

# The AQUARIST AND PONDKEEPER

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Photo: F. Benson  
For the aquarist, spring brings live foods. By the way-side pond above is seen well-known Bristol shubunkin breeder, Mr. F. Amos collecting water fleas for his stock

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## Editorial

IT is some time now since the antibiotic substance aureomycin was added to prepared fish food by manufacturers with the object of promoting growth of fishes. This seemed at first to be a reasonable procedure since experimental work with other animals had shown conclusively that using diets supplemented with aureomycin or penicillin enhanced growth and size. The foods have been widely employed since then, and while no harmful results have been reported by aquarist users, neither have there been enthusiastic outbursts over fine, large specimens arising from the feeding. A recent report concerning direct examination of the effect of aureomycin on guppies gives rise to new thoughts on the matter, however.

American scientists have found that guppies given a diet containing one-fifth of its bulk as aureomycin grew to a smaller size and gained less weight than guppies kept under similar conditions but without the dietary supplement of aureomycin. The reason for this retarding action of the antibiotic was not discovered, although heavy growth of a non-bacterial organism occurred in aureomycin-fed aquaria, and this organism could have been responsible for growth inhibition in part at least. If so, this would create yet another example of the way in which upsetting the total biological balance of a system, albeit with good intention and favourable theoretical indication, can produce untoward results.

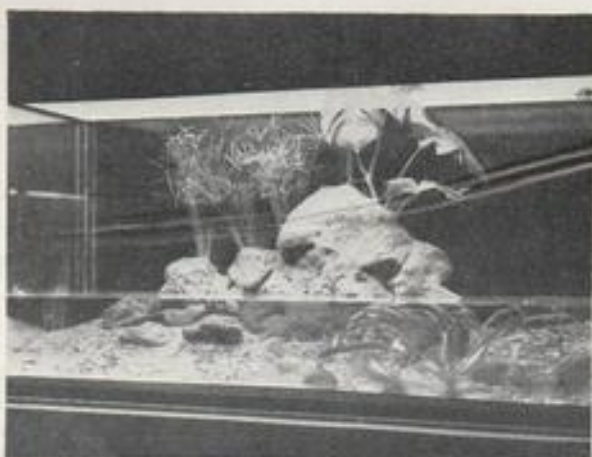
Presumably, the moulds and yeast-like organisms are normally kept in check by the moderate growth of harmless bacteria present in the environment of fishes, which the aureomycin destroys to their advantage. The concentration of dietary aureomycin used in the above experiments is certainly greater than that found in proprietary fish foods, so that the extreme results are unlikely to accrue from their use. Unless guppies can now be shown to differ from other fishes in their response to antibiotic feeding, it does look as if manufacturers should discontinue the addition of expensive compounds to foods, since their expected beneficial actions have not materialised and no longer justify the charge to the aquarist.

# LONDON'S New Aquarium

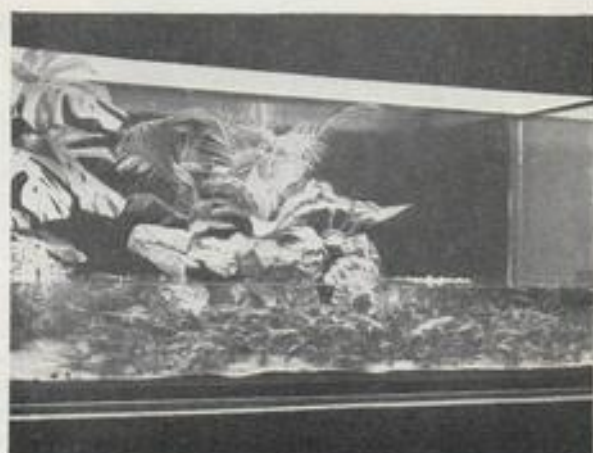
Photographs by  
LAURENCE E. PERKINS



LAST November saw the opening of a new public aquarium in London at the South Bank site opposite Festival-Hall and close to Waterloo Station. Its exhibits, shown in 112 aquaria, are mostly tropical fishes but there are some cold-water species and marine specimens on view, and all form a series of bright and attractive pictures set in the walls of the darkened hall. A pleasurable effect is given by an arrangement of bays



for the aquaria as shown in the top pictures of this page. The curator, Mr. Eric Bowler, has struck upon a happy display idea in showing large tropical aquaria only partly filled with water and examples containing large cichlids, bloodfins and tiger barbs exhibited in this way are also pictured here. Many of the less common tropical species are at the South Bank Aquarium, including that notoriety of the fish world, the piranha.





## Firemouth Cichlid

(*Cichlasoma meeki*)

ORDER:—Percomorpha, from Greek *perke*—perch, and Greek *morphe*—shape.

FAMILY:—Cichlidae, from Greek *ichthys*—a kind of sea fish.

SPECIES:—*Cichlasoma meeki*—from Greek *ichthys*, Greek *osma*—the body, and *meeki*—after Professor Meek.

A FIVE-INCH native of South American inland waters, the firemouth was first introduced to British aquarists a few years before World War II. Like many another species it disappeared for the duration, but comparatively recently has reappeared, and is fast reaching a full measure of popularity. This is not surprising, for the expression "Once seen, never forgotten" is truer of *Cichlasoma meeki* than of most of our aquarium fishes. Its attraction lies more in its striking coloration than in its shape, which is fairly accurately depicted, I believe, in the sketch above of an adult male.

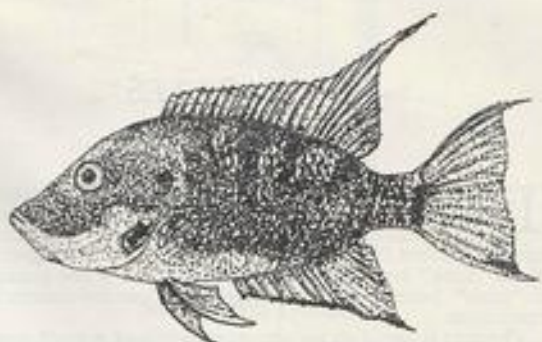
Except when swollen with roe the body shape of the female is similar to that of the male, but the contour of the dorsal fin differs. The first two or three branched rays of a mature male are elongated to form a narrow extension which reaches upwards and backwards over the caudal fin. In the female this extension is not developed. All fins of both sexes are reddish in hue, and freely speckled with blue spots. Dorsal and anal are edged with blue. The basic body colour is a slatey grey, which is replaced by intense orange along the abdomen, the throat, and the lower portion of the face. The pigmentation enters the lower part of the mouth, and this character gives rise to the fish's popular name of firemouth.

At the base of the operculum in the orange area is a distinctive dark mark, edged with greenish gold. This mark is always present, but in addition there are a number of dark vertical body-bands and a dark line extending from behind the opercula to the base of the caudal fin, which come and go apparently at the will of the fish.

### A Docile Look

The expression on the fish's rather large face is one of docility and contentment. I never fail to be reminded of a well-fed cow when looking at one of these fishes. The expression does not belie their nature—they are much less impetuous and bellicose than the majority of the members of their family. Unlike a cow, however, they cannot tolerate the proximity of plants. Any placed in their aquarium are systematically and thoroughly uprooted, unless weighted down. In such cases they may be torn to shreds, or be pushed as far to one side as possible. Particularly is this so when the fishes are preparing to spawn. This is usually indicated by the appearance at the vent of a small projection—the breeding tube, through which semen and eggs will be passed.

Both fishes move around the aquarium, gulping up great mouthfuls of sand and spitting them out at different places. A series of depressions are made, rocks are polished up and all likely spots for the reception of spawn thoroughly surveyed. Between whiles the courting couple will indulge in wrestling matches with lips locked tight together. Should either show signs of weakness the whole business is liable to end with the thorough thrashing of the weaker party. For this reason, some aquarists provide a bunch or two of bushy



Male firemouth cichlid

plants, floating at the surface, so that the unfortunate discarded lover can seek and find shelter.

Other things being equal, however, such procedure becomes unnecessary. When it suits them the couple will commence egg-laying. As likely as not they will completely ignore the rocks placed invitingly about the floor of the aquarium, and the well-scrubbed flower pot placed temptingly upon its side, and carefully fasten their numerous eggs upon the back or side glasses of the aquarium.

As soon as all eggs are laid, guard duty is taken up and shared equally by the two fishes. Nervous and fidgety during this period, it is not uncommon for them to remove the eggs several times to fresh, well-cleaned spots. In a temperature of 80° F. hatching begins in from three to four days. The fry are taken in the mouths of the parents and carefully placed in a depression in the sand, where they appear as a seething mass. Never for more than a second or two are they left unguarded, and never for more than a few hours do they remain in any one nursery.

This constant changing of position is calculated to raise the blood-pressure of those who witness it for the first time. The parent fishes hover over the fry, their beady eyes alert, their noses down. A swift sucking movement and numbers of the youngsters are drawn into their mouths. Then, horror of horrors, mother and father seem to be chewing their offspring. A few strokes of their fins, and out of the mouths into a fresh depression, newly washed and none the worse, emerge the babies.

This goes on for several days. When the egg sacs are absorbed, and the fry begin to swim strongly, they are still looked after by the parent fishes for a period, but, just in case, it is wisest to remove the adults when the young are about ten days to a fortnight old.

### Firemouth Feeding

Not particularly choosy in the matter of food, adult *Cichlasoma meeki* will readily partake of quite a number of different proprietary foods, but the aquarist desirous of bringing them into tip-top breeding condition will do well to feed a "meaty" diet. Earthworms, chopped small enough for the fishes to swallow without undue effort, are an excellent main dish. They can be supplemented with a quantity of live *Tubifex*, "bloodworms," Mayfly larvae, gnat larvae and pupae, newly-swatted flies, large *Daphnia*, and freshly crushed aquatic snails.

Fry will thrive best on a first food of Infusoria and water coloured green with floating algae, but, if neither of these foods is available, a fair substitute can be made from yolk of

(Please turn to page 5)

# Building an Aquarium Heater-Indicator

by B. H. GATES

THE following form of indicator system has many advantages over any other type, with cheapness of construction and accuracy being among its main features. Most if not all of the components will be found in the "junk" box, but can be purchased for a few pence, if "junk" boxes are not a feature of the constructor's equipment.

The unit is based on the simple principle of voltage drop or if it is preferred, developed voltage across a resistance in a circuit, this voltage being determined by the current flowing and the value of the resistance; a study of the circuit diagram will show that the resistance, a short length of 600 watt electric fire heater-spiral (chosen because of general availability) is connected in series with the heater, the developed voltage being used to illuminate a standard torch bulb.

As the voltage is mainly dependent on the current flowing through the heater circuit it is obvious that should the heater fail current will cease to flow, resulting in no voltage to the bulb. Again, should the heater develop shorted turns (reducing its life) a greater current will be drawn, producing an increased voltage across the resistance, the bulb indicating this condition by its extreme brightness; the reverse effect taking place in the case of a failing heater (low efficiency).

