portions from the lump and press them into the rebates in the framework of the roof. Do the whole of one panel at a time, starting (working from the inside) from the bottom of the left-hand timber and then from the top of the right-hand timber. If you are right-handed you will find the putty forcing nicely from your knife into the rebates. Left-handed glaziers please start puttying at the bottom right.

Take the first piece of glass, lay it on the putty at the bottom, slide it gently into the hook and press down evenly with wide spread fingers. Watch the air disappear from the unevenly but amply-spread putty and where there is a shortage knife in some putty firmly from the underside. Trim surplus putty from the inside but let the putty on the outside remain, and holding a brad, finger down against the glass, knock it in with a hammer sliding on the glass, until it is firm yet extending some small way over the top of the glass edge. Put in six brads to the pane. Work out how much overlap you may allow where pane meets pane and put in the upper brads where the bottom of the next pane will rest.

I used horticultural glass measuring 24 ins. by 18 ins. and each panel has four panes. There is an overlap of about 2 ins. three times and the lower pane overhangs the wall to drip clear. If yours does not work out so well you can increase the overlap or cut the top pane.

Cutting the Glass

Cutting this thick glass is very easy with the right tool. Good glass cutters cost less than five shillings and I recommend the kind having about half-a-dozen wheels in the cutting end and a screw arrangement which makes simple a rapid change from wheel to wheel. When not in the hand the tool seems to improve by resting in a jam jar containing half an inch depth of "turps." Before you start cutting, prepare your workplace well. You must have ample room and the glass must lie flat. Find a clear part of the bench or table and cover it evenly with an old black-out curtain.

Lay down a piece of glass to be cut, mark it with your wheel, then lay a straight-edged piece of smooth wood between the points marked so that the wheel holder when pressed against the wood has its wheel on the mark. Then, with the left hand firmly holding the timber, draw the wheel

Clearing the house interior before construction of concrete tanks and before glazing is complete. The heating pipes are seen in position

along, preferably once only, pressing firmly. Avoid going over the scratch many times. The line should begin at an edge and continue unbroken to the other edge.

Now turn the glass until the line marked is pointing towards you. Put thumbs on top and fingers underneath on either side of the line and snap the glass upwards like a biscuit. If you have to cut off, say, half an inch only, proceed in a similar manner except for the snapping. Instead lay the glass scratch upwards on the bench, with the marked half inch extending over the front of the bench. Take a pair of pliers (glass or ordinary), grip the surplus glass gently and firmly with the pliers, then smartly drop the hand. You may get a clean snap along the whole length but if you do not, just nibble off the surplus with the pliers.

Take a look at the illustration showing the glazing in progress and carefully make your own plan of campaign. From the picture and from what I have mentioned earlier, you can gain the following information: That I started on the south side at the point farthest from the door because I am right-handed and because the prevailing wind is south-west. When the other side was glazed I started at the door end so that my right hand came naturally into position over the lower roof timbers for steady glass handling and pressing home. There were no gales during glazing and although the house is built on a hillside in Lancashire there have been no glass losses.

Making the Fish Tanks

Do you realise that up to this point I might have been describing the making of a peculiar kind of greenhouse? Apart from the positioning of the pipes there is little about the place to bring fish keeping to the mind; those builders who have received the blessings of their wives because of the flowers the place is supposed to produce will now have to leave the floral trail behind and remember that this place is designed primarily for fish, with cucumbers multiplying a close second. Flowers? You may make room for *some*. Those big Christmas in-curved chrysanthemums will flourish.

Look at the illustration where Richard is clearing up the debris before tank construction starts. Remember what I said about leaving out the glass if you are building in the sunny months? This is important. It is preferable to construct all your concrete tanks before glazing. You can stand up and straighten your back when working by the eaves if there is no glass in. You can nail support battens to the roof timbers at all points and let them protrude through, if there is no glass. Another point: it is hard work mixing and bucketing and tipping a ton of concrete at night at a temperature of over 90° F. I glazed before making the tanks and the May sun was too hot. When I build the next fish house to the same design I shall build the tanks before glazing.

For the benefit of fast workers who can work better from pictures than from words there is a photograph of the shuttering and stays. I shall tell you all about that and some more in my next and final article.

By the way, I emptied one of my cold tanks to-night to clean it ready for the fantail fry and in water of 43° F. I found a healthy well grown Buenos Aires tetra which jumped in accidentally last summer. He has wintered with the sticklebacks. My book of wisdom says these fish are happy in anything between 60° and 80° F. Did you know they would live for months between 40° and 50° F. and stand the weekly hosing in of cold tap water to replace evaporation losses? What a fish!

An Aquarium Makeshift

JUNIOR aquarists who live in cities or who are far distant from ponds and streams, frequently have difficulty in obtaining supplies of suitable water plants at short notice. It is fortunate, therefore, that there is to be found in almost all, even the smallest gardens, a land plant which thrives in water without any soil and which provides an excellent stop-gap until proper water plants can be obtained.

This plant is *Lysimachia nummularia*, commonly known as money-wort or creeping jenny, a flower of a prostrate growth adorned by innumerable yellow blooms. Sprays, their length depending on the depth of water in the aquarium, are removed from the parent plant and long, slender roots are soon produced in abundance while at the same time numerous new leaves appear. As I have used this plant all through the winter until spring, I can thoroughly recommend its use, either permanently or as a makeshift.

J. M. Barron

Fish Culture in Lagoons

FROM Queensland comes the news that the Council for Scientific and Industrial Research is conducting experiments in Moreton Bay, with the purpose of seeing if a large number of lagoons can profitably be converted for fish culture to increase the existing yield of mullet, whiting, bream and blackfish. The organisation has appointed Dr. Bass-Becking, an eminent European research worker, as expert adviser on fish farming. Fertiliser will be added to the waters to augment the growth of aquatic life and so stimulate the growth of the fish.

A. W. H.

The Feeding of Tropical Fish Fry

by HUGH F. MILNE

TROPICAL fish in an aquarium, given correct light, temperature, water and feeding, will, with few exceptions, spawn when adult. The four conditions mentioned above can usually be produced by the keen aquarist who has set himself the task of breeding a particular species. The main difficulty, however, lies ahead, when the eggs hatch, and the minute fry with their even more minute mouths have to be fed. Granted that difficulty, many aquarists maintain that winter-bred fry, due to the scarcity of natural pond foods, cannot be successfully reared. This argument I would like to disprove by outlining my breeding programme for fry which I use the whole year round without recourse to a pond.

Here I would like to point out that pond Infusoria and sifted *Daphnia*, however clean it may appear to the naked eye, is often teeming with encysted life which, given the balmy conditions of a tropical tank, spring to life and wreak havoc with a brood of fry. This I have had happen to fry three weeks old by introducing throughly washed *Daphnia*. I now make it a firm rule never to use pond procured food in any of my breeding tanks.

First Foods

The ideal first food, for the minutest fry the tropical breeder will encounter, is *Euglena*. *Euglena* is a free-swimming form of a unicellular green algae. To the naked eye it appears as thick green water. When, however, a drop of this water is examined under the microscope it is seen to contain hundreds of green elongated Infusorians in constant activity. *Euglena*, although present in most stagnant pools in the form of a green scum, is best procured from a reliable source. (Cultures are often advertised in the columns of this magazine.) Once procured it is easily cultured and maintained if the following rules are observed: (1) sterilise a jar with boiling water and add two pints of tap water; (2) boil for half an hour 40 grains of wheat; (3) transfer the grains only to the jar; (4) cover the jar and keep in a dark, cool cupboard, shaking the contents every other day; (5) at the end of four weeks add the culture of *Euglena*; (6) place the jar where it will receive sunlight, and the culture should be ready for use within a fortnight. Never rely on one culture only; it is always better to have several on hand in case of mishaps—and remember to keep a gill of the old culture with which to start a fresh one.

On the fifth day I find it advisable to feed larger Infusoria to maintain rapid growth. An excellent Infusoria powder is on the market for this purpose and obtainable at most dealers. Here I stray from the orthodox manner as outlined in the instructions which accompany the phial of powder. I have made a small cloth bag, 3 ins. by 2 ins.—a one-inch surgical bandage is excellent. Into this bag I empty a half teaspoonful of the powder, tie it at the neck and suspend it in the aquarium. The bag must be lowered gently into the water, otherwise the powder will spill through the fine mesh and cloud the water. In 24 hours, threadlike fungus growths will be seen growing through the meshes; in another 24 hours the bag will be covered and on closer scrutiny the first Infusorians will be seen weaving in and out of the fungus threads.

All that is necessary when feeding the Infusoria to the fry is to trail the bag over the surface of the aquarium and the Infusoria will be seen to fall in a thick white cloud. I find that a better growth is maintained if a dried, crushed lettuce leaf is added to the water at the same time; it appears to act as a food and, of course, starts a culture of its own. To use this method of Infusoria culture it is best to introduce the bag three days before it is required. I find that the bag has, on an average, a life of one week before the bandage rots away and has to be removed. To ensure a continuous supply the second bag must be added four days after the first. The half teaspoon per bag I find sufficient to feed up to 100 fry in an 18 ins. by 10 ins. by 10 ins. tank.

Two Worm Combination

The next item in their menu is a combination of two foods, micro worms and shredded earthworms. These foods I normally introduce between the third and fourth weeks, but this is naturally determined by their rate of growth. I do not think any remarks need be made on culturing micro worms as it is by now sufficiently well known, but I would like to draw attention to its removal from the porridge medium and the culture dish. I find a deep saucer with a glass cover which fits loosely yet completely over the top, serves the purpose best: loosely so that a liberal supply of air is available for the worms, and completely so that the porridge will not dry out, both necessary conditions for a thriving culture.

To remove the micro worms I place the saucer near a gentle heat. If the culture is well established, sufficient worms have crept out of the porridge up the inside of the saucer within five minutes; they are then easily removed with the finger and washed into the tank. This method ensures that only micro worms are introduced; a necessary precaution as porridge will soon foul the water. As with the *Euglena* it is better to have several cultures going at the same time. Three saucers would provide a three-day rotation, thus ensuring a liberal supply each time one is placed near the heat. I find that micro worms breed best in a darkened corner away from any excess heat.

Lastly, a few words on the earthworm and its method of preparation. Small red earthworms, two to three inches long are best. These should be rinsed well in running water and excess sand and earth squeezed from the vent by running them between forefinger and thumb. Large worms are useless for fry as their skins are too leathery and prove too tough a morsel, even when shredded. As for shredding, the quickest, cleanest, and most painless method is to use the standard worm shredders which are on the market to-day—a few quick rubs and the worm is ready for feeding. With a little practice the aquarist can soon vary the size of the particles to suit his growing fry. This latter course I continue until the fry are large enough to take the usual chopped and dried foods which suit their species.

Food Changes

No hard and fast rules can be applied to fry rearing regarding when to change from one size of food to a larger. That depends entirely on the rate of growth and must be left to the individual breeder's discretion. However, I would like to emphasise the gradual change-over. It is better to overlap each stage by at least four days. Fish I

(Continued overpage)

AQUARIST'S Notebook——

by

RAYMOND YATES

MERCUROCHROME is mentioned in aquarium literature as a cure for white spot, but it is safe to say that the majority of aquarists are quite unfamiliar with its use. In the U.S.A. it is very popular indeed but in this country it is stocked by few chemists, there being practically no demand for it. In any event, it is a scheduled poison and a signature is required, and it should be remembered that a chemist is unlikely to sell it to a person unknown to him. Apart from these initial difficulties there are other disadvantages.