Required value of resistance is decided by the following: mains voltage ( $V_m$ ), heater wattage ( $W$ ), current flowing ( $I$ ), bulb voltage ( $V_b$ ). The first unknown quantity (current flowing) is found by dividing the heater watts by the mains volts, the resistance value being arrived at by dividing the bulb voltage decided on by the current flowing.

$$\frac{W}{V_m} = I \quad \frac{V_b}{I} = R$$

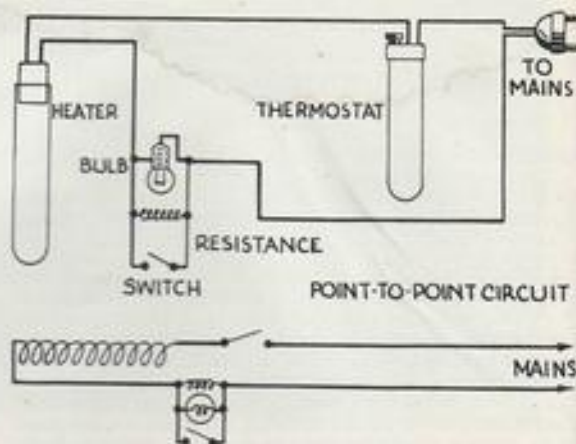
For example:—  $\frac{60w.}{240v.} = .25a.$        $\frac{2.5v.}{.25a.} = 10 \text{ ohms.}$

Most of the required values of resistance will be found in Table I, but one thing must be borne in mind, that when two or more heaters are connected in parallel, using one indicator to serve them all, the heater wattages must be added when working out the required resistance.

The required value of resistance having been arrived at,

TABLE I.

Heater (watts)	Max. Bulb Rating (amps)	230—250 VOLTS Resistance (ohms) for				200—210 VOLTS Resistance (ohms) for			
		3.5v.	2.5v.	2v.	1.5v.	3.5v.	2.5v.	2v.	1.5v.
25	.1a	—	—	20	—	—	18	—	
40	.16a	—	16	12.5	9.5	—	13	10.5	8
60	.24a	—	10	8.4	6	—	9	7	5.3
75	.3a	11.3	8	6.5	4.8	10	7	5.7	4.3
100	.4a	8.3	6	5	3.6	7.8	5.5	4.5	3.3
125	.5a	6.7	4.8	3.9	2.8	6	4.2	3.4	2.5
150	.6a	5.6	4	3.2	2.4	4.9	3.5	2.8	2.1



Circuit diagram of aquarium heater and thermostat showing method of including an indicator bulb

the amount of heater spiral required to make up this resistance has to be decided, so allowing for the possible absence of ohmmeters, and the fact that heater spirals vary in length according to the gauge of wire, mains voltage and the manufacturer's design, a second table has been prepared. From this the resistance of the element or spiral to be used is found; this result is then divided by the length of the spiral in inches, the required amount being carefully measured and cut, then gently stretched until the turns are just clear of each other.

For example:—required value of resistance obtained from Table I is 6 ohms. (Mains voltage, 240 volts; heater spiral, 600 watts). From Table II, heater spiral resistance, 96 ohms (length 8 ins.).

$$\text{Therefore, } \frac{96}{8} = 12 \text{ ohms per inch.}$$

To give 6 ohms; length of spiral required =  $\frac{1}{2}$  inch.

In the circuit diagram it will be seen that a switch has been connected in parallel with the bulb and resistance. This can be of the push button or toggle type, and has been included to preserve the life of the bulb, but is optional where a permanent indication is required.

A 2.5 volt bulb in 100 per cent. condition requires a 3 volt supply to illuminate it to a safe maximum brilliance, but as a brilliant light is not necessary as an indicator, the resistance values given in Table I should be adhered to, although they are far from critical. The constructor requiring the indicator to register heater efficiency, e.g. shorted or high resistance turns, etc., will find it more practical to make the value of the resistance one or two ohms under the value given or arrived at; domestic electric light bulbs of a wattage equal to that of the heaters can be used when experimenting with various resistance values.

When selecting the required indicator bulb, it must be remembered that in practice, the current rating of it must be very much lower than the current flowing in the heater circuit; for this reason several resistance values have been omitted from the chart, as difficulty may be experienced in obtaining bulbs of this voltage with a sufficiently low current rating, but as there is a good supply of 2 volt.



TABLE 2.  
Heater spiral resistances (ohms)

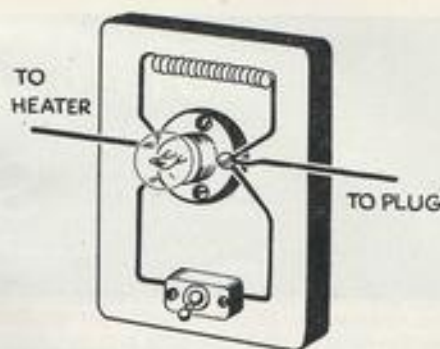
	600 watts	750 watts	1,000 watts
250 volts	104	83	62
240 volts	96	77	58
230 volts	88	70	53
220 volts	81	65	48
210 volts	74	58	44
200 volts	67	53	40

0.06 amp. bulbs available, this should not prove much of a stumbling block.

One method of overcoming the high current bulb problem is to switch in parallel with the heater a pygmy lamp, so increasing the total wattage and current flowing. If on the other hand the constructor finds that the bulb is on the dim side, due to the bulb drawing too great a current, the value of the resistance should be increased slightly.

Four sizes of bulbs are shown in Table II, merely to suit general availability, but it will be noticed that the smaller voltage bulbs require a smaller value of resistance, thereby saving space in the case of midget units or where a multi-way rotary switch is used to check banks of aquaria.

Although the construction of the unit is simplicity itself, a great deal of care must be given to insulation, as most connections carry the full mains voltage if accidentally or otherwise wired into the "live" line. Should this occur



SUGGESTED LAYOUT

Suggested arrangement of indicator lamp, resistance and switch on a baseboard

the fault may be rectified by reversing the mains plug, the old adage, "it's better to be safe than sorry," being strictly adhered to.

The unit can be mounted on a panel cut from bakelite sheet or some similar material, or enclosed in a plastic or bakelite box, the latter being obtained from most stores as soap containers, at approximately 1s. complete with a tight fitting cover; a hole is cut in the cover to allow the bulb to be seen.

## Potted Aquatic Plants

by R. WHITEHEAD

MANY fishkeepers practice the habit of planting water plants in trays or pots and this method has much to commend it. Earthenware or plastic trays and pots can be used, the grass-like plants being planted in trays and individual pots used for the larger plants such as the Amazon sword or *Cryptocoryne* species.

All sorts of shallow glass dishes and other kitchenware can be pressed into service but the purpose-made square or rectangular trays are more convenient to fit into the aquarium. The smallest sized earthenware flower pots are useful and the writer has even used plastic egg-cups perforated in several places with a red hot wire to allow the water to circulate around the roots of the plant.

For the breeding tank plants in trays offer many advantages. They are easily moved from tank to tank as required and furthermore, growth is not retarded as is generally the case when plants are moved and set in the compost. This method also allows plants most suited to the breeding tactics of a particular species to be massed together as desired.

Although transportation is a little more difficult, potted plants are also useful when furnished aquaria are being planted at shows and exhibitions. Once again the root system is not affected and with care the pots can be hidden with the compost. Many aquarists complain that they regularly lose many valuable plants even when exhibiting close to home; it is possible that with the careful use of plants in trays and pots these losses may be considerably reduced.

Experiments are often made using soil and peat under

the compost and also using various natural and artificial fertilisers in the compost. By confining the experiments to potted plants a certain measure of control over the tests can be retained. The health and growth of the plant can be compared with similar plants set direct in compost in the normal way. If the experiment is not a success and more especially if the newly introduced substances are having a detrimental effect on either fishes or plants, it is an easy matter to remove the plants without unduly disturbing the set-up.

## Firemouth Cichlid

(Continued from page 3)

egg—hard boiled. A small quantity of this placed in a piece of fine cloth, and washed backwards and forwards in the water will provide a mist of food. If the material is so fine that the yolk will not pass freely between the threads, screw the neck of the small bag so that more pressure is exerted upon the food. Slight aeration, provided by the suspension of a diffuser stone just beneath the surface of the water, will keep the "mist" moving for quite a long time. As a result of this movement more will be eaten, as the fry tend to ignore stationary particles.

Once over the first few days the fry will be ready and eager for *Cyclops* nauplii, freshly hatched brine shrimp, micro worms, chopped white worms, gnat-larvae, baby *Daphnia* of the spineless species, and dried food moistened with the juices of earthworms.

To partially harden the fry, allow a variation of at least 10 degrees in the water temperature. From 70° to 80° F. and back again every 24 hours is not too much. Keeping the temperature too high for too long produces weaklings.



A page for  
the beginner  
contributed  
by

A. BOARDER

TOWARDS the end of this month pond-keepers will start looking for signs of spawning by goldfish. Each new season brings the keen anticipation, and hopes are raised high as to the numbers and quality of the expected fry. Providing you have been feeding the fish as I advised last month all you need now is plenty of patience. Although spawnings have often been delayed as late as June, I have never yet had a season without a spawning.

I have often been asked which is the best water plant for a spawning medium. I do not think that it matters very much which plants are used. It is a fact that goldfish eggs are adhesive when first laid and they stick to anything with which they come in contact, whether they are fine leaves, coarse ones or the side of a pond or tank. They cling so tightly that if some were laid in an earthenware bowl, a strong current of water could be passed over them and they would not move. However, although the thickness of the leaves has no effect on the adherence of the eggs, the density or otherwise of the clump of plants can determine how many eggs are likely to escape the attentions of the fishes once spawning is over.

For a close coverage I do not think that a good clump of hornwort (*Ceratophyllum demersum*), can be beaten. If this cannot be obtained then the following make good substitutes—willow moss (*Fontinalis antipyretica* or *gracilis*), *Elodea canadensis*, and blanket weed. The latter can be ideal as far as the protection of the eggs is concerned, but when this weed is taken from the pond and placed in a hatching tank it can grow so thickly and float upon the surface so much that it is inclined to cover the whole surface of the water, and then when the fry hatch they cannot reach the top. When I have used blanket weed as a spawning medium I have found it a good plan to place a couple of sticks across the tank to hold the blanket weed down below the surface.

#### Pond Survey

Do try and keep a good supply of water plants in reserve so that once a good number of eggs are laid on a bunch it can be removed for hatching and another bunch put in the pond in its place. If you can keep this spare weed under cover it is an advantage, as otherwise all sorts of pests can get into it and later do damage to the eggs. Where bunches of weeds are left in the pond for spawnings it must be realised that newts may have entered the pond and laid their eggs among the leaves. If many of these are left on the bunches the newt tadpoles can be a danger when the fry hatch out. I have noticed that these tadpoles are rather weak swimmers when tiny but once they get over a week old they are very fast and take a lot of catching. A good plan is to examine the bunch of weeds each day and if any newt eggs are seen they should be squashed. They are about a quarter of an inch across with a distinct yellow blob in the centre.

It will be a good idea to check up now on the pond and the water plants. There may be a crack or two in the sides of the pond caused by February's freeze-up. These cracks

can be dealt with either when the pond is emptied or when the water is well lowered. They can be cleaned and filled with fresh cement and sand (fine), equal parts, or with one of the mastic preparations. The cracks will usually give no further trouble throughout the summer but when hard frosts come again they may be re-opened.

Any water plants which have become too large in the pond can be split up. It is better to discard the old centre part and keep some of the newer outer growths. Remember that all water plants will make rapid growth from now on and too much must not be left in the pond or before long the whole surface will become covered with leaves and the fish will be hidden from view. Also no pond looks well once the water's surface is covered, whether by water lily or other leaves. I consider that no more than one-third of the surface should be covered by leaves at any time. When more than this is overgrown I suggest that some of the leaves be removed or the whole attractiveness of the pond will be lost.

During this month it is essential that the fishes are fed as often as they will take food. As the water gains in warmth so will the fish become more active, and in this case they must have plenty of the right kinds of foods so that they get plenty of nourishment for assisting in the formation of eggs and milt. If you can get some Infusoria ready for the first hatching it is a wise plan. The receptacles can be either small tanks or quart jars. I do not think that very small containers are of much use. It will be found that if a good range of containers can be obtained a continuance of supplies can be kept up quite easily. If the culture is started by placing some crushed lettuce leaves or potato peelings in some old pond or tank water, the Infusoria will soon form. Do not leave a jar too long without attention or the culture may die out. Remove some of the water every few days and replace with fresh. Always examine the water with a microscope to see whether there are any organisms present. It is useless giving dirty water to fry if it contains no living Infusoria.

It is sometimes suggested that once some eggs are laid there is plenty of time to start an Infusoria culture. As the eggs will hatch in four days at a temperature of 70° F., it can be seen that there is not enough time to get a good culture going, so it is necessary to commence in good time, even if some has to be thrown away. Any suitable container will do for a fry hatching tank, but I prefer one which has opaque sides. The sun can shine on the water's surface, but do not let it shine through an unshaded glass tank side.

#### The Tropical Tank

Your tropical fishes should now be breeding well, and if any special species are required, do see that the pair has a tank away from other fishes. Although some fish may be reared in a community tank you are not very likely to breed many show-quality fishes by this method. The parents

(Please turn to page 8)



# Journal of a MARINE AQUARIST

by L. R. BRIGHTWELL

WHEN one considers that the number of species of marine animals must outnumber freshwater forms by at least a hundred to one, it is not surprising that the marine aquarist is almost daily offered a chance of trying out something entirely new to his tanks. A row of fifty tanks (what a dream of delight!) would scarcely cope with the chances offered him—and not a penny to pay if a coast-guarder.

I have had specimens of the small purple sea-urchin (*Paramechinus miliaris*) in a tank only 15 ins. by 7 ins. by 7 in. Much laboratory work has been done on this florissant echinoderm. Cross-bred sea-urchins have been obtained by artificial insemination and many other marvels brought to light. As an entertainment for the amateur it can be recommended. The sea-urchin is always right side up, for the long waving tube feet are thrust out on all sides, and imperceptibly it creeps over the tank floor and up the glass, searching for food—just what I am a little uncertain. In the course of its march it camouflages itself, picking up stones, shells, living and dead, scraps of coralline—in fact, anything in its path.

Under a binocular low-power microscope one can see just how this is done. The entire surface of this seemingly inanimate prickly blob, rather like a sweet-chestnut husk, is very much alive. The spines are far from static; each rolls upon a ball joint, and between spines and tube feet are hundreds of pincer organs mounted on long flexible stalks. They serve many purposes, keeping the surface clean, holding camouflage in place, and seizing food scraps which are passed from one to the other until they reach the mouth, the complex Aristotle's lantern on the under surface of the

creature. The vent is at the top on the dome-like roof, and it is a strange sight to see waste matter fall from this opening, like a spate of pin-head-sized rabbit droppings. In every country but the Land of the Free, sea-urchin spawn is regarded as a great delicacy, and in the West Indies so much so that its fishery is controlled by law.

There are vast numbers of sea animals which, though almost as countless as the sand-grains among which they live, are exceedingly hard to come by. Only the grab, or, better still, the telescopic mouths of certain fishes, such as the gurnard, can rout them out of the burrows which they dig. Lately, from a depth of 34 fathoms some 10 miles south-east of Brighton, I found in a ginger beer bottle an example of the snap lobster (in the U.S.A. pistol prawn), the first living example to come my way, though I have found many, and even remains of squilla (the mantis shrimp) in the stomachs of skate and gurnards. Little is known about either. The pistol prawn has a spring trigger thumb to one of its claws and can emit a sharp "crack" like that produced by snapping one's finger and thumb.

This find was of a brilliant scarlet, but on being put into a small tank with a sandy floor, it seemed to mope and lose colour. The only information obtainable was an entry in the Plymouth Fauna List stating that two or three specimens from the Plymouth area had been found under stones at low tide. Accordingly a fist-sized stone was placed in the tank near the glass front and at once *Alpheus* became full of energy. It hollowed out a cave beneath the stone, with a bolt hole, lobster fashion, back and front. In addition it threw up a spectacular series of earth-works which changed almost nightly. In this same tank live some carpet clams (*Tapes*) and sand or basket whelks (*Nassa reticulata*).

Whilst the common whelk is a bad doer in a small tank, *Nassa* thrives apace. It ploughs through the sand breathing, periscope-wise, through its long siphon, waving aloft like a miniature elephant's trunk. Little comes amiss as

(Continued at foot of next page)



On the left are shown two specimens of the common "purple" sea urchin—one crawling up the aquarium glass and the other attempting to drill a mussel. A view of the urchin's surface is seen greatly enlarged on the right, showing spines, tube feet and pincer organs.





# Do Tadpoles *Learn* to Swim?

WELL, do they? No real enthusiast of water life will have neglected his aquarial education to such an extent that he never collected frog spawn in his young days, subsequently watching their development within the narrow confines of the jam jar. Looking back to those days, what would have been your answer?

The question is not so unimportant as at first it seems, for on the answer hangs the whole theory of what is called *maturation*. Maturation is the development of certain types of ability in a creature as it matures, and not by practice. In other words, is swimming a fully accomplished activity that frogs are born with, which comes into operation as soon as they reach a certain stage of development, or is it something they find out for themselves, when squirming about in the water and watching the others?

There is a further important implication in maturation, and that is this: if such an activity comes into effect only after a certain period, during which it is maturing, then any attempt to train the animal in this process *before* this period has elapsed, will be so much waste of time. More than this, it might even be detrimental to the efficiency of the natural process of maturation.

At this point educationists and child psychologists begin to prick up their ears. While they are not concerned with whether or not the humble tadpole learns to swim, they are worried about the possible effects of early training on the human infant. The theory raises such questions as "Can bowel and bladder training begin too soon?" and "Is there an age before which it is useless or even harmful to try and teach arithmetic?" In other walks of life, similar queries are posed. When should I start training my gun-dog? Is it too early to put my yearling to the jumps? And many others of a similar nature.

In an attempt to provide a factual solution to these problems, Coghill, a noted animal psychologist, made a very intensive study of the swimming development of tadpoles and similar water creatures.

His first observations showed that in the first stages the tadpole shows no co-ordinated movements at all, and just squirms about in the water; gradually however, ability appears, and in three days swimming has reached a stage of maximum proficiency. This still did not answer the question of whether the tadpoles were actually learning to swim, and so Coghill obtained a large batch of salamander

eggs about to hatch out. He chose this particular creature because the tadpoles are larger than those of the frog, and therefore easier to study, and also because their development takes place at a slower rate.

This time he put the tadpoles into two batches, directly they had hatched out. The first batch he reared in cold water and the second were placed in an aqueous solution of anaesthetic. This kept the tadpoles in the second batch completely unconscious and motionless, although it did not prevent them from growing and developing in the same way, and at the same rate of progress, as the first batch. At the end of five days, the normal tadpoles were swimming perfectly, and no further improvement was possible. But what about the unconscious ones? When they recovered from the anaesthetic, would they be able to swim as well as the others, even though they had not moved a muscle since the moment they hatched out?

It seemed very unlikely, and yet this was the crucial test for the theory of maturation. Since they had grown at the same rate as the others, and their bodily development had been the same, their swimming ability should have perfected itself during their unconscious state. Batch No. 2 was then put into cold water after the five days had elapsed, and for some minutes went through a series of drunken gyrations while the effects of the anaesthetic wore off. Once they were fully "round" however, they swam as well as the group with five days' practice behind them. Their swimming ability had not been learnt, it had *matured*, and the theory of maturation was at last vindicated.

To consolidate his findings, and put them on a scientific basis, Coghill repeated his experiment a number of times until the results were beyond all doubt. In addition, he carried out further experiments on some *axolotls*, which are tadpole-like creatures, and remain so when fully grown. As well as proving the presence of maturation by the earlier method, Coghill showed by detailed observation and skilful dissection that the swimming ability of the *axolotl* is directly proportional to the growth of certain nerves.

So it seems, as we plough through the water with our laborious breast-stroke, that however enviously we may think of the tadpole, it isn't really so clever: after all, we *do* learn to swim!

Dr. L. R. C. Haward

## Journal of a MARINE AQUARIST

(Continued from preceding page)

regards diet to this invader of crab and lobster-pots. I have found that the common rag-worm does much to keep a sand floor well churned and so free from bacteria. And, incidentally, a small tank with an aerator keeps this bait fresh and lively for weeks on end—a useful tip for anglers.

A fine specimen of the lovely cleanser swimming crab (*Portunus depurator*) has been in residence for over a month, and tiny male pea-crabs creep in and out of the mussels which I keep in every tank, at once useful filters and a handy food supply. The she pea-crab, a big bloated dame, sits always inside a mussel but the male, a hard-shelled, go-getting little Lothario, wanders from shell to shell, in an eternal game of *cherchez la femme*. Two fine examples of the sea bull-head (*Coltus*) arrived to-day, and with the breeding month, hopes rise high.

And so this most exciting of all forms of aquarium-keeping continues—a non-stop march into the illimitable. No wonder the cult is growing.

## Stepping Stones

(Continued from page 6)

may be harassed, and I am sure that the young ones are chased about so much that they have a job to pick up a living let alone obtain enough food to enable them to form into really good specimens.