Mercurochrome in solution produces a deep red dye which stains anything it touches, and when added to aquarium water produces a two-colour effect—red in the lower half of the tank and green (similar to the effect of acriflavine) in the top portion. There is no obvious effect on the fish during treatment although, on occasion, a delayed adverse action occurs, and it is because of these toxic "after effects" that many aquarists prefer to play for safety and use other remedies. Why mercurochrome should act in this peculiar way is hard to explain, but no two tanks are ever exactly alike, the age of the chemical is unknown to the purchaser, and the reactions of the drug are unreliable at tropical tank temperatures. Fish which have been "doctored" with other chemicals are probably weakened and more liable to show after-effects. Whatever the reason, the fact remains that some risk has to be taken with this very effective cure, because mercurochrome is still the only guaranteed killer of white spot parasites.

It is unaffected by light and does not stain plants or gravel, but has a bad effect on some plants, *Aponogeton* in particular. Green and blue-green algae thrive in it. A correct dosage for a tank infected with white spot is four drops (or less) of a 2 per cent. solution of mercurochrome, to each gallon of tank water. Only the one treatment is necessary as all signs of the disease usually disappear within a week. It should be remembered that mercurochrome is useless for other fish diseases except as a swab for open sores or wounds. A 2 per cent. solution should be obtained from the chemist, the cost for about four ounces being approximately two shillings.

No keen aquarist likes to hazard valuable fish and to those who are doubtful of using this first-class remedy it may be mentioned that most experienced aquarists use it with impunity. It is just the odd case which crops up from time to time which gives it its bad name.

* * *

SOONER or later every aquarist will meet trouble in the form of a fungoid growth on the eyes of fishes. Where this is the result of accidental injury or internal parasites (e.g. worms) eating through, little can be done. In other cases a complete cure can be effected by swabbing the eye once a day for two or three days with cotton wool dipped in castor oil. This is an old remedy but one which does not seem to be at all well known. Gouramies, fighters and paradise fish seem to be the most liable to eye fungus, and a complete cure is obtained if the treatment is given the moment the eye is seen to be opaque.

* * *

ONE point about *Tubifex* worms which is not usually realised by the beginner, is that they can be carried long distances merely wrapped up in greaseproof paper. They are generally offered for sale in water but can easily be carried home dry. Many firms send these worms by post in small tin boxes. Naturally they carry better in cold weather than in the heat of summer.

CABOMBA is one of the best plants for the tropical aquarium, and it grows very well indeed if provided with a good top light. When it enjoys the benefit of strong surface illumination it becomes very beautiful indeed, the leaf fans being about one inch across and the colour a bright leaf green.

Cuttings should be taken from these plants from time to time. They grow quickly and soon form their own roots. The old plant will throw up new shoots in a very short time, and a mass of root stock *Cabomba* is ideal for spawning tanks. When offered for sale by dealers this plant is usually very large and rather coase, due to having been grown in a side light. However, the dark coloration and the broad, fan-like leaves soon change to the more graceful form when transferred to a tank with a strong top light.

* * *

PEROXIDE of hydrogen is sometimes advocated as a cure for the attacks of certain fish parasites such as trematodes. Even when used in the proportion of 1 part to 500 parts of water it has a very stimulating effect on fish and some varieties seem adversely affected, more particularly, barbs, harlequins and neons. The fish gasp at the surface and give the impression that they are suffocating. Aeration helps but it is wiser to remove the fish which are in difficulty to another tank, once they reach this state. The other fish can be left in the tank water; undoubtedly the effects are good. Peroxide will remove the red colour of permanganate of potash from tank water instantly, if required. The so-called "double strength" (20 volumes) should be used.

The Feeding of Tropical Fish Fry

(Continued from the preceding page)

find, in spite of popular opinion to the contrary, are conservative in their diet and wary of something new. If the aquarist suddenly changes to a larger food with his fry, they will not refuse it eventually, but they may take two to three days to get accustomed to it. Two to three days' growth in a fry's life is all important and may make all the difference between a really good adult specimen and a not so good one.

Frequency of feeds depends on the time available to the breeder, but the oftener the better provided the fry are eating it and it is not adding to the sediment at the bottom. A sure way to see whether the fry are receiving sufficient food is to watch their stomachs: if the bellies are bulging—this can be observed in fry when they have been free swimming for one day—all is well; if not then more food is required.

This feeding programme I have successfuly used with several species of fry including fighters, flames and serpae tetras. At the moment of writing I have a brood of 50 flame fishes, five weeks old, their average length half an inch—surely sufficient proof to the sceptical that winter rearing is practical and that pond foods are unnecessary.

AQUARIST AT HOME:

Mr. A. Huson

(NORWICH)

Interviewed and photographed by JAS. STOTT

THIS month I would like to introduce readers to another Norwich aquarist who started 20 years ago with coldwater species and then turned to tropicals. These, however, failed to hold his interest and so he returned to his "first love" with renewed vigour, and he re-started his coldwater activities on specialised lines, concentrating entirely on shubunkins.

It is obvious that a considerable amount of thought based upon experience went into the designing of Mr. Alfred Huson's present establishment and from what I could see I should say that it is extremely satisfactory from a practical point of view. His fish house is 20 feet long by 9 feet wide

A view of one end of Mr. Huson's fish house showing the large stock tanks

and 9 feet high to the ridge. Concrete is used for the foundation and flooring and the same material is used for the first three feet of the walls; wood boarding is employed for the next three feet up to the eaves, and this part is lined with asbestos sheeting. The glass-paned roof is high ridged and is fitted on the inside with "Windolite" placed one and a half inches away from the glass. This is used to help retain heat in the house during the winter, but the temperature is adequately controlled through the summer months by a good ventilating system.

Most of the tanks housed in this building are large, but there are a few small tanks which are used for special purposes such as quarantine and hospital quarters when necessary. There are in all 15 tanks ranging in size from 18 ins. by 10 ins. by 10 ins. up to 8 feet by 2 feet by 18 ins. Outside the fish house is situated a concrete pond composed of three sections with narrow connecting channels and pockets incorporated in the design to provide suitable conditions for bog plants. By means of a pump operated by a single phase ¼ h.p. motor and a system of piping, water from this pond, when so desired, may be circulated through the larger tanks in the fish house and returned to the pond.

Mr. A. Huson photographed by his garden pond

Before entering the tanks, however, the water is taken through a filter to exclude undesirables. This system is not used constantly; it is usually permitted to operate a few hours per week during the summer period.

I noticed some healthy-looking young fishes and I was interested to hear Mr. Huson say that he is always prepared to try rearing so-called backward fish, and never considers this to be time wasted. Sorting out and placing into suitable conditions in an attempt to encourage normal rate of growth has often resulted in the production of some quite attractive fish in the experience of this breeder. As far as rearing is concerned he is all for variety in feeding, a principle which I think all breeders agree on and, of course, plenty of swimming space. He suggests starting with Infusoria, then to dried boiled egg yolk mixed with fine ground rice and made into porridge form for the second stage, then on to screened *Daphnia*.

Mr. Huson gave me the following recipe for preparing a good dried food which he always uses. Equal quantities of "Weetabix" cereal, cod liver oil bird food, Bemax, and breakfast oatmeal are taken. This is mixed and then put through a coffee mill and graded fine for dry feeding of fry after the screened *Daphnia* stage, and the larger grading used for a general fish food. This is found to be an extremely nourishing dry food mixture and is supported with plenty of live food whenever possible.

In this picture can be seen the water pump which circulates water between fish house tanks and garden pond. At the extreme right a coffee mill used in dried food preparation is shown

A page for the beginner contributed by

A. BOARDER

IN the January and February issues of *The Aquarist*, I have described the types of plants to be used in the tank and also the water problem. I now intend to deal with the actual setting up of the tank. It is far easier to keep in good order a tank at least as large as the 24 ins. by 12 ins. by 12 ins. size. It is always advisable to test the tank first to see that there are no leaks. Very tiny ones usually seal up on their own as soon as the water and compost are added.

Wash the tank out well with a disinfectant. Then well wash the compost for the base. Sand is the best for this purpose and its texture depends to a certain extent on the sizes of the fish which will be accommodated. There should be no dust in the sand, and only particles which will not wash about in the water must be used. If the sand can be dried and sifted through a sieve, like a tea strainer, the fine stuff can be removed. Well wash under a running tap, with frequent stirrings and the compost will be ready to use. Place sufficient in the base of the tank to bring it up to the top of the lower front frame and let it rise to three or four inches at the back according to the width of the tank.

Aquarium Rocks

Now for the rocks—these certainly add to the charm of a set-up tank and I advise their use in moderation. Do not use so many and so large pieces that most of the lower part of the tank provides no swimming space for the fishes. For most of our coldwater fishes I prefer flat types of rock which are tastefully displayed on the compost so that they appear to lie in a natural formation. Leave about the front half of the base clear of rocks and concentrate on the ends and back. On the other hand do not put large pieces of rock so near the back glass that they may form a trap for fishes. Do not put a large rock dead centre of the tank, it will look awful if you do. Try to visualise an actual attractive underwater scene and you will not go far wrong.

See that no crevices are left under parts of the rocks; even if they are not large enough for fishes to get under, small particles of uneaten food may be washed there to cause trouble later on. If you have no natural rock, this can be made with concrete but this must be well scrubbed before use so that all the free lime is washed away. Certain types of rock are unsuitable for tanks, and all those types which may disentegrate in water should not be used. Weathered Westmoreland stone used for rockeries is very suitable. When setting up it is advisable to break up some of the rocks so that some small pieces may be placed near the rocks so that the compost matches somewhat with them. Nothing looks worse to see a tank with yellow sand and almost black rocks on it.

Filling the Aquarium

When you are satisfied with your arrangement of rocks, introduce some water—about a third will do for a start. Then plant as suggested last month, trying to cover the back corners of the frame and keeping the taller kinds to the rear. It is as well for subsequent cleaning purposes to keep the front of the base quite clear of rocks and plants. Try to get a natural look with the plants and set them in small clumps rather than one single shoot of a kind regularly spaced throughout the whole tank. Visualise, if you can, how the plants will grow and what the tank will look like in a few months' time. When all plants are in position you can add the rest of the water. This should reach the top frame of the tank and is best poured on to a thin flat board so that it does not disturb the compost or plants. If the compost has been correctly washed the water should be clear. If it is not so it may be necessary to empty and re-fill. Any film or scum on the surface can be removed by drawing a piece of paper quickly over the surface from end to end.

The tank should, of course, be placed in position first as it will weigh quite a lot. A 24 ins. tank can hold about 120 lbs. of water. Do not be in a hurry to put some fish in the tank. If you can leave it for about a fortnight to settle down and allow the plants to get established a bit, it will be a great advantage. See that the tank gets plenty of light during this time, as few plants will grow well without it.

Size of Fish

When deciding on the fish do not think that you are bound to fill the tank to its fish capacity. Two or three small fish in good health will always look better than a crowd of unhealthy specimens at the top of the water gasping for air. The types of fishes to be used will depend on your own particular preferences. I suggest that for a start a few small goldfish or shubunkins should be used. Small green tench are also very good as they do act as scavengers to a certain extent. One word of caution: do not use large fish. A large fish in a small tank looks bad and I do not like to see any fish in a set-up tank about the size of the one mentioned, over about three inches in body length. Three of this size are adequate for this tank and any more might mean overcrowding.

Fish which have been purchased are best kept to themselves for a fortnight to give any disease a chance to develop and show itself. Do not think that once the fish are in the tank you must provide a constant supply of food. Leave them without for a day or two and then when you do start to feed do so with great care. The best set-up tank can soon be put out of order by over-feeding. This whole subject of feeding is too large to be dealt with here and so I shall leave that to be dealt with in the next issue.

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 greaseproof 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.

The Black Widow

(Gymnocorymbus ternetzi)

(BLACK WIDOW, BLACK TETRA, or BLACKAMOOR)

ORDER:—Ostariophysi, from Greek *ostarion*—a little bone, and Greek *physa*—a bladder.
FAMILY: Characidae, from Greek *charax*—a sea fish.
SPECIES: *Gymnocorymbus ternetzi*—from Greek *gymnos*—naked or lightly clad, and Latin *corymbus*—head. Ternetzi—after a collector, Carl Ternetz.

THE popular name "black widow," frequently shortened to the one word "widow," is the one commonly used in this country whenever and wherever aquarists refer to this lovely little fish. Nor is the reason for the name hard to discover, for the broad intensely pigmented anal fin of a young fish looks exactly like a short black skirt worn by a somewhat robust young lady. The effect is heightened by the almost complete transparency of the tail (caudal fin).

The ground colour of the fish's body is silver, overlaid by two or three narrow, black, vertical bars. The black pigmentation spreads into the dorsal fin, and almost completely covers the adipose fin, and caudal peduncle. From the tip of the snout to the commencement of the rays of the tail, a widow is approximately twice as long as it is broad.

It is one of the greatest griefs of aquarists that the black fades to grey as the fish grows old and nears its maximum length of two inches. Wild specimens are said to grow up to three inches in Paraguay, their country of origin.

A small shoal or school of young widows, swimming busily among vivid green plants in crystal clear water is a sight not easily forgotten, as many a happy owner will testify. They are most comfortable in a temperature of from 72° to 75° F., but breed more readily in somewhat warmer water—from 76° to 80° F.

When preparing to breed widows feed them live food—as much as they will eat. They are not easily sexable, but the development of roe as the female comes into condition is visible as a fattening of the lower half of her body, while the male, although taking his full share of food, will not noticeably alter his shape. Add additional fine-leaved plants to those already in the aquarium—*Ambulia*, *Cabomba*, or *Myriophyllum*, are all suitable. They should be arranged in dense thickets, to catch the eggs which the female will scatter among them during the actual spawning drive. If the breeding pair are left in the aquarium after they have spawned they will probably eat as many of the eggs as they can find, or, a few days later, all the fry which hatch from the uneaten eggs.

As a first food, after they have absorbed their egg sacs, the young appreciate water in which floating algae is present in quantity, and Infusoria. If neither of these two natural foods is available, minute quantities of dried egg can be substituted. Assuming, however, you *do* use algae water, or an Infusoria culture, make certain that it is the same temperature as the water in the rearing tank. Infusoria can be killed by too sudden a change of temperature, and fry can be chilled by the sudden influx of much cooler water. Dead Infusoria and dead fry can both start pollution, with disastrous results.

As the fry grow they will need larger food, but not too large for them to catch and consume. Take them gradually, therefore, through new-hatched brine shrimp or *Cyclops* nauplii, to baby *Daphnia* of the smaller species, and micro worm, and then to new-hatched gnat larvae, and bigger *Daphnia*. With plenty of such first-class natural food growth should be rapid, and the young fishes strong and healthy.

Nature has equipped "widows" with a set of thoroughly efficient, though extremely small, teeth. If no live food is given for them to chew, their desire for blood may overcome their normal good nature, and they will nip little pieces out of the fins of other fishes.

If you are the proud owner of first-class specimens of "widows" and are desirous of exhibiting them to the general public, remember that they will retain their coloration to a much greater extent if displayed in a furnished aquarium. The normal unfurnished show tank admits far too much light and causes the chromatophores to contract, and a beautiful fish becomes almost, if not completely, uninteresting to the casual observer.

Design for a Heat-Insulated Fish Carrier

WHILE the colder months are still with us, it is advisable to take suitable precautions when transporting fishes, otherwise there is a dangerous risk of bad chilling with all its attendant ills and high mortality rate. Many of the hardier exotic fishes are able to live comfortably within a wide temperature range and can easily stand the temperature of their water being lowered, always providing that this cooling is very gradual. The heat loss from unprotected glass jars or cans, however, can be very rapid, especially when the outdoor temperature is at, or below, freezing point.

A thick wrapping of newspaper or woollen material is a good emergency method of insulation, but the container described here is a much neater job, it costs very little, and furthermore, within its thick padding the inner glass jar is virtually unbreakable. It will be noted that the container is unsuitable for use over long periods in extremely cold weather. It is, however, most servicable for the transport of specimens to your local table show or for carrying home purchases from your dealer.

To make it you need one "Horlicks" or similar screwtop jar, size not larger than 5½ ins. diameter by 6 ins. high; a one-gallon paint can (obtained from your decorators or local builder); a piece of hair-felt about ¼ in. thick by 32 ins. by 7½ ins. The felt can usually be purchased at an upholsterers, builder's merchants, or from a heating engineer.

The standard-size paint can, 7 ins. diameter by 8 ins. high, was used as a container for the jar and for this the felt should be cut as follows:—one piece 20 ins. by 7½ ins. (around the inside of the can), and two circles of 5½ ins. diameter (for above and below the jar). After several experiments I found that a domestic carving knife was the best tool with which to cut the felt. With a coat of paint or enamel the container is complete and you will find it a most useful addition to your collection of "fishy" equipment.

Roy Whitehead

The Use of Vermiculite in Aquaria

Since vermiculite has been marketed as a plant-growing medium for aquaria many aquarists have asked this journal for information on the product. The main article on this page, by an advocate for the use of vermiculite, outlines its properties and gives some personal observations on its use. A further note from a scientific contributor says that more may be claimed for vermiculite than is justified from the aquarist's standpoint.

MANY aquarists do not favour the use of a bottom layer of growing medium in the aquarium, but to my mind this "growing medium" is an essential part of the aquarium set-up. I have seen many tanks where gravel only is used which, although not lacking in verdure, gave the appearance of stunted plant growth somewhat reminiscent of the Japanese art of growing miniature trees and shrubs. The true value and purpose of plants was thus not fully realised.

I have never been too keen on using loam or any other type of organic material, so recently I decided to use vermiculite. I must say that the results have been excellent and the plants (six varieties totalling over 30 plants), which received considerable buffeting in the post over Christmas, have now shed their old growth and are well on their way to making luxuriant new growth. In a little under a fortnight from planting, the *Vallisneria spiralis* sent out four new shoots; vermiculite is, of course, especially suitable for encouragement of new plant growth.

What is Vermiculite ?

Vermiculite is the name given to a group of mica-type minerals mined in South Africa. It is found in the form of extremely fine laminations, within which is held a minute quantity of water. When vermiculite is processed at a temperature of over 1,000° C., the water changes to steam, the material expands into cellular granules and an enormous number of air cells are trapped in the granules. During this process the material acquires a bright reflecting surface, varying from gold to brown in colour. This reflecting surface, incidentally, enables the material to resist conduction, radiation and convection of heat.

Why is this mineral earth so suitable as a growing medium in aquariums? Growing mediums such as peat or leaf mould can and will react with the water and alter the pH value. They have also other disadvantages, that when stirred up for such reasons as replanting, etc., the water may become cloudy and even rather foul. Colonies of worms may establish themselves, thereby upsetting the balance of the aquarium. Vermiculite, however, is rot-proof, termite and vermin-proof, odourless, permanent, incombustible, does not react with water, being neutral, and, unlike organic material, will not promote fungus growth. It is also extremely light.

Some of these qualities are not essential qualities for aquarium compost, but are mentioned for interest's sake.

Vermiculite is also reasonably cheap to buy. I have found that for about 2s. 6d. I can get enough suitable for an aquarium 3 ft. by 1 ft. by 1 ft.

Hints on Use

Before using vermiculite, it should be soaked in water for about 24 hours. It should be layered to a depth of 1½ ins. to 2 ins. where plants are required to be grown and a layer of 1 in. to 2 ins. of compost (particles 1/16 in.) laid on top. I usually leave the front area of the aquarium free, so that when the sediment is siphoned off there is no chance of the suction interfering with the bottom layer. Its only disadvantage as far as I can see is that, being extremely light, it rises when disturbed and floats on the surface. With care, of course, the top layer of sand will counteract this. I have observed angels, platys and barbs, etc., attempting to eat some that had escaped to the surface with no ill after-effects.

Vermiculite is also an extremely efficient insulator, a non-conductor of electricity and is non-irritating to the skin. It can be used for many purposes in the fish-house: to make lightweight concretes which can be sawn by hand, or to lag the sides and ends of one's aquarium to preserve the heat.

Perhaps the reason that plants in an aquarium grow so successfully in vermiculite is this:—there are two broad types of soils. (1) Mineral soils—those which owe their principal characteristics to the size and character of the minerals present, and (2) organic soils—those whose dominant characteristics are determined by the character and relevant quantities of organic compounds present. Now the health and growth of the plants are determined by both; the first being introduced (vermiculite), the second (organic material) being supplied by fish along with the fragments of stems, roots and leaves, etc., which break down when attacked by the various micro-organisms and eventually result in forming nitrates which are essential to plant life.

I do not profess to be an expert on the matter, the above being solely a written account of my observations and research on this subject. Perhaps now is the time for some aquatic plant expert to give his views on the "pros and cons" of the use of this material.

I. McCallum

Dr. E. Elkan writes:

YOUR correspondent, Mr. J. G. Powell, in the February issue of *The Aquarist* complains of his bad experience with vermiculite and says that "very little appears to have been written about it." If he will turn to the publication *Vermiculite* by Dr. E. R. Varley (H.M. Stationery Office, 7s. 6d.), to the article "Vermiculite—a Versatile Mineral" by A. G. Thomson (*Discovery*, August, 1952, p. 261) or to the article "The Use of 'Exflor' Horticultural Vermiculite for Seeds and Cuttings" by S. R. Mullard in the *Cactus & Succulent Journal of Great Britain* (vol. 10, p. 88, October, 1948) he will find that vermiculite production started in 1923, that very much has been written about it and that it can be of no conceivable use to aquarists.

Its main useful property is that of holding water. Once saturated with water in an aquarium it will be as useful there as any gravel or stone may be since it consists of mica and has no nutritive value. Also, as we see from Mr. Powell's experience recorded in his letter, it may, if not thoroughly washed, change the pH of aquarium water to the great detriment of the fish. Vermiculite is of great use to industry and of some use to those growing difficult plants in hothouses. Fishes and water plants are better left to thrive on the kind of soil they find in natural surroundings.

OUR EXPERTS' ANSWERS TO READERS' QUERIES

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.

Can you tell me what I can paint my aquarium frames with to help prevent the formation of rust?

Several thinly applied coats of aluminium paint make a good rust preventive. After the final coat has dried, ordinary enamel paint can be put on to tone with the predominating colour of a room. While a tank is still empty, it is a good idea to melt candle wax in an iron ladle and apply it to the top frame on both sides.

I have a perma black molly which has recently developed what appears to be a fungoid growth just below the dorsal fin. What should I do to cure this disease?