Pay special attention to the inhabitants of the community tank at this time of the year. Have the fishes increased in size and numbers so that the balance is now upset? If the tank has become overcrowded you must do something about it right away otherwise some of the fishes will start to suffer; a bad epizootic may break out and affect all the fishes. If the water plants have become too crowded they should be given a good pruning. Leave enough space for the new shoots to find some room, as in time some of the old plants will die out and you will have no fresh ones to take their place. I will finish with a word of warning. Do not be too ambitious and buy every new tropical you see; wait until you have gained plenty of experience with the more usual ones or you may be in for disappointments.



# AQUARIST'S Notebook



by  
RAYMOND YATES

FROM time to time I come across dealers up and down the country who display plenty of fish of many varieties but have no prices on view. Most go-ahead dealers to-day have the names and prices of all their stock on the respective tanks, but some still go to the opposite extreme. I think this is a mistaken policy because many people refuse to buy from a shop which displays no prices for the goods it has on sale. Rightly or wrongly, the public in general suspect that the owner of such a shop is afraid of his competitors knowing his prices or alternatively knows his prices are high and dare not display them for fear of driving custom away. They also suspect that he has a sliding scale of prices according to the means or experience of a particular customer or think that the shopkeeper sternly considers an enquirer will be too nervous to walk out without buying.

These possibilities may not apply in the case of aquatic dealers but there seems no obvious reason why they should not give their prices for all to see. It cannot be said that prices of tropicals are very variable as they have rarely been more stable than at present. Some dealers when asked the price of certain fish hesitate in the most obvious manner; in one case, when I made an enquiry, the dealer's answer was "Have you ever seen them on sale before?" It is also a bad policy to have fish of the same species in various sizes and show only one price, as this is invariably for the smallest specimens, whereas the purchaser usually wants the larger fish. Prices of tropicals, and also the demand, have fallen considerably during the past year. In their own interests and also of the hobby at large, dealers should mark their prices plainly on every tank. Custom wants encouraging, not discouraging.

From time to time one sees advertisements in the local papers offering a fully set-up tank for sale. Sometimes the same type of advertisement is seen on a postcard in the windows of those small shops which specialise in these rather popular small "Sales and Wants." I have followed up one or two of these and in a number of instances have been surprised to find that the advertiser was an established and enthusiastic aquarist who was not disposing of a tank in the normal way but making a business of selling furnished tanks in this manner. As soon as a tank was sold another one was set up and advertised. There is a great deal of this done and it must have some effect on the sales of the local dealers. Readers who reply to advertisements thinking to pick up equipment reasonably cheap should not be too surprised if they discover that the advertisement is one of these to which I have referred. Second-hand tanks are always a doubtful purchase and it is wiser to see them full of water when viewing. Tanks that have been left empty for any length of time usually leak hopelessly when refilled and need replastering. The trouble is that the removal of the pressure of the water allows the glass to move back but the plaster compound is not so resilient, and when the glass moves back under pressure of refilling, there is a space for a leak.

It is rare that one goes to any show which provides the comfort and convenience of cloakroom facilities. In warm weather, with a high temperature at the show, visitors would welcome a cloakroom where parcels, coats or even carrying cases and the like could be left for a small charge. Seating at shows is also a rarity apart from that provided in the cafe

—there are usually no seats at all in the actual showroom. Many clubs make the mistake of placing all the fish of the same type in adjoining tanks so that it is quite common to walk along a line of tiger barbs, ten or a dozen or more, when they could have been intermingled in tank placings with other barbs. Too many fish of the same variety in a line detract from each other's merits.

Another fault is that the fish in any one class entered by one individual are almost always placed in adjacent tanks so that the judge has only to recognise a single fish to have a shrewd idea who is showing its near neighbours. Many tanks have no name of the fish thereon although a large sheet of printed names of most tropicals can be obtained from *The Aquarist* for cutting out and sticking on to tanks (price fivepence). Wrong names are frequently seen on tanks and although this does not worry the uninitiated it annoys the keener aquarists. Many of these errors are trivial but occasionally fantastic errors are made. Few societies bother to put the names of the fish in furnished aquaria on the tank or cover, but these are often some of the best fish on view and few people care to show their ignorance by asking strangers the names of individual fish.

Some award labels in use are very pale efforts which are hard to see or read with a light behind them. The new labels, issued by *The Aquarist*, are excellent and stand out boldly. These are now issued in "First," "Second," "Third," "Fourth" and "Special," and 50 sets of these in booklet form cost two shillings. Apart from large shows they are admirable for table show placings—everyone likes to see his entry adorned with a vivid award label and the cost is negligible.

It is a common error with aquarists to mix very brightly coloured fish with more subdued specimens with the result that the lesser coloured fish look dull to the point of drabness. Where one has highly coloured varieties, such as bright reds or yellows, they should not be kept with more sober fish. Even *H. rosaceus* and harlequins look very ordinary against red-eyed red swordtails or large *Barbus schuberti*. A tank containing these last two fish is certainly a riot of colour, even if the colours are primary.

Blind cave fish are not long in finding any food put into their tank, in fact it is a matter of seconds only before it is located. However, they meet their match with *Daphnia*, as although they can tell that the *Daphnia* has been introduced and its approximate position, they cannot get more than an isolated one or two. They show amazing vexation in such circumstances with other fish, and deliberately charge much larger fish such as angels and firemouths in what is obviously an effort to keep them away. The effect is laughable—the blind fish deliberately scaring the others away, even if only for a moment.

A contributor to a recent issue of the Portsmouth Aquarists' Club Magazine raises a point on inbreeding. He blames the failures to raise fry in certain instances to the



fact that the parents are really brother and sister and suggests as a solution that one should buy the male from one source and the female from a different source, preferably in a different town. Where fish are not easily sexed he suggests that six fish be bought from two different sources thereby getting a better chance of obtaining an unrelated pair. At first sight this seems reasonable enough but the theory is open to several objections.

It is true that some varieties (e.g., livebearers) have been bred too frequently and too carelessly and that the standard of fish is weaker as a result. Zebra danios are poor specimens at their best compared with native fish but then most tropicals reared in tanks cannot compare with wild fish, either for colour or size. Many fish are imported into this country from the continent and as these come mainly from one source in Holland and one source in Germany it is doubtful if there is anything to be gained by buying fish in different towns where they are not bred in this country.

Inbreeding is somewhat overrated by many people. It should be remembered that all the golden hamsters in this country have come from a mere half-dozen brought home from Syria by Professor Hindle. The main point about inbreeding is that it perpetuates any strong or weak traits and enhances these. If the points are strong ones so much the better; the trouble is that weaknesses are intensified. I think this is a point which could very well be considered further and perhaps readers have views on this topic they may wish to express.

Yet another short film (it runs about 15 minutes) is now showing at cinemas which is of interest to aquarists. It is called "Zoo Babies," and deals with a selection of youngsters in the collection at Regents Park. About half the showing is devoted to the aquarium and there are some excellent shots of angels, goldfish, Roman eels, sea horses, trigger fish, blue and silver fish and other varieties with several good feeding sequences. There are also shots of terrapins, loggerhead turtles, skinks, lizards, snakes and crocodiles. One amusing incident deals with a fancy goldfish which appears to be doing a sort of hula dance and at which the audience is convulsed. Actually a female guppy is engaged

in biting at the end of the long veiltail and it is this irritation which is the cause of the odd behaviour of the goldfish.

One would hardly expect the *I.C.I. Magazine* to publish anything of interest to aquarists, but there are two items worth attention in the November, 1953, issue. The first deals with the I.C.I. Marine Research Station at Brixham, Devon, where anti-fouling compositions are tested against that enemy of the commercial steamship, the barnacle. Normal compositions remain effective for only four to six months and the direct cost of fouling on a single voyage from London to Cape Town for a 7,500-ton cargo ship, capable of 14 knots, is more than £1,200. The loss of revenue for a ship in dry dock may amount to £1,000 a day.

The station is built on the floor of a quarry, and inside is a laboratory filled with tanks through which sea water is continuously circulated. An Australian barnacle is now ousting the native species mainly because the latter breed only once a year whereas the visitor is guppy-like in this direction. At Burnham-on-Crouch in Essex the station maintains test rafts. Most anti-fouling compositions have copper or mercury as a base; the essence of a good composition is that it should be very slow in turning into solution in the sea. Apart from barnacles there are marine plants to contend with and, last but not least, marine bacteria which play a large part in the breakdown of anti-fouling paints.

The other item deals with a legal poaching effort at Loch Fhearna in the Highlands. Here some 55 charges of between 10 lb. and 60 lb. each were detonated with the object of killing all the pike and perch in the loch so that the area could be used as a spawning ground for salmon. A fortnight after the explosion it was reported that there was no longer any sign of living perch or pike in the loch. Previously, at Loch Luichart, experts had spent two years catching 18,000 pike, 28,000 perch and 1,000 eels.

Stone diffusers used for aeration give far better results if they are inverted, that is to say, if they point upwards towards the surface instead of hanging down, pointing towards the gravel. A bent glass tube is the easiest means of obtaining this result.

## FRIENDS & FOES No. 23

### Water "Gnat" or Pond-Walker

#### HYDROMETRA STAGNORUM

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

CLASS:—Hexapoda, from Greek *hex*—six, and *podos*—foot.

**A** MOST curious little creature, dark, almost black in colour, with an extremely long head, thin body, and hair-like legs.

It walks slowly and sedately about the pond surface, and seems to prefer localities where there is a little duckweed (*Lemna*). Occasionally, if alarmed, it demonstrates a surprising turn of speed. The slightest puff of wind will blow it across the surface of the pool.

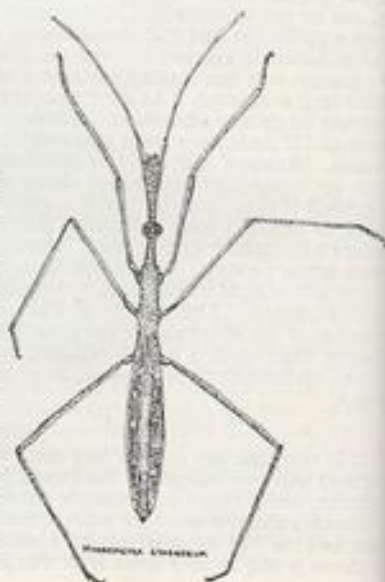
Although not usually found beneath the meniscus, if by accident it finds itself below it, it is not unduly per-

turbed. I have had them walking round the bottom of a jar for several hours before deciding to crawl out once more above the surface.

Under magnification the body reveals a distinct pattern of minute golden flecks. Beneath the head is an equally long, needle-like proboscis, through which it draws the juices of its prey. Flies which fall upon the water surface, and *Daphnia*, *Asellus*, and the like, are items in its diet. The eggs are laid above water level, attached by tiny stalks to the plants.

It is found throughout the spring and summer months, and is itself likely to fall victim to any fly-eating fish.