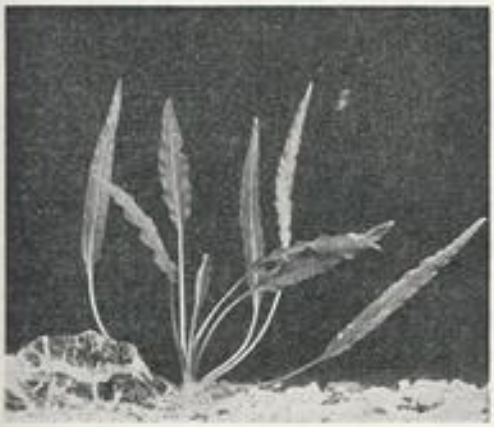
Give your fish a course of salt baths. Use common household salt, or Tidman's Sea Salt, rather than refined table salt. Use it in the proportion of four teaspoonfuls to every gallon of water. Make sure the salt bath is the same temperature as the aquarium, and keep the fish in the bath for half-an-hour or longer. Repeat this treatment several times over a period of 10 days to a fortnight. Meanwhile, add a teaspoonful of salt to every gallon of water in the aquarium. It must not be forgotten that mollies normally prefer slightly salty water.

A female albino swordtail and a male perma black molly have mated and produced young. Can you tell me if these fish are scarce, and if they are of any value?

The young fish you have are of scientific interest and rather rare. It would be a good idea to forward some specimens pickled in formalin to the British Museum (Department of Fishes) South Kensington, where they could be studied. We fear that your young fish will not prove fertile, but you should try to breed from them, or back to either parent. If you are of a scientific turn of mind, it would be a good idea to keep written records of your work in this direction.

I would be very grateful if you would kindly tell me how to filter the water in my aquarium without using electrical equipment.

It is quite easy to filter water without electrical equipment. Obtain a large flower pot, and, working from the bottom, fill it with layers of round pebbles, charcoal, sand, and finally glass- or cotton-wool. Suspend the flower pot over a clean jug or jar, and siphon water from the aquarium on to the wool. The wool will catch larger particles of sediment, and finer particles will be trapped as they pass through the sand. The layer of charcoal will help to purify the water. But watch that the filtered water does not flow over the side of the jar and on to the carpet or nicely polished linoleum.



For best growth plants of the genus Cryptocoryne require a rich medium for rooting on the aquarium base

The leaves of my *Vallisneria* are getting too long for the depth of my aquarium. Will it do any harm to the plants if I cut the leaves back to a more convenient length?

The leaves of *Vallisneria* may be cut back to suit the depth of your aquarium. If anything, cutting back the leaves stimulates the growth of the plant. You will find, however, that long leaves provide excellent cover for the fishes, and help to cut down too bright a top light.

I have an aquarium frame measuring six feet in length and wonder whether quarter-inch thick glass would be suitable for glazing it?

You will need glass of about half-inch thickness. Use toughened glass on the bottom, and best plate for the sides and ends.

I have seen *Cryptocoryne cordata* plants with leaves close to 10 inches long, yet my own plants remain small. When I have mentioned this to dealers they always say that large plants have been grown under ideal conditions. But I do not believe that the plants one sees at the large shows and the London Zoo Aquarium can be the same as the ones sold to the general public.

The information given to you by the dealers is right. Most aquarium plants can be grown to a large size if they are given deep compost and plenty of room. If you pay a visit to the botanical gardens at Kew you may see really large *Cryptocoryne* growing in mud. You must not forget that an inch or two of washed sand is not exactly the ideal growing medium for specimen plants.

I bought a male fighting fish the other day but, on reaching home, I noticed that some of the fins were torn. When I mentioned this to the dealer, he said the damaged fins would grow again. Is this true?

The information your dealer gave you was quite true. But by torn fins, we presume you mean small splits or tears between rays and membrances. Badly damaged fins may not heal so well and leave a scar. If you want to keep fighting fish in perfect condition, keep them in solitary confinement. For even when kept with small fishes of a different species, there is always the possibility that they will get their long fins nipped.

My aquariums have become infected with gill flukes and the fish have died. I am going to dispose of the sand, rocks and other furnishings, and make a fresh start. But I am reluctant to destroy my collection of plants. Is it possible to sterilize them and return them to the aquariums?

To be perfectly honest, the wisest course would be to get rid of all plant life because gill flukes are very resistant to germicides. And if you plunge the plants in a strong solution of salt and water or some other specific the chances are that the plants will be killed. If the plants are from the tropics, you might care to keep them in a really high temperature for a day or two. But it cannot be guaranteed that such treatment will kill any disease germs that many be carried with them.

I am very keen on breeding some penguin fish (*Thayeria obliqua*), but cannot find much information concerning them. Can you tell me something about their breeding habits ?

Penguin fish are not very difficult to breed, but they are not easy to sex. As a rule, female fish are plumper than the males, especially when they are coming into breeding condition. The eggs are laid in thickets of plant life, usually close to the bottom of the water. After spawning, the parent fish should be removed to fresh quarters. At a temperature of 80° F., the eggs hatch out within two days. The fry need green water and the smallest of Infusoria for the first few weeks of their life.

Can you give me some information on the breeding habits of *Aplocheilus lineatus* ?

This species is not difficult to breed. Eggs are deposited, a few at a time, in the plant life. Spawning continues over several days. The eggs take a few days to hatch out, and as the eggs are deposited at different times, the fry are always of different sizes. You have to sort the larger ones from the smaller ones to prevent bullying. *A. lineatus* like to be left alone in old, clear water well filled with feathery plant life. Very good results have been achieved in aquariums having a layer of peat under the sand. The eggs hatch best in rather shady conditions.

I have just set up a tropical aquarium and wonder why the fish in it keep skimming over the heater tube. Can you tell me the cause of this behaviour ?

Fish often behave in the way you describe in a newly set up aquarium. As a rule, they stop doing it after the aquarium has become established. Perhaps the newness of the water sets up a slight irritation; for fish transferred to long-established tanks never seem to act in the same fashion. On the other hand, a dirty, neglected bottom will encourage organisms to multiply and have an irritating effect on the fish. The remedy for this is to siphon away sediment on the bottom and top up the aquarium with boiled water set to cool down to the same temperature as the aquarium. Several siphonings may be necessary before the fish get rid of their "itch."

I am building a fish house, and wonder whether there is any way of controlling the growth of algae in the aquariums ?

Algae is an amazing thing, and will often appear in conditions normally inimical to it. Shading the aquariums from too bright a light with muslin, or whitewash stippled on the glass roof will help. So will a natural acid condition of the water brought about by covering the bottoms of the aquariums with a mere sprinkling of granulated peat covered with the usual compost. As a rule, algae will not gain much ground in an aquarium stocked with plenty of vigorous-growing submerged vegetation and from which all rockwork with a lime content is excluded.

I have a perma black molly which has developed the habit of staying stationary in the water, and wagging its body from side to side. Could you diagnose the trouble, and give me a cure for it ?

Your fish is suffering from a chill. Perhaps your heater went out of action for a short time; perhaps the fish got a chill before you introduced it into your aquarium. Maybe your aquarium has been subjected to a cold stream of air or draught. Anyway, a mild chill can be remedied by keeping the temperature a few degrees above normal, and feeding the fish on scraped lean meat and live food rather than on prepared packet food. Really bad cases of chill are usually fatal within a week or two. Then the sufferer loses its balance altogether, and not only "shimmies" about the water, but cannot move off the bottom, or descend very far from the top—a pitiable sight. Try putting a teaspoonful of common household salt to every gallon of water in your aquarium. Mollies like a slightly saline condition.

A few weeks ago I spawned a pair of Siamese fighting fish, but lost all the fry because I had no Infusoria to feed them with. Can you tell me how to cultivate Infusoria ?

You will need several one pound jam jars, or similar pot or glass containers. Fill each one with some water from an aquarium, and into each put some crushed aquarium plants, some crushed lettuce leaves, or even a slice or two of raw potato. Place the jars in a warm cupboard out of the light and leave for about four days. At the end of this time, the jars will have a faint to definite nasty smell, and, held to the light, will be slightly milky looking. If you have good eyesight and great powers of concentration, you will notice white dots moving about in the water. Or perhaps you will see what look like wriggling cottons. Feed about half a cupful of this water to the fry every day for about a week, after which you may get them on pea-flour, dust-fine proprietary dried food, or micro worms. It is impossible to lay down rules for feeding fry but, after a little experience, you will know the amount of food to give, the best times to feed, and whether the food given is being taken in sufficient quantity to nourish the tiny bodies, and develop them into healthy little fish.

COLDWATER FISHKEEPING QUERIES *answered by* A. BOARDER

My goldfish have been eaten by a heron. The same thing happened last year since when I have run a single strand of wire round the pond; some of this was pulled away. Can you advise a better method of keeping the fish safe ?

There are two or three things which you might try to protect the fish. You do not state the size of the pond, but if it is not too large you could get some chicken wire and fix it to two posts to act as rollers. The wire could then be rolled over the pond each night and removed by day. You could also try a scarecrow, but do not leave this in the same place for long, as birds will get used to a fixed object and take no further fear from it. It is usually in the early mornings when the heron visits a pond and the scare need be left in position only at night and removed say after breakfast. Fine black wire such as was used for coils in the early days of wireless could be stranded around the edge of the pond a few inches from the ground and a few old tins and bits of mirror glass could be attached so that a noise and flashing is caused when the wire is touched. A piece of paving stone on a couple of bricks in the water will form a retreat or hiding place for the fish. It is often noticed that fishes are taken from those ponds which provide little cover for the fish.

I have a tank 24 ins. by 12 ins. by 12 ins. well planted with water plants. I have in it three shubunkins, one goldfish, one telescopic, one fantail and a catfish. They average two inches in body length. The fish swim about nearly all the time with their fins folded up and travel in a wobbling manner. What do you think is the trouble ?

I do not like to hear of fish with the fins folded as it always spells trouble. A healthy fish keeps the dorsal fin erect and the others well spread most of the time. Sometimes they are closed for a bit, especially when feeding. Of course, you have *plenty* of fish as the tank maximum is 12 inches. You may have been over-feeding, when the water will turn foul. I advise emptying most of the water from the tank and at the same time give the fish a salt bath for a few hours (a tablespoonful of sea salt to the gallon of water). Perhaps the compost has gone foul too, and if so you will have to clean this and set up the tank afresh. When all is in order again will be plenty of time to start feeding; until then do not worry over this as fish eat very little during cold weather.

My tank, 18 ins. by 10 ins. by 10 ins. contains two shubunkins a golden orfe, a bitterling carp and a catfish. They often skim over the gravel as if an electric spark was after them. I suspected flukes and gave them a salt bath; after a few days they were as bad as ever. Also the plants which are without roots when I buy them will not grow. Can you give me any advice on the matter ?

The action of the fish certainly gives the sign of flukes present. The salt bath is hardly sufficient for these. I recommend Dettol: the amount varies with the time in which the fish can be left in the solution. If you use a cubic centimetre to a gallon of water the fish must be removed after a few minutes and watch must be kept on the fish the whole time. If it turns over it should be removed to clear water. It is no use treating a few fish in a tank and then replacing them in the tank without disinfecting the tank as well; they will only get re-infected immediately. As to the plant cuttings, if these are pushed into the compost they only rot and do not often form roots. If left floating in water for a time they should form roots all right. Watch the numbers of fish in your tank; it is not over large and as soon as you try to over-stock, trouble is bound to occur.