C. E. C. Cole



THE AQUARIST



## AQUARIST AT HOME:

# Mr. D. Wright & Son

(PETERBOROUGH)

Interviewed and photographed by ROY WHITEHEAD

THIS partnership, well known to fishkeepers within a wide radius of Peterborough, has achieved some notable successes in breeding tropical fishes during the past six years. Mr. Dennis Wright and his son Roger now have nearly 80 tanks in use for tropical fishes and these range in size from five to 60 gallons. The tanks, most of them home made, are housed partly in a garden fish-house and partly in a lean-to conservatory. A 10-foot diameter circular garden pond is used for breeding and rearing goldfishes and shubunkins.

Although Mr. Wright has kept coldwater fishes for many years, it was not until 1947 that he and his son acquired a few of the more common livebearers. These bred more or less by accident and these exciting events inspired the Wrights to attempt intentional and controlled breeding. The following is a record of their successes since that time:

1948—*Lebistes reticulatus*; *Xiphophorus helleri*; *Mollinia sphenops*; *Xiphophorus maculatus*; *Brachydanio rerio*.

1949—*Tanichthys albonubes*; *Barbus conchomus*; *Trichogaster trichopterus*.

1950—*Brachydanio albolineatus* and *Betta splendens*.

1951—*Gymnocorymbus ternetzi*; *Hyphessobrycon scholzei*; *Colisa lalia*; *Hemigrammus unilineatus*; *Colisa labiosa*; *Macropodus opercularis*; *Danio malabaricus*; *Brachydanio rerio* × *B. albolineatus* hybrid; *Hemigrammus caudovittatus*; *Hyphessobrycon serpaes*; *H. flammeus*; *Pterophyllum eimekei*.

1952—*Hemigrammus ocellifer*; *Barbus nigrofasciatus*; *B. titteya*; *Badis badis*; *Nannostomus anomalus*; *Epiplatys chaperi*; *Aphyocharax rubripinnis*; *Melanotaenia nigrans*.

1953—*Panchax lineatus*; *Barbus schuberti*; *Rivulus cylindraceus*; *Trichogaster leeri*; *Aphyosemion australe*.

The partners now have little difficulty in breeding any of the aforementioned fishes at will; current broods in varying stages of development that can be seen in the fish-house are *Aphyosemion australe* (lyretail), *Rivulus cylindraceus*, *Tanich-*



*thys albonubes* (white clouds), *Hyphessobrycon serpaes*, *Barbus nigrofasciatus*, *B. titteya* (cherry barb), *Epiplatys chaperi* and *Brachydanio rerio* (zebra danios). The successful breeding of *Hyphessobrycon innesi* (neon tetra), *Cichlasoma severum*, *Hyphessobrycon gracilis* and *Apistogramma ramirezi* is the target for 1954.

The breeding pair of neon tetras has been induced to spawn several times but so far the eggs have proved to be infertile. Attempts to cross *Colisa labiosa* (thick-lipped gourami) with *C. lalia* (dwarf gourami) have met with little success but *Brachydanio rerio* (zebra danio) × *B. albolineatus* (pearl danio) hybrids have been brought to maturity in several instances.

The fish-house, 16 feet long by 8 feet wide, is home-built and constructed of timber and asbestos-cement sheeting with double-glazed windows. The floor is of concrete and shallow pits are formed in the floor under each of the four banks of tanks. These pits are used for storing water plants and occasionally act as overflow stock tanks for live-bearer broods. The house is heated by a small solid-fuel boiler and during the very coldest weather thermostatically controlled electric radiators come into operation.

Artificial top lighting is not used for any of the tanks as all receive a sufficient amount of natural daylight. Most of the breeding is done in this fish-house and all breeding tanks are constantly aerated by a twin-piston compressor. No compost is used in either the breeding or the fry tanks; plants are planted in pots or trays and moved as required. It is interesting to note that, although Mr. Wright senior is a fairly heavy pipe-smoker, the "no smoking" rule in the fish-house is strictly enforced.

In the conservatory about a dozen stock tanks are kept and these are lighted and heated by electricity. These tanks are planted and "furnished" in the orthodox manner. The

(Please turn to page 14)



Mr. D. Wright is shown in his fish-house in the top picture. Above is a view of his conservatory aquaria with cacti to the left of the photograph.



Red flower of *N. escarboucle*

THE art of fish-keeping may very well be linked with horticulture and of all the flowers in or near the pond, the water lilies take pride of place. There is something restful and entrancing about the appearance of their beautiful blooms that endears them to almost everyone. Some pondkeepers think of the pond as a home for their fishes only and fail to appreciate the interest and pleasure to be obtained from combining the art of water garden culture at the same time. Water lilies have flowers with colours ranging from white through shades of pink to a dark red. Some are yellow and a few blue. The latter are more for heated ponds though and the ordinary outdoor pondkeeper will be well advised to leave these to the fortunate owner of a pond in a hot-house. I do know of some who grow these tropical varieties in an outdoor pond which is cable-heated but I consider that here are many different coloured lilies which are quite easy to grow and flower in an ordinary pond.

#### Water Lilies and Fishes

The point which most fishkeepers will want cleared is whether the lilies are of any value with regard to the keeping of fishes in the same pond, or whether they are harmful in any way. From experience I can safely say that lilies are of definite value in the fish pond, as they provide welcome shade in the hottest time of the year, and many fishes, especially young ones, are very fond of resting underneath a lily leaf during the sunny part of the day. From there they may sometimes be seen moving out to take a fly which has settled on the surface of the water. I know that most of our pond fishes do like an occasional browse in the strong sunshine but there are times when it may be too powerful for them and it is then that the lily leaves provide such useful shade. There are other uses for the lilies, as they will soon clear the green algae from a pond by keeping the sunshine from a part of it and so starve the algae of that precious light without which it cannot thrive. In the early part of the year, before the water lily leaves have grown up, the water may become very green with algae, but as soon as the lily makes good growth the algae will gradually disappear and will not return again that season.

Lilies will feed upon the waste matter in the pond, including the droppings from the fish. In this they help to keep the pond water healthy. I think it will be agreed that there is a strong case in favour of water lilies in the fish pond. There are one or two disadvantages which I will deal with but they can easily be overcome with a little attention at the right times. The first is that if you overdo the water lilies in a small pond it will be possible for the leaves to completely cover the surface so that the fishes can scarcely ever be

# WATER LILY

Photographs by I. N.

seen. Also unless some of the dying leaves are removed from the pond in the autumn there may be some risk of pollution, especially in a small pond. It must be realised that water lilies are of no value as oxygenating plants, as their leaves are on the surface of the water and they do not appear to give off any oxygen under the surface.

I will now deal with the methods for growing these grand plants so that the best may be had from them. I do not recommend the cultivation of these plants in ponds which have no fish in them. Any pond kept for long free from fishes will soon become infested with insect larvae and the resultant midges and mosquitos can become a nuisance in or near the house. A few fish in the pond will ensure that nothing of this trouble occurs. Very few fishes use the water lilies for spawning in any way except that I have known some kinds spawn on roots which may have grown up into the water. Very small fishes love to hide under the friendly leaves of the lilies and I have seen ponds which have a few small fry under each leaf during the sunny part of the day.

#### What Types?

Before you actually buy the water lilies it is advisable to consider well as to the types you require. It is useless trying to grow some of the more rampant ones in a very small pond. Water lilies which are of a miniature type are wasted in a very large pond. Consider the size of your pond and try to visualise the scene a few years ahead and buy the water lilies which are best able to give you the pleasure you expect; although a lily root may look small when you obtain it you will be surprised how soon it grows under good conditions. Do not try to grow too many plants in a small pond. You will get a much better picture with one or two plants separated by stretches of open water than if you cram several together so that the plants grow into one another. The larger the pond then the more scope there is for a comprehensive display. There are lilies so small in type that they may be grown in a pond no larger than a water butt, and so you can see that it is necessary to know how large the plant can grow before introducing it into the pond.

The type of pond will have a good deal to do with the way the plants are set in the pond. If your pond has a clay or natural bottom it will make the planting job much easier; all that will be required is that the roots are anchored temporarily to the bottom either with a large stone or two or some other form of weight. Once the roots start to grow and enter the soil there will be little fear of the plant coming loose again. This last can very well happen in a concrete pond and therefore it is essential to carry out the planting in such a pond in a different manner. In a natural pond I do not consider that any artificial or natural manures are necessary. As a rule it is not so necessary to encourage the

#### A Few Suggestions

For water about six inches deep:—*N. pygmaea*, white, *N. pygmaea helvola*, yellow.

For eighteen inches:—*Nymphaea laydeckeri purpurata*; *N. odorata alba*, white; *N. rose nymphae*, white.

For pond two feet deep:—*N. escarboucle*, red; *N. gladstonia*, white; *N. sunrise*, yellow.



# Culture — by Astilbes

ANCE E. PERKINS

plants to grow once they are established as to restrict their growth within reasonable grounds. The best time for planting is in early April and so, if the pond is other than a concrete one, all that is necessary is for you to procure the plants, weight them and lower them into their positions and then leave them. It is sometimes advisable to lower the level of the water in the pond when the lilies are first planted but the more robust kinds do not seem to mind very much whether this is done or not.

## Concrete Pond Planting

The planting in a concrete pond is a very different matter and unless you pay some attention to one or two details in planting you may be in for some disappointments. It is possible to plant a well-established plant with a large root system into the concrete pond without much preparation, but a small root is not likely to make a good plant quickly without special care. The trouble with some concrete ponds is that once a lily is in full growth with plenty of leaves on the surface, the whole plant—roots, stalks and leaves—may leave the bottom of the pond and float up to the top. Nothing looks worse in the pond if this happens. Some form of anchoring is absolutely essential. In a fairly small pond the lilies may be planted in containers so that when the pond is given a clean out these may be lifted out of the pond altogether. For a small lily I think that it is a good plan to get a large flower pot and place it on a few sheets of paper. Then mix a bucketful of concrete and spread it around the base of the pot. This will give the extra weight to keep the plant down. This method is a good one to employ when planting other kinds of water plants, especially those which grow up out of the water. When strong winds strike such plants the weighted pots prevent the plants from being blown over. The concrete should be allowed a couple of days in which to set before the lily is planted in it. If the lily has been obtained already, see that it is kept in water until you are ready to plant it as it should not be allowed to dry out too much.

The planting medium is rather important for the plant is



*Siamot* is the name of this lily; its flower is large and primrose yellow in colour



*Chromatella* has a yellow flower

not likely to find much in the way of nutriment in a concrete pond, especially if it is a new one. Once the pond gets well established with fish, there is likely to be plenty of nourishment for the plants, but it is at the beginning that something extra is required. I do not consider that anything lasting in the way of manure is necessary as this will form in good time from the fish and natural causes. One of the best substances in which to plant the lily in its pot is turf from a meadow. This will form a good medium for the roots and will give sufficient nutriment to get the plant well started. If you are unable to get turves then you may use some John Innes potting compost. This can be obtained from any good nurseryman and there is nothing in it that is likely to be of harm to the inhabitants of the pond. I do not advise using too much in a very small pond but the amount of chemicals in the compost is not enough to upset the balance in a medium-sized pond. You can make up the mixture yourself if you care to do so but if you only require a small amount it is as well to buy the mixture ready made. The different ingredients may cost you more than you would have to pay for the finished product.