One of my fantails has had difficulty in rising to the surface lately. When it does do so it immediately sinks to the bottom like a stone. It has difficulty in swimming on an even keel; what is the matter with it ?

It appears that the fish is suffering from a form of swim bladder trouble. This may be caused by indigestion and if this state is improved, the fish may soon recover. On the other hand it is noticed that at times this complaint is inherited when it is much harder or impossible to cure. Swim bladder trouble can often be helped by placing the fish in warmer and shallower water. Where a fish suddenly develops this after it is a couple of years of age I always think that there is a good chance of a cure. Try a diet of live foods only for at least a fortnight. Drop a few crystals of Epsom salts into the tank—they will do little harm and may do quite a fair amount of good. Fishes which suffer from swim bladder trouble will often improve as soon as the weather gets warmer; sudden chills can bring on the complaint.

I recently bought a pair of moors. They do not seem as tubby as when I bought them. They are always hungry and I feed on small chopped worms and a small pinch of dried food. How can I keep them in good health ?

As you state that the fish appear always hungry I take this to be a very good sign. When almost any animal goes off its food there is usually something wrong. Your fish may be lacking some starchy foods and as a rule these deep-bodied fishes get plenty of this type of food given them by the breeder. Add to their diet some Bemax and some oatmeal, soaked for preference. You have the fish in a living room and as this will get fairly warm during the day time, the fish will be sure to eat more than if the water was very cold. The amount of food required by goldfish depends almost entirely on the temperature of the water.

I am trying to rear goldfish fry with micro worms but I do not know whether I have to use oatmeal dry for the worms; can you please tell me which is correct ?

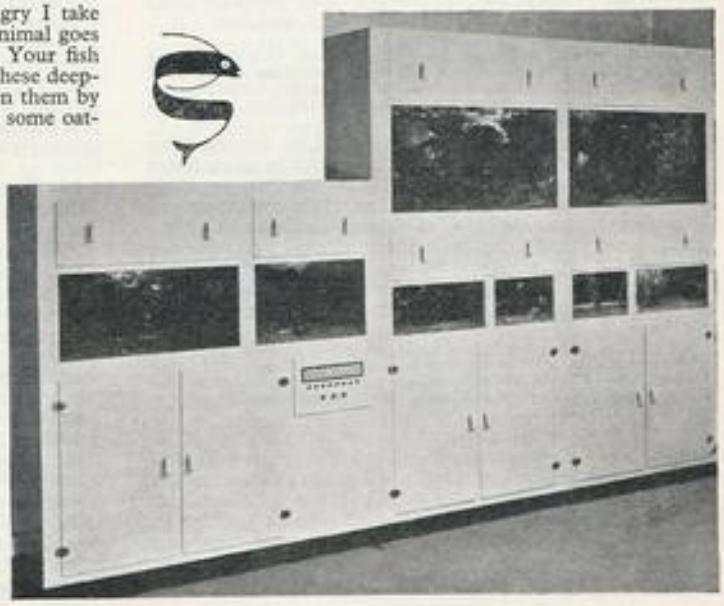
The oatmeal must be wet. You can also use soya flour and make it into a creamy solution. If you stir the mixture each day it seems to stop it from turning sour. It needs to be warm to assist the worms to grow. If a few small pieces of wood are placed on the surface the worms will crawl on them when the wood can be washed in the fry tanks.

I have an outdoor pond, 7 ft. by 2 ft. 6 ins. and 18 ins. deep. There are 12 fish in it and plenty of water plants. Lately one of the fish has developed a habit of remaining almost head down in the plants away from the others, if disturbed it swims away with some effort but returns to the old spot; it is very fat. Can you find the trouble for me ?

It is a well-known fact among pondkeepers that when a fish leaves the others and sulks away on its own it is usually in some trouble. It may be the beginning of fungus trouble; some fish in an outdoor pond develop a kind of fungus over the eyes and this is not always seen unless the fish is caught and closely examined. Have a good look at the fish in a small bowl and see if you can spot anything wrong with it. There may be nothing much wrong and if it is very fat it may be a ripe female which has developed a large roe which may be pressing on the swim bladder and giving it some distress. This condition will no doubt be relieved all in good time. If the fish shows any signs of fungus give it the salt treatment as recommended by me.

My friends and I are coming to the opinion that water lilies in a small pond are a failure and a nuisance. I have tried them in baskets, tubs and other containers but the pink lily I have always bursts the sides and the lily soon chokes the other plants in the pond. It also seems to turn the water oily. Please let me know whether you agree with my findings and whether I should make another attempt ?

You have obviously gone wrong from the start by using a lily which is too vigorous for a pond the size of yours. When giving advice to pondkeepers on such matters I always refer them to actual growers of these plants for



De Luxe Cabinet Aquaria

MR. G. R. CLARKE, secretary of the Staines and District Aquarists' Society, is the designer and owner of the attractive cabinet of aquaria shown in the accompanying photograph. It is made from hardboard secured to an inner angle-iron framework which supports the tanks. The two large aquaria are community show tanks and the smaller ones are used for tropical fish breeding. Novel features include the neat panel of indicator lamps showing correct functioning of heating circuits for each aquarium and illumination controlled by an electrically-operated time switch. Any one or more of the tanks can also be lighted independently of the time switch without affecting its operation of the other lighting.

advice when purchasing. They know best which type of lily will suit a particular pond, having regard to the size and depth. I made the same mistake many years ago, and it, too, was with a large pink lily which crowded out everthing else and covered the surface of the pond in a short time. I now only use a smaller growing type, and there are several to choose from. Get rid of the large lily and get a smaller type; plant this in a pot as recommended in my book, *Goldwater Fishkeeping*, and you will have no further trouble. As to the oily matter on the surface, I agree that this will happen when the lily leaves start to die and decay. I always remove as many leaves as I can as soon as they begin to die in the autumn. I certainly think that it is worthwhile to continue to grow water lilies—they are among the most attractive water plants we have, if not the best.

My five months old calico fantail has red patches all over the body, especially where the fins join the body. How can I cure this disease ?

These blood patches are the result of damage caused by pests such as flukes or argulids. If the trouble has been caused by the fish louse I expect that you would be able to see them. They attach themselves to the fish with a sucker and feed from the fish. The wound they cause shows up red and angry. If no pests have been seen I expect that the damage was caused by flukes which may of course still be present. The fish should be given a bath in Dettol to kill the flukes. Use a cubic centimetre of Dettol to the gallon of water and leave the fish in for 15 minutes only. Watch the fish whilst in the solution and remove it if it turns over and gets very distressed. Remove to fresh water and after a day it can be tried in a salt solution. Use a tablespoonful of sea salt to a gallon of water and leave the fish in for a few days. Should the water turn foul and smell, it must be changed as soon as possible. The fish should not be returned with the others until it is cured.

Can you tell me if a scaled telescopic-eyed fantail and a calico one have to have two anal fins ?

These types must have paired anal fins. All the double-tailed types such as the fantail, veiltail, moor, oranda, lionhead and celestial should have two anal fins. For the scaled fantail seven points are allotted for these fins but six, five and four points for other types. It has, however, been decided to disqualify all fish shown in classes for these types if they do not have the two required anal fins.

I have two tanks 24 inches long with 60 watt strip lights over the top. The plants grow well but the shubunkins spend a lot of the time resting at the surface. They are not mouthing for air. Are the lights too near the surface are are they left on too long each day—12 hours ?

You are using rather strong lighting and are keeping them on for a long time each day. I think, however, that the fishes are just "sunning" themselves at the top as they would do in a pond during very sunny weather. You could soon see if this is so by turning off the lights for a time to watch the behaviour of the shubunkins. It may also be that the upper water is warmer, when the fish will prefer this to the lower colder strata. The strip types of lamps do not as a rule give out as much warmth as the ordinary types of lamps.

My tank of 18 ins. by 10 ins. by 10 ins. holds three golden orfe and four goldfish. They seem to have developed swimming bladder trouble and perform kangaroo-like hops when swimming over the bottom of the tank. What is the trouble and how can I cure them ?

In the first place it sounds as if you have too many fish in your tank. It will only hold safely about seven and a half inches of fish. I do not think the fish have swim bladder trouble. With this they lose their balance and sometimes swim upside down. They have difficulty in keeping an even keel at most times. Your fish are swimming across the bottom in an endeavour to rid themselves of pests, probably flukes. Treat the fish as suggested in the query above. This trouble is catching and may have been caused by feeding with fresh *Tubifex*, or even any type of live food which may be carrying the pests.

My aquarium never seems to stay clear for long. Could it be through insufficient plants and how many should there be in a 30 ins. tank ?

The clearness of the water in your tank may be affected by the lack of plants but more likely overfeeding has a lot to do with it. Plants in a tank without fish will keep the water very clear but as soon as fish are added with the necessary feeding the water soon becomes very cloudy. The types of fish make a difference also, as fairly large goldfish will root about over the base of the tank, mouthing up large quantities of sand and mulm to blow it out when higher up in the water. You also say that you use an aerator. This can also help to keep the water cloudy by keeping up a continuous circulation. Your tank could hold a good number of plants. If you had clumps about four inches across you could have at least six bunches of any four of the following without over-doing it:—*Lagarosiphon major; Egeria densa; Elodea canadensis; Myriophyllum spicatum; Ceratophyllum demersum; Sagittaria natans; Vallisneria spiralis* var. *torta; Fontinalis antipyretica*, with a small clump of *Eleocharis acicularis*.

I have made a miniature stone wall for my tank in order to bank up some of the sand at the back. The stone blocks were fastened with cement. How long will this take to weather or ripen ? I keep it in water and scrub it every other day and change the water.

The cement should be quite safe after about a week of the treatment you are giving it. Fresh cement gives off a certain amount of lime, but you must realise that in a large area of water the small amount given off by your wall would not amount to much of a concentration. A little lime in the water helps some types of plants. It is probable that if the wall had been left in water for a week with an occasional scrub it would be quite safe. I have made tanks completely of concrete and have had fish in them after only a couple of scrubbings. If water is left in such a container for about a week and then the container is given a good scrubbing it is usually sufficient cleansing. A little vinegar in the washing water helps kill the lime.

I am building a tank. Is there any objection to putting gold size in the putty and can I put the base of the tank in last ?

Some people use gold size in the putty to assist it to stick. I do not think that it is essential. It is usual to place the base of a tank in first, then the sides and finish with the ends. This plan gives a good seal. The glass should be practically as large as the base of the tank and so it must be placed in first for the width of the other glass would prevent you from getting it in last.

What is the best planting medium for a tank ?

Many aquarists have their own particular fancy for tank composts. I think that it depends a good deal on the type of fish you are going to keep in the tank. The compost is there for two reasons—to cover and hide the base of the tank to make a better picture and to form anchorage for the water plants. You will note that I have omitted to say that it is to give nourishment to the plants. I have done this deliberately, as I consider that the less food in the compost then the better will the plants be able to do their main job, that of clearing up waste and decaying matter in the tank. I think that sand is the best medium and its coarsness and density will depend on the type of fish to be kept. For many tropicals and small types of coldwater fishes I think that a small sand can be used. This will leave a smooth surface from which the fish are able easily to pick up small particles of food. With large fish, however, it is as well to use somewhat larger types of sand as the fish will suck the sand up when feeding and can blow it about thus clouding the water. The only objection to large-grade sand is that food

may drop between it and being uneaten set up putrefaction. With fish such as goldfish of three inches in length, it will be found that small stones can be used on the bottom, as the fish can grovel about and find all that drops to the bottom in the shape of food. After fishes have been living in a tank for a few weeks there will be plenty of mulm at the bottom on which the plants can feed. Not all the mulm should be removed from the tank at the weekly servicing but much should be left for the plants.

Last month we brought home four sticklebacks from a local pond. There were many in the pond and all were unusually heavy and swollen. The four fish died after a time and each contained two creamy white objects about ¼ inch by 1½ inches long. These appeared to be alive. What was wrong with them?

I think that the two objects in the fishes were roes or spawn. I doubt very much if they were actually "alive," but when the fish were first opened they may have appeared to move, they do contract sometimes. The swollen appearance would bear out this conjecture. The fish were heavy with spawn ready for next year. If the fish had been suffering from a form of worm I should not have expected to find two of each in the fishes, and they would not have all been the same size. It is a pity that you could not keep the fish alive when they may have bred in 1953. Fishes caught from the wild require careful treatment to get them used to the confines of a tank. They should have plenty of space and well-oxygenated water.

When my pond froze over in December I made a small hole in the ice and siphoned out some of the water, the idea being to lessen the chance of cracking the sides of the pond and to admit air to the surface of the water. Has this idea ever been tried before and has it been found successful?

Your idea is a very good one but by no means new. It has been used by pondkeepers for many years. The idea is all right in theory and sometimes it works well in practice. I have made many experiments and usually find that the ice drops in the centre and falls on the water. This does often leave an air space around the sides of the pond but it does tend to freeze up again with the underwater. If on the other hand the ice is allowed to freeze up to a thickness sufficient to stop it from cracking and falling, there is a great deal of pressure on the sides of the pond in any case.

Is it possible to use an aquarium heater in an outdoor pond, 12 ft. by 8 ft. by 2½ ft. deep about centre? I could place it in a corner where there is a six inch deep ledge.

You could use the heater quite safely in the pond. The warmth rising from the heater would ensure that there was a small patch over it where the ice would not form. I should not put the heater at the shallow part as the heat will soon reach the surface and be wasted. I should place the heater in a deeper part if possible. I do not like to recommend any special type of heater, there are so many on the market, and I consider that if you purchase from any of the firms who regularly advertise in *The Aquarist*, you should get satisfaction. When ordering state the purpose for which you require the heater; the dealers will no doubt know which will be the best type.

I am a novice and have a tank, 24 ins. by 12 ins. by 12 ins. which contains two shubunkins, one goldfish and one catfish, averaging 1½ inches. Can I put in any more fish and which kinds?

Your tank will hold about 12 inches of fish. There is no necessity to try to overcrowd the tank and it is probable that a few fish will keep more healthy far better than if there were too many fish. You could add another goldfish or fantail, a small green tench and a small rudd.

Memory or Instinct?

HAVE you ever studied fish trapped in rocky pools at low tide? They swim around for some time, and then, seeming to tire of their limited perimetry, they suddenly leap across the rocks from one pool to another. Now the strange thing is that their aim is correct in every case; although the neighbouring pools are completely hidden from the fish, they always gauge the direction and distance perfectly, jumping direct into the pool of their choice and never landing on the rocks in between.

Can *you* explain this? Would you say that the fish remembers the terrain he has swum over when the tide was higher; or do you think that the fish can detect the presence of water other than in his own particular pool by some strange instinct, similar to the one that drives him miles away from his haunts to his long-forgotten birthplace and spawning ground?

An American psychologist named Aronson, who has spent his life investigating the behaviour of fish in the hope that it will provide some clues to human instincts, decided to study this problem scientifically in order to decide which explanation was the correct one. Arrangements were duly made to obtain a sufficiently large catch, the fish being netted into a large portable tank in which they were transported to the laboratory. Here, in a large deep tank, conditions of the rocky shore were reproduced by the formation of four isolated pools set in rocks.

The fish were introduced into one of the pools individually, and their subsequent behaviour carefully watched and recorded. After circulating round the pool aimlessly for some time, the fish would suddenly leap out of the pool, landing, as often as not, on the rocks. The number of leaps made within a set period was noted, together with the number of times the fish landed in one of the pools. At the end of the set period the fish was removed from the pool into another tank, and the next fish given a trial. This procedure was repeated until the entire catch had been tried. The main feature of the performance was that the fish did far less jumping than they appeared to do in their natural surroundings on the coast and that when they did jump, their sense of direction and distance was very poor, and unrelated to the actual position of the adjacent pools. What jumping there was, in fact, was entirely haphazard.

For the next part of the programme, the tank was filled so that several feet of water covered the whole of the rocky base. The entire catch was then put into the tank and allowed 24 hours to swim around and get acclimatised to the surroundings. The following day the fish were removed and the water level in the tank lowered until the four pools were isolated as before. Once more the fish were introduced into the tank individually. This time, however, their jumping was as frequent as it had been before captivity, and not one fish landed on the rocks!

By swimming over the terrain, the fish had been able to explore the tank bed, so that when isolated in one of the pools, they had *remembered* where the nearest deep point of the tank bottom lay. When the fish were given no opportunity of studying the bed, they had absolutely no knowledge where the deep water was situated; *instinct* could not help them. Were *you* right? By lengthening the period between the 24 hours of exploration and the date of the first trial afterwards, Aronson further discovered that all the fish could remember the situation of the pools for about a fortnight: even when a long period of exploration was allowed, the fish could not remember any better, so 14 days appears to be a fish's memory span for this kind of knowledge, and there would seem to be no future for the fish as a pathfinder or a piscatorial guide!

Dr. L. R. C. Haward

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

THERE must be few people to-day who have not grown ordinary tulips and daffodils, but on the other hand there are very many who have never had the joy of seeing the "babies" of the bulb world growing in the Pyrenees. There are quite a number of these tiny species which can be grown in any ordinary garden, say in the rock-work which may be planned as an introduction for the pool. Most of the plants enjoy an open situation with all the sun they can get. Fortunately they thrive in almost any ordinary soil. The exceptions, perhaps, are the anemonies which like a rich moist earth and the Trilliums which prefer partial shade and a peaty soil.

The great thing about these bulbs is that they can be left down for a large number of years. They need little attention, beyond the keeping down of weeds and the clearing away of the withered foliage at the end of the season. I do sometimes lift my baby tulips every second year, and the irises too, for that matter, every third or fourth year. But even they can be left down for many more years than that in the warmer districts.

We can start our collection with the anemones, and the species suitable for the rock garden are very dainty indeed. Take *A. apennina*, which produces lavender-blue daisy flowers in March which are only six inches tall; or there is *A. nemorosa allenii* with its lavender-purple flowers on baby stems which are in bloom from January to March as a rule. Going down the list alphabetically we come to *Brodicea grandiflora* which I like because of its beautiful bright blue clusters of flowers which appear in June. I have seldom had the stems longer than five inches.

The smaller flowered species of crocus are much more suitable under the conditions we have in view than the taller kinds which most people know. Take for instance, *C. imperati* whose inner petals are violet and the outer petals fawn. This, I think, is the earliest crocus to flower. I have had it in bloom in January and it is invariably out by February and early March. *Crocus sativus* is a purplish lilac feathered with violet. It is a fascinating flower because the stigma is blood-red in colour and quite long too. This flowers in the autumn. *C. Sieberi* is a soft lavender blue with an orange throat and stigma and is at its best in February and March. All these three never grow any taller than six inches; there is one which is even shorter, *C. Tomasinianus*, which produces dainty pale-blue flowers in March.

The dwarf species of cyclamen are all hardy. The autumn flowering kinds are usually planted between January and July, but the spring flowering types from July to September. What pleasure *C. europaeum* gives me with its crimson sweetly scented flowers and silver marked leaves! It never grows higher than four inches and is invariably at its best in August when we come back from our summer holiday. *Cyclamen neapolitanum* is an autumn flowerer and the flowers are invariably out before the leaves appear. They are rose pink, while the foliage is ivory-like and marbled with silver.

For some reason or another the baby daffodils fascinate our visitors more than any other plants. You get the *Narcissus cyclamineus* with its rich yellow flowers, and as its name suggests, they are very much like those of the cyclamen. They are usually out in February and March, being backed by narrow rush-like leaves, never taller than six inches or so. *N. minor* is a trumpet-shaped daffodil golden yellow in colour, which is out in March, six inches high. *N. minimus* is even shorter and is never bigger than three inches. Its flowers are a citron yellow colour. A very dainty cup is that of the *N. moschatus*. It is white at the base and pale citron above. It is a little bit taller than the others, unfortunately, but quite dainty.

Then there are the tulip species which are suitable for a rock garden. The *Tulipa biflora* for instance with its creamy yellow flowers on eight-inch stems, produced in abundance in May, and there is *T. pulchella*, only six inches tall, which blooms in May, also bearing rosy mauve flowers. Another that ought to be mentioned even though it is a little taller is *Tulipa greigii*. The leaves are spotted, the flowers are of a glowing vermillion scarlet tinged with orange and they are usually borne on stems 10 inches in length. It is another May flower.

There is a cheery little plant which I think is fairly well known. It is the *Eranthis*. The flowers are bright yellow and are similar to those of a buttercup. Each flower has a beautiful green frill below it. *Eranthis hyemalis* is usually in flower during January and March but grows only three inches tall. What about the *Fritillaria pudica* which only grows four or five inches tall? It has lovely bright yellow flowers and makes a beautiful show in April or May. Or consider seriously the *Iris Danfordiae* with its yellow and brown flowers on two and a half to three inch stems in February. Do not leave out the *Iris histrioides major* which is six inches tall. It is blue, yellow and violet and is a great attraction in February also. I have no room to say much about the baby *Muscari* or the little *Scillas*. But I must just mention the *Leucojum autumnale* because it has such lovely white and pink flowers in October and only grows four inches high.

New Publications

BRITISH aquarists have good reason to be grateful to the members of the Federation of Guppy Breeders' Societies, for their efforts have attracted world-wide attention to the hobby of fish-keeping in this country. It was here that the guppy first received serious recognition as an individual fish by the activities of the old Guppy Breeders' Society, and now aquarists in other countries are anxious to develop strains of the distinctive varieties of the guppy which have been established. For this reason especially, the latest publication of the Federation, *The Guppy Breeder's Handbook*, is a most welcome addition to aquarium literature. In its 37 pages, nine guppy varieties are described, the official show standards for them are explained and illustrated by outline drawings, and useful accounts of line breeding and show selection methods, aquaria for guppies, and their maintenance in health and disease, are also included. The handbook can be obtained from Mr. A. P. Stanley, 307, London Road, Isleworth, Middlesex, price two shillings and a stamp for postage.

Number 7 of the first volume of the *British Journal of Herpetology* is dated December, 1952. The main papers in it deal with the role of amphibia in dispersal of bivalve molluscs, an account of a pairing in captivity between a male British toad and a female common frog and a description of methods used to overcome difficulties experienced in rearing tadpoles of *Xenopus laevis*. This last contribution is accompanied by a plate showing three photographs of *Xenopus* illustrating fungus infection and the pathological condition termed hydrops. Under the heading "Notes" are observations on British reptiles by members of the British Herpetological Society. The *Journal* is free to members of the society but copies can be supplied to non-members (price three shillings each and stamp for postage) on application to the secretary, Mr. J. I. Menzies, c/o Zoological Society of London, Regent's Park, London, N.W.8.

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.