## Little Attention Required

When you have planted the lily root in the pot or other container it is essential that you secure it there by passing a piece of wire around and over the pot. If this is not done you may find that later on, when the lily has made many leaves, the pull of them will cause the whole plant to rise from the pot and float on the surface as I have described above. Once the plant becomes established there is little attention needed; in fact I consider that a pond with water lilies and other plants requires less attention than any other part of the garden, the lawn included!

Most water lilies open their flowers only in the daytime and will close towards the late afternoon. When the flowers die it is as well to cut through the stems as far as you can reach down and remove them. Also, when the leaves start to die down in the autumn, I advise that they are removed, especially in a small pond. The rotting leaves can cause some pollution and so you can be on the safe side by taking out as many as possible. The plants will remain dormant during the winter and should not be disturbed. It is possible that the plants will need no other attention for at least four years and then they may need a little division. The root stock will have become strong and large and it can be divided in the spring with the aid of a sharp spade. As long as you leave a crown you can cut the stock up into as many pieces as you like.



# Coldwater Fishes for Aquarium and Pond

## Golden Orfe

THE golden orfe is, in my opinion, the finest coldwater fish for a fairly large pond. It is such an active species and one which keeps near the surface most of the time that it is generally the most attractive fish it is possible to have. These fish will shoal well, especially as youngsters, and nothing looks better than to see them cruising about just below the water's surface searching for flies and other insects which drop into the pond. Orfe will stand any amount of cold and are very hardy. They are not too happy in water which has a deficiency of oxygen. During hot thundery weather these fishes will soon be in trouble in a small pond, or even in a large one as soon as the oxygen content is lessened either by warmth or foul gases caused by decaying food or vegetation.

Except when orfe are not more than six inches in length I do not advise their inclusion in any pond which is less than six feet by six feet with a depth of not less than two feet. If given plenty of space and plenty of the right kinds of food these fishes can grow to two feet or more in length and make splendid specimen fish. In shape the fish resembles an elongated dace with fairly pointed fins. The depth of the body should be about a fifth of the length of the fish and outline should be streamlined with no signs of humps or fat belly. The colour should be a brilliant gold with no spots of black or patches. The full particulars for the shape of the fins are given in the Federation handbook on standards, but of the thousands of orfe I have seen I cannot remember seeing one which was different in shape from the others! This fish cannot be compared with goldfish, which have had the shape altered so much over centuries. Apart from size, colour and condition, all I have seen have been exactly alike.

The golden orfe can be kept in a well-kept tank only when small, and once the fishes reach a size of five inches overall they are better placed in outdoor ponds. They are not fussy as to food but show a preference for live foods, especially flies, wasps, gentles, worms and *Daphnia*. Their method of feeding is very attractive as they snatch flies from the surface at great speed. If at any time during hot weather these fishes are seen mouthing at the surface, fresh tap water should be played on the pond immediately. This will usually put them right; I have found orfe on their sides at the top of the water, but after fresh water has been added they have been swimming around as if nothing had happened.

There is not much chance of breeding these fishes in a tank or small pond. They are generally fairly large before



Outline drawing of the golden orfe from "Show Standards for Cultivated Fishes" (F.B.A.S. 2s. 6d.)

they breed and it is unusual for them to do so unless they are over a foot in length. Their breeding habits are rather similar to the goldfish. The males chase the females through the shallows where they lay their eggs. Willow roots and similar subjects are mostly used for this purpose. To make sure of rearing many fry it is essential to provide plenty of cover for them and also some parts of the pond must be very shallow so that the youngsters can escape from the parents. The adults are such quick feeders that the fry would not last long without the cover. The young do not long stay bronze like goldfish but soon change to the golden colour.

Orfe are not good subjects for showing as a good-sized fish would require a very large tank. The limit of size often stated at shows would prevent the showing of an adult fish. As they have a minimum exhibition length of six inches it can be seen that a fair-sized tank would have to be provided in any case. Apart from condition, the main point to watch is that the fish is a clear golden colour throughout. So many fish develop black spots and patches, especially on their backs. Many fish which have the correct colouring when they are young get too many black markings later on, and so are spoilt for show purposes. I am not sure that some of this black may not be caused by the condition of the water, as I have noticed that fish in certain ponds keep clear whilst other ponds have the orfe very spotty. When they do get black markings they do not appear to lose them again.

To succeed with this grand fish, let me repeat:—plenty of room, fresh cold water and as much live food as you can supply.

A. Boarder

## Aquarist at Home

(Continued from page 11)

conservatory also houses a fine collection of cacti and succulents.

Both father and son are of the opinion that correct feeding and conditioning are of prime importance, especially when trying to spawn the egg-laying fishes. A great deal of time is spent in live food collection and normally every tank contains live *Daphnia*. Other foods used for conditioning are chopped earthworms, shrimps and other fish. Fry are at first fed on cultured Infusoria (that obtained from hay is considered to be most successful), then micro worms, screened *Daphnia* and *Cyclops*. Finely ground earthworms are also used, particularly for the fry of the labyrinth fishes.

Porridge is used for micro worm culture and both these and Infusoria are always ready for use. Proprietary foods are not used in this establishment; if live food is unobtainable or only to be found in small quantities, dried *Daphnia* and Bemax help out the rations. A rigorous system of culling the broods is practised and all deformed or diseased fishes are destroyed.

Mr. Dennis Wright was the 1953 president of the Peterborough and District Aquarists' Society and, although the work in the fish-house leaves little spare time for attending meetings, he nevertheless takes a keen interest in the activities of this society and is a valued helper at the annual shows. The partners exhibit regularly at shows within easy travelling distance and an impressive array of trophies, diplomas and prize-cards are proof of their numerous successes.



# Making Sure that Fish Keep Alive

by W. L. MANDEVILLE

(Continued from last month's issue)

IT is not possible to move in aquatic circles for long before becoming aware that fishes do not breed, rarely die, and never get killed. The successful fishkeeper tells us that "he" has bred *gracilis*, *rosaceus*, etc., or that "he" has spawned his veiltails, and the successful fishkiller informs us that he has "lost" his pair of angels, or "lost" a hatch of fry.

In the first instance, if the speaker is a competent aquarist, we assume that he has induced his fishes to spawn, and reared a percentage of the resulting fry, but very often it means that his fishes have spawned with no inducement other than putting them into a tank where they can do so without hindrance; but whilst the association of one's self with success is a natural human tendency, and does little harm, the disassociation of one's self with failure is an "ostrich-head-in-the-sand" tendency, and is best avoided.

The value of casualties—if such a description can be justified—lies in the genuine attempt to discover the cause, and often the cause is quite natural. Weak hearts, poor nervous systems, and ineffective respiration are commonplace among fishes (and exuberant fishes have been known to crack their heads against the cover-glass). The fact that fishes comprise one of the largest links in nature's food chain—being food for each other, and for countless birds and mammals, to say nothing of what is known as "the harvest of the sea"—emphasises that the survival of fishes depends more on prolificacy than on quality of physical structure.

Many casualties are accelerated by transport hazards. Enzootic, and epizootic diseases are encouraged by the close contact inseparable from economic transportation. Shock, during the repeated nettings necessary to effect distribution from breeder to wholesaler, wholesaler to retailer, and retailer to you, takes its toll of good fishes. Fish-cans, used for transport, with bottoms that distort when lifted, and return to normal when set down (each movement being accompanied by a minor thunderclap) are not conducive to long life. The adoption of plastic bags, and the use of antibiotics in transport water, indicates that the "trade" is striving to reduce these hazards, for they cause financial loss and customer dissatisfaction; but each unit in this distributive chain does purchase living fishes, and a little thought and care will keep them so.

## Settling in New Purchases

Rest is the first requirement of newly acquired fishes. This is easily provided by keeping them for a time in moderate light, and with as little disturbance as possible. On arriving home, the temperature of the carrying jar should be equalised by floating it in the tank intended for the newcomers. At the same time, a second glass container of clean water should be equalised in like manner. The fishes should be netted out of the carrying jar, and placed in the container of clean water. (If the water in which fishes are transported is discarded, the risk of infection is reduced). A little duckweed or similar small plant on the surface of the container will provide shade, and the fishes will rest. The other occupants of your tank will provide company without being able to make contact, and providing that the

container is large enough to accommodate the newcomers for about 24 hours without distress, valuable time for inspection is gained, and the opportunity for isolated treatment of disease if necessary, is provided.

With the laudable intention of ascertaining the cause of death, many carcasses are sent to Mr. W. Harold Cotton (who conducts the post-mortem examinations for *The Aquarist* readers) with a query such as: "Can you tell me, please, what killed this fish?" It would be interesting to know how often he is tempted to reply, "You did!" but Mr. Cotton is a fish pathologist, and seeks, among the many possible causes of death, for the one that delivered the final blow, but the value of his work is lessened, unless the owner of the fish investigates his own activities prior to the decease of the fish, and in many cases the answer lies there. From my own records, 75 per cent. of my casualties were avoidable—which means that I caused them.

## Toxic Hazards

It was a sad day when I discovered that the rubber tubing (used for airlines from the aerator) fitted into the hole in the diffuser stone. I decided that "stems" were unnecessary, and, months later, casualty after casualty (traced eventually to the free sulphur dissolving out of the rubber tubing) caused me to revert to glass stems, and the casualties ceased. An enthusiastic cinema attendant, helping me to fill up a large tank at a cinema, stressed rather expensively that detergents are not an asset in a tank of fishes, and that it is wise to reserve water-carrying utensils for aquatic work, and not to use any old can that is lying around—or any new can for that matter—unless the cold water is put into the utensil first, and the hot water added afterwards. To reverse this procedure increases the risk of dissolving into the water any galvanising salts from newly galvanised ware, and any scums that may have accumulated on the household bucket.

This also stresses the risks inherent in using water from the household hot-water system. Whether it is a galvanised or copper installation, it will not improve with age from an aquatic point of view, and whilst it may be comparatively safe at low temperatures, the risk increases when the system is kept continually at higher temperatures. Freshly drawn water, heated especially for the fish tank, is the safer method.

It is common knowledge among experienced aquarists that limestone, marble, fluor-spar, etc., will produce conditions which are fatal to fishes when these materials are used to decorate a coldwater tank, and have the same result, only much more rapidly, when used in a tropical tank. These calcium carbonates can be seen decreasing in size as they disintegrate and dissolve into the water, and the occupants of the tank decrease in numbers proportionately.