February Floods

THE disastrous flooding in the coastal areas, among other things of more importance, has caused many headaches among aquarists in the affected localities, and the Isle of Sheppey did not escape. Loss of light and power hit our tropical fish enthusiasts in particular. A three days' break made it necessary for some form of improvisation, and a contaminated water supply did not help the position.

Happily I did not have a single loss, and I managed to maintain my tanks at a temperature of 62° F. This was done by siphoning one-third of the water from each tank twice a day, and heating it in a saucepan before returning. Each tank was covered by blankets immediately, and although some of the tank inmates appeared to be somewhat in difficulties they made a rapid recovery when heating was restored.

Although I sincerely hope that none of our fellow aquarists will experience such unfortunate circumstances as these, I think I have shown that even in an emergency time and trouble pays dividends.

STANLEY W. BULL,
Sheerness, Kent.

The Editor takes this opportunity to express deepest sympathy with all who have suffered in the flooded areas both at home and in Holland, and ventures to include readers of "The Aquarist" also in expressing the hope that recovery from the experiences of the tragedy will be swift.

Cheap Breeding Trap

IN the February issue of *The Aquarist* Mr. L. Sycamore suggests an inexpensive way of obtaining a plastic live-bearer trap utilising a Woolworth's food container. I thank him, and *The Aquarist*, for a very useful suggestion, and following up on his request for some other aquarist to suggest an improvement on his method of boring one-eighth inch holes and then sawing out one-eighth inch slots, I suggest the following procedure.

Make a small hole in one corner of the base of the food container, and then with a fret saw cut all the way round the edge of the base, thus completely removing it. The next step is to cut the base lengthwise into half, either by scoring with a sharp marking or penknife or by sawing. The two halves are then halved again making four strips which, after smoothing the edges on a piece of fine glass-paper, are fitted back into the lower part of the food box, in such a way that they form a shallow "W" shape when looked at from the end of the container. Ordinary balsa cement is ideal for fixing.

The two side pieces should be fixed first, fitting close to the walls and of course sloping down toward the middle at an angle of about 20 degrees. The other two pieces are then inserted, sloping up to form a ridge at the middle which is sealed with cement, and leaving two narrow slots at the lower edges of the "W" shape. The width of the slots is of course dependent (a) on the angle at which the strips are set (and can of course be greater for such fish as swordtails than for guppies), and (b) the amount of waste removed in sawing, which obviously should be as little as possible.

To make the trap float, two table-tennis balls should be obtained and neatly cut in half. The four halves are then cemented to the trap as near the top as possible. They will work equally well inside or outside. My own preference is outside on the ends of the trap as far apart as possible.

If the trap must, as I know it has to in many cases, float in a community tank, the young can be caught in a second food container fitted underneath the one that has been made into a trap. It can be temporarily fixed with elastic bands, or a more permanent method would be to fix it with balsa cement, having taken the precaution to make the middle section of the trap base removable by making two little inverted "V" shaped ledges, one at each end of the trap, for it to rest on instead of fixing with cement. This is essential as the fry will otherwise be so well trapped that the aquarist himself will be unable to get at them! Any odd bit of perspex or celluloid can be used for the "V" shelves.

HAROLD ROBERTS,
Bourne, Lincs.

King Fisher

DURING the recent spell of cold weather, I was surprised to see a kingfisher sitting on the rustic fence surrounding the ornamental ponds in my garden at Beckenham, which is a quarter of an hour's train ride from the centre of London. From the attentive way the bird was surveying the water, it was obvious that his was no casual visit, and sure enough, during the next half an hour he dispatched three golden orfe (2s. variety), ignoring the cheaper types of fish available.

The kingfisher's procedure was identical on each ocasion. A vertical dive was made into one of the ponds, a quick flutter to the rockery with the fish in its beak, a few sharp blows on a flat stone, a quick jerk of the head and the fish disappeared, head first. The bird immediately returned to its "command post" to select another victim. However, greed not only leads to the downfall of humans. Later that day the kingfisher returned and this time he so gorged himself with fish, that we were able to creep up from behind and catch the bird by hand, as it rested on the fencing, sleeping off the large meal.

The photograph (page 241) of the self-appointed mascot was taken in a corner of our tropical fish hatcheries, before the exotic visitor with a taste for golden orfe was allowed to go on his way. I wonder whether any of your readers have experienced a similar visitor so close to London?

I. F. NEICH,
The Kingfisheries, Beckenham.

Unusual Death

A VERY unusual death occurred in my tank, and I wonder if any of your readers have witnessed anything similar. As I have quite a few mollies I have allowed the algae to coat the plants, which is most probably the reason that the following happened.

After giving birth to a fine shoal of youngsters a large speckled mollie was put into my community tank. The next day I saw her apparently standing on her head on a piece of *Gabomba*, but on a second glance I saw she was dead. I pulled her out with a pair of forceps and was amazed to see the plant come too, knowing that it was well rooted. The mollie had swallowed nearly three-eighths of an inch of the stem that had been pruned two or three days before. She had, of course, choked to death. K. G. O'BRIEN,
Romford.

Safety Device

THIS morning I happened to look into my fish tanks only to see with very great disappointment all my fish apparently dead on the bottom. The thermostat had stuck and the temperature was 42° F. After warming, all that came back to life were four swordtails out of about 80 fishes, which had taken me over three years to collect.

I think that such disappointments would be avoided if the manufacturers of thermometers were to fit an electric contact in their instruments so that by means of a dry battery and small bell the alarm could be sounded if the temperature dropped below 70° F.

T. C. CHAPMAN,
Nr. Taunton, Somerset.

Thermostat Care

SOME time ago I carried out an experiment to see if very light oil would stop some of the intense burning of the silver contacts of my submersible thermostat. To my surprise it proved to be excellent; the light oil was poured into the tube in sufficient amount to cover the contacts and contact burning no longer occurred. S. THICKBROOM,
Dagenham, Essex.

Club Row Fishes

MAY I reply to a statement on page 183 of the December, 1952, issue of *The Aquarist*? It concerned the sale of fishes in Club Row. I have kept coldwater fish for the past two and a half years and have had 48 fish of various kinds. Of these, 36 were bought from Club Row at 6d. 9d., 1s. and 1s. 6d. each and are still alive and healthy; the other 12, bought from high-class pet stores, are all dead.

I have also bought several dozen coldwater fish for doctors at a hospital where I am employed and have not had one complaint. I say that fish sold in Club Row are healthy because there is a quick sale and the stall holders depend on the customers each week for their living. I may also add that I have bought several dozen plants in Club Row at 2s. 6d. a dozen; in pets stores the plants are 9d. and 1s. each.

N. E. PETERS, London, E.11.

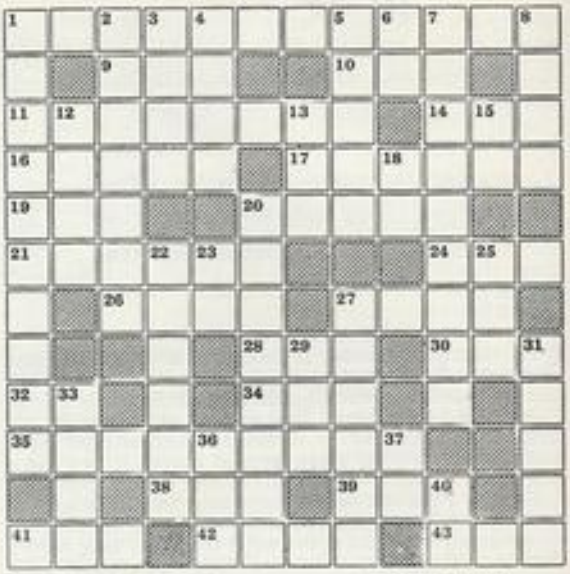
WE have had our attention drawn to one of your correspondents' letters published in the December, 1952, issue, relevant to goldfish purchases in "Club Row."

Doubtless the remarks may well apply to certain irresponsible stall traders—of no intimate connection with the long-standing association of the market—and it is felt that the tone of the last few lines of the reply may well create a prejudice against the legitimate traders conducting long-standing businesses. In our own case—we have been established in the heart of the market for 85 years—and endeavour at all times to provide the public with healthy stock, against the type of trader referred to.

Since one of our customers of long standing drew these remarks to our notice we have felt it necessary to protest against the generalisation of the answer instead of differentiating between the types of traders in this market who are doubtless well known to you. J. W. AGASS, *Aquarist*,
London.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

1 Aquarium in equipoise (8, 4)
9 A one-spot! (3)
10 Bring forth young (3)
11 American tortoise (8)
14 Brief fluid measure (3)
16 Could be a barb, but the shark is this of the sea (5)
17 View of *Rasbora's* pectoral fins (6)
19 End of the mere before (3)
20 Gastropod (5)
21 Save (6)
24 Fish limb (3)
26 A nut of a sea fish (4)
27 Put to rest (4)
28 Mineral spring (3)
30 Snow-shoe of fish skin (3)
32 No good in short (1, 1)
34 *Axelhe* is water this (3)
35 See 20 across (9)
38 Organ of balance in fish (3)
39 Eggs (3)
41 Imitate (3)
42 Winged sea fisher (4)
43 A fish, but not nine tailed (3)

CLUES DOWN

1 Bert lit gin (anagram) (10)
2 The one that got away! (7)
3 Ragged race for land (4)
4 Close (4)
5 *Ilyeria* — (5)
6 Thanks for half a tank (2)
7 Heavenly cichlids (5, 4)
8 Salmon just spawned (4)
12 County reputed to be without snakes (4)
13 Jock (3)
15 Alternative to D.C. (1, 1)
18 Mixed type of pike (2)
20 Haunt of marine fans (3-5)
22 Are cut for clergymen (6)
23 International body (1, 1)
25 Protection for the octopus (3)
27 Pond of sea water (6)
29 "— weed" or bladderwort (3)
31 Lagoon, for instance (5)
33 — like a fish out of water (4)
36 The vole is wrongly called a water — (3)
37 By the Grace of God (1, 1)
40 See 15 down.

PICK YOUR ANSWER

1. The missing word in the adage "To . . . a spear to catch a mackerel" is: (a) angle. (b) cast. (c) set. (d) throw.
2. *Cardamine lyrata* is native to: (a) Brazil and Venezuela. (b) China and Japan. (c) Georgia and Florida. (d) Spain and Portugal.
3. The Cuban cichlid is the popular name of: (a) *Cichlasoma coryphaenoides*. (b) *Cichlasoma maculicauda*. (c) *Cichlasoma tetracantha*. (d) *Cichlasoma urophthalmus*.
4. The general colour of *Cynolebias bellotti* (Argentine pearl fish) is: (a) Bright red. (b) Deep blue. (c) Light green. (d) Pale yellow.
5. Dr. Hugh M. Smith has estimated that the annual intake of mosquito larvae by an adult wild *Betta* is: (a) 1,000 to 5,000. (b) 5,000 to 10,000. (c) 10,000 to 15,000. (d) 15,000 to 20,000.
6. In the wild, *Cryptocoryne ciliata* grows to a length of: (a) 6 ins. (b) 9 ins. (c) 12 ins. (d) 15 ins.

G. F. H.

(Solution on page 260)

News 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.

AT the annual general meeting of the East Midland Section of the **Federation of Guppy Breeder's Societies** all the officers of the society were re-elected. The treasurer reported a satisfactory balance and assets. First cup on the society's list was presented to Mr. L. Matthews; it is to be awarded annually to the novice gaining the largest number of points with his fishes in the year. Another cup for speartail guppy males has been promised to the society.