It is necessary to mention this well-known hazard, not only because newcomers to the hobby appear to be unable to resist these attractive "rocks," but even experienced aquarists, for reasons of economy, sometimes use shingle containing these materials. Recognised suppliers of aquarium compost usually test for free alkali, and willingly guarantee freedom from it. Shingle from an unknown source should be tested with acid, and if the presence of alkali is indicated by the rising bubbles, the material should be neutralised with a mild acid, and then washed thoroughly.

## Feeding Risks

Reference to feeding records will often indicate the cause of unexpected casualties. Fishes rarely starve to death, but sudden access to a well-liked food—even a food as valuable as *Daphnia*—will frequently be followed by casualties, for



"gorging" is almost a certainty. The greatest risk of gorging exists in the community tank where competitive feeding causes fishes to grab what they can whilst it is there; the fault is not in the food, but in the method of feeding. A shake of dried food into a net of *Daphnia* will not only dilute the rather rich animal protein, but also steady up the rate at which it is taken by the fishes.

The attractive sight of a group of fishes milling around a white-worm feeder is one that appeals to most aquarists, but a little closer observation will reveal a tremendous amount of bullying, with the possibility of the weakest fish being injured, and the certainty of the strongest fish getting most of the worms—probably more than is good for him. It is wiser to scatter the white-worm into the tank and to make the occupants "seek and find."

In breeding tanks I reared many batches of lusty planarians and "lost" several hatches of fry before I decided that willow root, cairns of stone, or bunches of raffia, were more certain to be free from these pests than any plants. Even when the greatest care is exercised, these, and other pests, become established in the rearing tanks where live food is used, and when plants are taken from these tanks for use as a spawning medium, the pests arrive with them. Frankly I have yet to learn how to sterilise a plant thoroughly and still be able to recognise it as a plant. The fancy-goldfish breeder who uses plants from a pool for spawning, should study the section of his text-books dealing with diseases carefully—he will need the information.

Careful reading of this series of articles will have revealed the opinion that diseases are introduced into our tanks, that malnutrition is avoidable, that gluttony is fatal, and that healthy fishes—living their natural span (which is rare in nature) and reproducing themselves, are within the compass of our ability if we put our minds to it. But if the question "What is the greatest menace to fish life?" were posed to my fishes—I would not wait for the answer!

## Undersea Exploration

IT is reported that the B.B.C. has made arrangements for the rights of three films to be made by Commander Jacques-Yves Cousteau. A voyage of exploration, which will last approximately a year, is to be made in the Mediterranean and the Aegean Sea and the Corporation is contributing to the cost of the expedition. It is hoped that one of the films will be ready to televise during the summer. Will the expedition make any startling discoveries? That question will have to wait until the first descents are made, but it is likely that the films may contain shots of submarine creatures never before seen by man, creatures even more fabulous than the much-publicised coelacanth!

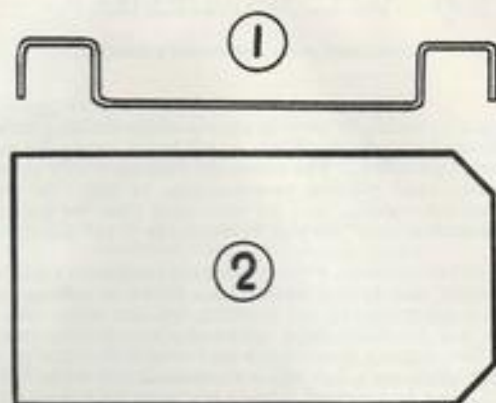
R. W.

## New Arrival

A CONSIGNMENT of clown loach (*Botia macracantha*) arrived at London Airport by B.O.A.C. York freighter from Singapore recently. It is believed to be one of the largest to have left Sumatra, to which the fish are indigenous. Part of the consignment was sent to America and some of the fish have been disposed of to London aquaria and dealers for sale to fish fanciers.

The clown loach, which normally grows to five inches, is deep gold in colour with black stripes. Most of those received in the present delivery are about two inches long. The importers, Exotic Trade Ltd., waited approximately a year for the consignment to be collected.

## A Rust-Preventing Aquarium Cover



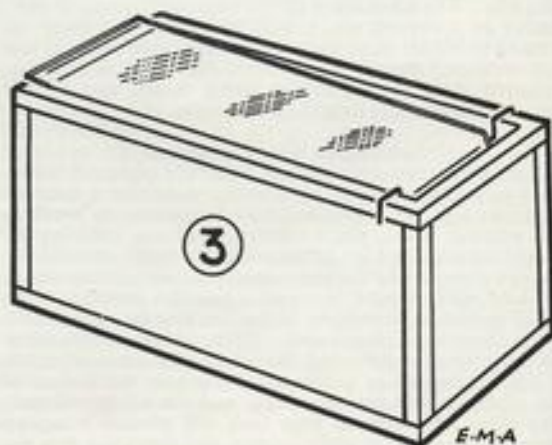
1. Shape of bent wire 2. Shape of glass sheet

AFTER experimenting for a number of years without much success I have at last found a method of preventing rust on the top of tanks, which might be of use to fellow aquarists.

Having devoted six tanks to the sole purpose of breeding fighters I have been constantly annoyed by the fact that by lowering the water and thus causing more condensation drops my breeding efforts have been sabotaged by the eggs being knocked out of the nest. But now, at last, I've found a solution to the problem, as follows:

First, get a long piece of stout wire and cover it with channel rubbering, then bend as shown in diagram 1. Cut the glass to fit on the inside of the top of the frame. The end of the glass is cut as shown in diagram 2 to allow for the width of the wire rest, previously made. This gives a nice slope to your cover glass, prevents rusting of the frame and solves the fighter nest problem.

Victor Hillman



THE AQUARIST



# Blue Gularis for the Tropical Breeder

by JOHNSON H. HOOD

**I**F we wish to enjoy the beauty of the rose at close quarters we must endure the thorns, for beauty is a thing that is rarely unalloyed. The blue gularis is among the handsomest of fishes but his disposition does not always reflect his looks. It is not that he is a bully (except he may misuse his spouse at breeding time) or that he is quarrelsome (except when overcrowded with his own kind) but that nature has endowed him with an over-generous mouth that can accommodate a three-quarter inch fish. Having revealed the "awful truth" let us turn to his brighter side, for once his full four inches is seen, to say nothing of his yawn, no one but a fool would take unnecessary risks.

The body colour of the male is blue, mottled with dull red markings and inclined to be barred towards the caudal. The lip of the large mouth is bright blue, the eyes ringed, and the body slender for the length. The pectoral fins are large, tinged blue, with bright edgings, and are in constant motion. The pelvics are very small; the dorsal long, ending in a point; the anal broad, fringed and pointed at the caudal end, all being of a bluish-yellow colour and marked with dull red or grey-blue streaks. The caudal is most striking. The upper, middle and lower rays are extended into points, a delightful and distinguished feature.

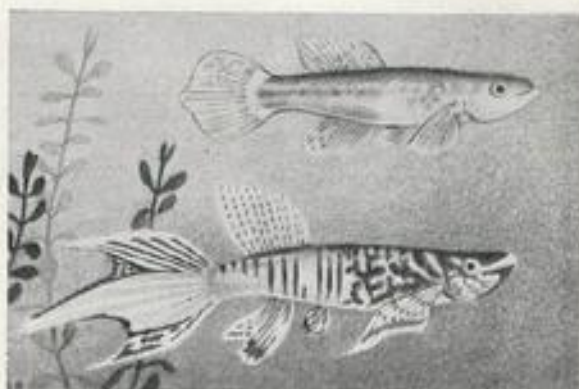
His coloration is enhanced by an impressive slash of orange (yellow in some specimens) in the lower lobe of the tail, together with a delicately etched pattern on the lowest extension, relieving the general blue-yellow cast with red and grey streaks common to the other fins. The female is quite unlike the male, as is usual in most *Aphyosemion*. Her length rarely exceeds three inches. Her body is olive-brown mottled with dull red markings, and the fins are all tinged with green. The caudal is rounded and much smaller than that of her distinguished partner.

## Long Hatching Time

When breeding gularis one must have a little patience for the eggs take quite a time to hatch; also such pests as snails, planarians, *Hydra* and the like, must be eliminated from the breeding tank, for they would have plenty of time to nullify your efforts and those of your fishes. Having issued that warning let us turn to the problems of feeding, water, temperature and, last but not least, the incubation period.

In the matter of food I found gularis most conservative creatures. Once they become accustomed to a food it is sometimes difficult to induce them to change. Their native African waters provide a constant supply of mosquito larva throughout the year, and upon this diet they feed almost exclusively. In aquarium life they will take *Daphnia* (sometimes), bloodworms, ghost larvae, mosquito larvae, and small chopped earthworms. To condition my pair I used bloodworms and small chopped earthworms. When spawning they had an exclusive diet of bloodworms to the tune of 80 per day.

Knowing how important it was to avoid pests I prepared the 36 ins. by 10 ins. by 10 ins. breeding tank carefully, sterilising with ammonia and vinegar, and washing well with plenty of hot water. Fresh rain water filtered through cotton wool was used for safety, and was acidulated by boiled peat which formed a quarter of an inch thick carpet over the bottom. To each gallon of water a teaspoonful of sea-salt



Pair of blue gularis (*Aphyosemion coeruleum*), female above, male below

was added. The pH was 6.7 and the hardness 3.5°. A thick matting of Indian ferns crowded the surface while the roots trailed the peat. The temperature ranged from 71° to 75° F., achieved with base-heating.

As soon as the pair was placed in the tank spawning commenced. The male rose above the female, forcing her down on the peat, and when the female had selected a place to spawn he took up a position alongside, vents touching or almost touching, and after much trembling the fertilised egg was deposited in the peat. This procedure was repeated every day, while the appetites of the fish increased greatly. After spawning for about two weeks the parents were removed and the eggs left to hatch. At no time did I see a fertile egg but an odd infertile one was noticed which appeared about one-sixteenth of an inch in diameter. During the incubation period the temperature varied from 68° to 76° F.

On the 31st day after the parents had been placed together I noticed two fry, and by the end of the fifth week over 20 could be seen. Knowing that more would probably follow I fed graded pond Infusoria only, to avoid the early hatched fry jumping too far ahead in size and devouring their younger brethren. This trick must have worked for I managed to rear 68 fish up to 1½ ins to 1½ ins. in length in that tank. I may have lost a few through cannibalism but it could not have been many. A newly hatched gularis is about one-eighth inch long and looks similar to a baby lyretail.

I gradually increased the size of the food until the full-grown *Daphnia* stage was reached. As I had access to a good supply of earthworms I began feeding small ones chopped up finely. The growth was accelerated and shortly *Daphnia* was refused unless hunger drove them to eat it. At five to six weeks sexing was possible, the average size being over 1½ ins. so all were removed to a larger tank.