* * *

PERMANENT headquarters have now been secured by the **Friends Aquarist Society** and meetings are now held each Thursday, 7.30 p.m., at St. Jude's Hall, Railton Road, Herne Hill, London, S.E.24. Mr. H. Castleton recently addressed a meeting of the society on water plants.

* * *

SINCH its inauguration at the end of last year **Keynsham and District Aquatic Society** has steadily increased membership. The society was instrumental in arranging a Bristol University Adult Educational Course on Fish Biology. Future meetings of the society will be held in the homes of various members. Enquiries are invited by the secretary, Mr. R. L. Vince, 8, Vandyck Avenue, Keynsham, Nr. Bristol.

* * *

AWARDS at the first table show of the **St. Leonards Fishkeepers' Society** were gained by Mr. P. Martin (wagtail platy), Mr. J. Froude (tiger barb), Mr. A. Froude (serpae tetra). Members have undertaken the maintenance of 12 aquaria in St. Helens Hospital.

Aquatic Traders Association

THE third annual dinner and dance of the Aquatic Traders Association was held at The Windsor Castle Hotel on the 28th January, and attracted well over a hundred members and guests. Chief credit for the success of the evening must go to Mr. and Mrs. R. Fairbairn for the excellent manner in which the affair was organised, and which proved to be such an enjoyable function. Mr. W. Riley of The Aquarium, Croydon, was in the chair, and received ample support from the toastmaster, Capt. L. C. Betts. The toast of the Association was proposed by Mr. T. Horeman (Windmill Products), suitable response being made by Mr. S. C. Jacobs. During the evening the company was entertained by Jill Andrews and The Voicemasters, well known cabaret artistes.

Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies: **Accrington and District Aquarist Society** (Mr. E. Smith, 27, Clement Street, Accrington, Lancs.); **Aylesbury Aqualife Association** (Mr. C. L. Stephens, 79, Abbey Road, Aylesbury, Bucks.); **Bradford and District Aquarists' Society** (Mr. D. O. Baker, 32, Cumberland Road, Lidget Green, Bradford, Yorks.); **Bridlington and District Aquarists' Society** (Mr. J. Bulmer, 20, Clarence Road, Bridlington, E. Yorks.); **Coventry Pool and Aquarium Society** (Mr. C. J. Grant, 26, Cecily Road, Cheylesmore, Coventry); **Crawley and District Aquarist Society** (Mr. H. F. J. Lusty, 48, Gale's Drive, Three Bridges, Sussex); **Dumfries Aquarium Society** (Mr. J. Murphy, 11, Criffel Avenue, Lincluden, Dumfries); **Dunstable and District Aquarists' Society** (Mr. E. J. Bilston, 59, High Street Path, Dunstable, Beds.); **East London Aquarists and Pondkeepers Association** (Mr. T. E. Butt, 25, Humberstone Road, Plaistow, London, E.13); **Falmouth and District Aquarists' Society** (Mr. A. J. Lanyon, Ingestre, Agar Road, Truro, Cornwall); **Federation of Guppy Breeder's Societies** (Mr. A. J. Holloway, 37, Garfield Road, Plaistow, London, E.13); **Greenock and District Aquarist Society** (Mr. R. Osborne, 73, Nicolson Street, Greenock); **Harrogate Aquarist Society** (Mr. B. H. Dean, 34, Duchy Road, Harrogate, Yorks.); **Keighley and District Aquarists' Society** (Mr. R. Simmons, 53, Granville Street, Keighley, Yorks.); **Lotus Aquatic Society** (Mr. J. A. Fowler, 148, Kingston Road, Merton Park, London, S.W.19); **Lyons Club Aquarist Section** (Mr. E. D. Gallagher, 134, Raymon Drive, Hayes, Middlesex); **Nelson and District Aquarist Society** (Mr. R. Moffitt, 32, Barkerhouse Road, Nelson, Lancs.); **North Herts Aquarists' Society** (Mrs. P. J. Pearmain, 33, Norton Road, Letchworth, Herts.); **Paisley Aquarist Society** (Mr. H. Hutton, 26, Kilnside Road, Paisley, Renfrewshire); **Peterborough and District Aquarists' Society** (Mr. R. Whitehead, 335, Lincoln Road, Walton, Peterborough, Northants); **Portsmouth Aquarists' Club** (Mr. J. Booth, 17, Landguard Road, Southsea); **Potters Bar Aquarists' Society** (Mr. E. W. Wright, 92, Mountgrace Road, Potters Bar, Middlesex); **Rotherham and District Aquarist Society** (Mr. J. K. Wright, 132, Victoria Road, Parkgate, Rotherham); **Royal Leamington Spa Aquarists' Society** (Mr. J. Brooks, 24, Clarendon Street, Leamington Spa); **Salisbury and District Aquarists' Society** (Mr. W. G. Palmer, Heathfield, 9, Elm Grove, Salisbury); **Scarborough Aquarists' Society "Scalare"** (Miss A. O. P. Fenton, 81, Trafalgar Road, Scarborough); **Sheffield and District Aquarists' Society** (Mr. A. A. Pick, 392, Firth Park Road, Sheffield, 5); **Shirley and South Birmingham Aquarists' Society** (Mr. L. A. Cross, 235, Castle Lane, Solihull, Warwickshire); **Shooters Hill and District Aquarium Society** (Mr. J. C. King, 140, Barlthall Road, Eltham, London, S.E.9); **Sutton and Cheam Aquarist Society** (Mr. J. J. Ketchell, Shadbolt Park, Salisbury Rd., Worcester Park, Surrey); **Sunderland and District Aquarists' Club** (Mr. N. Bailey, 1, Grange Crescent, Stockton Road, Sunderland); **Thames Valley Aquatic Society** (Mr. D. P. Creese, 51, Oakcroft Villas, Surbiton, Surrey); **Watford Aquarists' Society** (Mr. C. F. Foy, 2, Minery Drive, Watford, Herts.); **Welsh National Aquarists' Society** (Mr. M. E. Lewis, 195, St. Fagans Road, Fairwater, Cardiff); **Wickford Fanciers Society** (Mr. E. W. Stalley, Adanac, Harold Gardens, Wickford, Essex); **Wolverhampton and District Aquarists' Society** (Mr. W. S. Jephcott, 6, Aston Road, Dudley, Worcs.); **Wombwell and District Aquarists' Society** (Mr. J. A. Schofield, 37, Foley Avenue, Wombwell).

The Aquarist's Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue substantial metal emblem for the aquarist can now be obtained at cost price by all readers of *The Aquarist*. Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 1s. 9d. **together with the Aquarist's Badge Token cut from page xi,** to Aquarist's Badge, *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

New Societies

Bedford and District Aquarist Society: *Secretary:* D. Thurston, 42, Duchess Road, Bedford. *Meetings:* Second Wednesday in every month.

Crewe and District Aquarist Society: *Secretary:* R. F. Gow, 62, Bedford Gardens, Crewe.

Dudley and District Aquarist Society: *Secretary:* T. A. Tighe, 17, Jews Lane, Upper Gornal, Dudley, Worcs. *Meetings:* Every second and fourth Wednesday at 8 p.m.

Feltham and District Aquarists' Society: *Secretary:* A. Bryant, 129, Fernside Avenue, Hanworth, Middlesex.
Meetings: Fortnightly, Tuesdays, 8 p.m. at the Station Hotel, Feltham.

Grange Aquarist Society: *Secretary:* J. Sullivan, 11B, Sutton Dwellings, Plough Way, London, S.E.16. *Meetings:* Every Thursday, 7.30 p.m. at Weston Street School, Weston Street, London, S.E.1.

Huntingdon and District Aquarist Society: *Secretary:* F. R. Bowler, 11, Priory Road, Huntingdon.

Sleaford and District Aquarist Society: *Secretary:* P. Benstead, 43, West Banks, Sleaford, Lincs.

Standard-Kolster Social Club Aquarist Society: *Secretary:* A. J. Camp, Standard-Kolster, Cray Works, Sidcup, Kent.

Aquarist's Calendar

11th-12th April: **Bury and District Aquarists' Society** open show of furnished aquaria, tropical and coldwater fishes at the Y.M.C.A., Bury. Show schedules available from Mr. G. D. Grimshaw, 1, Garston Street, Bury, Lancs.

6th-10th May: **British Aquarists' Festival.** Open show of furnished aquaria, tropical and coldwater fishes, reptiles, water gardens, etc., at the Exhibition Hall, Belle Vue Zoological Gardens, Manchester. (See special notice overpage.)

16th-17th May: **Rochdale and District Aquarist Society.** Second annual open show of furnished aquaria, tropical and coldwater fishes. Full particulars from show secretary Mr. J. Dodsworth, 251, Rooley Moor Road, Rochdale, Lancs.

18th-23rd May: **Ulster Aquarium Society.** Coronation open show of aquaria and fishes. Schedules available from Mr. J. Lutton, Rannoch, Antrim Road, Glengormley, N. Ireland.

6th-7th June: **Chelmsford and District Aquarist Society.** Open aquaria show in conjunction with Chelmsford Coronation celebrations. Details from Mr. R. A. Gray, 2, Norfolk Drive, Chelmsford, Essex. Entry closing date, 25th May.

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

BRITISH AQUARISTS' FESTIVAL

"The Aquarist" Trophy for best egglaying fishes (present holder Mr. T. F. Whalley) will again form one of the fine collection of trophies at this year's B.A.F.

More Space to be given to this year's event

CORONATION Year in Britain is to be marked by a larger and improved British Aquarists' Festival; it will be even better than the two previous highly successful shows. This year's event will be staged from Wednesday, 6th May, until Sunday, 10th May, at the Exhibition Hall, Belle Vue Zoological Gardens, Manchester. The spring assembly of members of the Federation of Northern Aquarium Societies (organisers of the B.A.F. in collaboration with *The Aquarist*) will also take place on the Sunday, when prizes and awards will be presented.

The B.A.F. is to occupy an even greater area of the floor space of the commodious Exhibition Hall—50 per cent. more than last year—with 700 aquaria in use, and exhibits of coldwater fishes and rock and water gardens will be shown in ideal surroundings. Every effort is being made to enhance the educational nature of the show—a feature of the B.A.F. in the past two years which has been widely praised—and lectures and film shows will be given for visitors and parties of school children during the course of the B.A.F. in the annexe to the Exhibition Hall. In addition to the stands of aquatic traders there will be information stands and stands displaying ancillary activities of aquarium-keeping such as that of the Manchester Microscopical Society.

Entries and Show Schedules

Show secretary of the B.A.F. is **Mr. G. W. Cooke, Spring Grove, Field Hill, Batley, Yorks,** from whom show schedules and entry forms are obtainable. Entries of fishes are invited from individual aquarists and societies—transport is arranged for fishes arriving by rail or air. The exhibits will be arranged in their aquaria on Saturday and Sunday, 2nd and 3rd May, and will be judged on the 4th or 5th May before official opening to the public.

Reduced rates of admission are available for parties of 25 or more applying in advance for tickets, and as in the past, the price of admission to the B.A.F. (2s. adults; 1s. children) includes entry to the Belle Vue Zoological Gardens. Hours of opening to the public are: Wednesday, 6th May, 11 a.m.-9 p.m.; Thursday, Friday and Saturday, 10 a.m.-9 p.m.; Sunday, 10th May, 10 a.m.-7 p.m.

Crossword Solution

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

PICK YOUR ANSWER (Solution)

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

THE AQUARIST

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