In conclusion, I should point out that the eggs appear susceptible to strong light. Also that a higher temperature is supposed to lengthen the incubation period, although I have not proved this supposition, being anxious to obtain the hatchlings at the earliest possible moment. If there is a marked difference in the size of the young it would be wiser to segregate them, because even if the smaller ones are not eaten the larger ones will not let them feed and their growth would be stunted. It requires care and patience to breed this handsome fish but it is well worth the trouble.



## OUR EXPERTS' ANSWERS TO READERS' QUERIES

About two months ago I bought a blue male fighting fish. From the start it did not seem too friendly with the other fishes in my community aquarium, but just lately it has developed into a persistent bully, and has already killed a small angel fish. Can you please give me a reason why it should behave so badly?

Siamese fighting fish are very handsomely coloured, knowing, and highly interesting to keep and breed, but—they can be very vicious and destructive of other fish life. Some specimens are better behaved than others, and will live on good terms with the other occupants of a community tank. Others just cannot behave, and make themselves a nuisance by fin-nipping and driving timid members of the community away from food. The best thing you can do is to isolate your fighting fish from its companions, or place it with fishes quite capable of taking care of themselves—for instance, bony-plated catfishes, paradise fish, larger characins and the like.

I am a newcomer to tropical fishkeeping, and wonder whether you can help me. I have a home-made 36 ins. by 15 ins. by 15 ins. aquarium backed by a cement slab scored with deep lines and fissures to resemble natural rockwork. Although I soaked the aquarium for a week or two before introducing any fishes, those I have introduced since setting up the aquarium with plants and compost soon died. I have now emptied the aquarium of plants and fishes and added sufficient phosphoric acid to correct high alkalinity of the water (discovered after test). How long will it be before I can set up the aquarium again and add fishes?

Sometimes it takes quite a time for the lime to work out of fresh cement-work. Our advice to you is to leave the aquarium to soak for a further fortnight, and rinse out well before filling up afresh. It would be a good idea to strain the water used to fill up the aquarium through scalded peat. Peat water is naturally acid, and both fishes and plants should do well in it.

I have just had a tropical aquarium installed in our lounge, but every time the thermostatically controlled heater switches on and off it sets up interference in our wireless and television sets. Can this interference be stopped, please?

Yes. Your local dealer in radio components should be able to stop the interference by the insertion in the circuit of suitable smoothing condensers.

My two tropical aquariums are lit by warm white fluorescent tubes, but although the water keeps crystal clear and the fishes very healthy, the plant life refuses to prosper. Can you give me any explanation for this, please?

Plants do not grow at all well under a white light such as is given by some fluorescent tubes. You will notice an improvement if you change to a pinkish light, or the yellow light given off by ordinary electric bulbs.

Can you tell me what substitute green food I can include in the diet of fishes which normally eat a great deal of algae?

Most greenstuff-eating species will eat and thrive on the proprietary cereal food known as Bemax. Chopped lettuce, cooked and finely chopped spinach, and common duckweed collected from lakes and ponds are taken freely by fishes such as *Jordanella floridae*, barbs and other vegetarians.

Would it be safe to use water from the hot water tank to fill an aquarium?

We do not favour the use of water drawn from domestic hot water systems unless it is certain that the water is not stored and circulated through copper pipes; water kept in copper containers for any length of time is poisonous to fish life. However, if the water is allowed to run away

from the tap for a few minutes there is not so much risk of harming the occupants of the aquarium by using it.

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.

The plants in my aquarium turn brown. Please can you tell me why they lose their fresh green appearance?

One reason why plants turn brown is lack of light. Another reason is rust falling from the underside of the aquarium frame into the water. If your aquarium is not brightly illuminated by natural light or electric top light, we suggest that you plant it with species which grow very well in partial shade such as *Sagittaria natans*, fine-leaved willow moss (*Fontinalis gracilis*) and the *Cryptocoryne*.

I have my aquarium heated by two 60 watt heaters, but find that there is a difference of more than ten degrees between the bottom of the aquarium and the top. How can I remedy this, please?

Perhaps your heaters are placed in a vertical position, and close to each other rather than being set close to the bottom in a horizontal position, one at each end of the aquarium. Placed like this you will find that the heat will be more evenly distributed, and though there will be a slight difference in temperature between the bottom of the water and the top, we do not think the difference will be anywhere so much as 10 degrees.

I have a 24 ins. by 12 ins. by 12 ins. aquarium which has been going fine until a week or two ago. Now a green baize-like growth has appeared on the glass sides and rockwork. It is most unsightly: will it harm the occupants of the tank?

At this time of the year all sorts of green growths make their appearance in the naturally lit aquarium. They may prevent one seeing one's fish clearly; they may choke higher plant life, but they are not in themselves harmful to fish life. In fact, many species of fish like to browse on the green growths, and not a few species should have them in their diet. All the same, these growths can become very troublesome, and the best thing to do to keep them under control is to reduce the amount of light entering the aquarium from the top and sides by introducing floating plants, and planting more tall-growing species along the side facing the source of natural light.

Although I do not like to do it, I must soon make up my mind and kill a badly diseased fish. Can you tell me the surest and quickest way to do this?

Like yourself, we do not like to kill a fish; but it is kinder to do it and get it over than leave the sufferer to face weeks of misery. Perhaps the quickest way to kill a fish is to grasp the tail end of its body in a piece of cloth and bang its head very sharply against a table-top or brick wall. If this is done with force death will be instantaneous. Small tropicals held in a piece of cloth on a flat surface can be killed with a blow from a piece of wood.

Before I moved house all my fishes were in perfect health, but since setting up the tanks afresh I have had nothing but trouble. Do you think it has been caused by the water, which is very hard at my new address?

A change from soft water to hard water can have a very



bad effect on both plants and fishes. It is like transporting a family from Manchester to the high Andes and expecting them to feel no change in their general health. We do not favour doping the water with chemicals to reduce the pH value, but we think you will notice an improvement if you can arrange to strain or filter your aquarium water through scalded peat. In a short time, this should result in your water becoming more acid and more suited to the needs of your fish.

Although I keep emptying some of the water out of my aquarium and refilling with fresh heated to the same temperature, I cannot see the fishes in it for a green fog or haze. How can I clear the water, please?

The green "fog or haze" in your aquarium is caused by innumerable microscopic plants—free-swimming algae. Given time, algae will die down of their own accord and leave the water quite clear. But every time you add fresh water you prolong their existence, and, indeed, help them to multiply. Too much strong light is one of the causes of green water. Another cause is lack of sufficient

higher plant life. We advise you to bear with the green water; but in the meantime, set more *Vallisneria* or *Sagittaria* plants in clumps along the back and ends of the aquarium.

A gardening friend has told me that common moneywort or "Creeping Jenny" can be used as an aquarium plant. Is this correct?

Creeping Jenny grows quite well in cold water but soon grows stringy and dies down in the tropical aquarium. It can, however, be used as temporary decoration, and replaced by fresh stock when it becomes too drawn and lifeless.

Can you tell me whether it is dangerous to use an aluminum hood to cover my aquarium without an intervening sheet of glass?

Although aluminium is one of the least dangerous metals to have in contact with water inhabited by fish, we strongly advise you to place a sheet of glass between the hood and the top of the frame to prevent droplets of moisture falling back into the aquarium.

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## COLDWATER FISHKEEPING QUERIES answered by A. BOARDER

Can you tell me of an adhesive, which would join smooth stones together for decorating a tank, which would be harmless to the fish and plants?

Make a mixture of one part cement with two parts fine sharp sand. This will cement the stones together quite well as long as they were washed clean first. Allow to set for three days and then soak for another three days. Scrub well and the result will be quite safe in the tank. Even without a good washing the small amount of free lime would not be enough to do harm unless you used a large amount of the concrete in a very small tank.

Which sunfish would be the best to try to breed in a tank 24 ins. by 12 ins. by 12 ins. and how should I set about breeding them?

You might do better with the black-banded sunfish (*Mesogonistius chaetodon*), but most of these sunfish or bass can be bred in ponds or large tanks. The blue-spot (*Epiplatys gloriosus*) and the orange-spot (*Lepomis isomilis*) can also be bred from, but it must be realised that they all grow to a fair size; some kinds reach a pound in weight. They all make a form of nest in the sand and seem to prefer a shady, secluded spot for the nest. The male makes the nest, guards the eggs and the young when hatched. As with most other types it is essential to have one pair only in the tank and to remove the female when the eggs are laid. Although the adult sunfish grow so large the smaller specimens will often breed. They are difficult to sex and the fuller abdomen of the female is one of the surest signs of identification. All these fish show a decided preference for live foods such as worms, *Daphnia* and mosquito larvae, though some can be educated to take dried shrimp and shredded liver.

I recently bought two small moors and after a week's quarantine I placed them with two small fantails and three paradise fish. Now the moors are dashing about brushing their sides against the plants. I can see nothing on them. What is the trouble?

The actions of the moors indicated the presence of flukes. These are so tiny that you would not be able to see them without a magnifying glass. They are thinner than hairs and almost transparent. A Dettol bath should be given immediately; a half-teaspoonful of Dettol is stirred into a gallon of water. Place the fish in this, preferably in a

net. Watch it for five or ten minutes, then it must be removed to fresh water. Should the fish turn over it must be removed at once. The amount of Dettol to the gallon varies a bit according to the size of the fish and the length of time the fish is left in. Some aquarists recommend a teaspoonful to a quart of water, and leave the fish in for 15 seconds only. I think that a weaker solution with a longer immersion is the better plan.

Will you please give me some information on breeding earthworms in wooden boxes or sinks? I find difficulty in finding sufficient during the winter.

Earthworms take some time to increase in numbers when artificially bred. They lay eggs and these take some time to hatch, according to the warmth of the soil. You say the soil in your garden is light and sandy. You should empty all your tea-leaves and potato peelings in one place and this may encourage the worms to collect there. Some aquarists place tea-leaves and ashes in one large heap and are able to find small red worms there most of the year. It must be remembered that in dry times the worms go deeper or curl up and so it is essential to see that the heap is kept moist. A sack or two can be used to cover the heap, and will tend to keep it cooler and dark. I advise you to breed white worms as these can be bred at all times of the year and under the correct conditions they will increase rapidly. I described a good method in the January issue of *The Aquarist*.

I made a garden pond last October, and have had it filled with water all the winter. It has been well washed out. Will the water be safe for fish this month?

The pond should be quite safe to use now. I believe this fetish of cleaning a concrete pond can be carried too far. In my own experience, many years ago, I remember washing a pond out once, and then when it was refilled some fantails were put in right away. They lived for over 17 years. As I have said before, if a pond is made correctly and the concrete well mixed, there is only a small amount of free lime on the surface. Once the concrete has set the water does not penetrate it and the lime cannot escape. If a pond is made well, dried slowly, filled with water, left a week and then given a good scrub with a stiff broom or scrubbing brush, it should then be safe for goldfish. It mostly depends on the depth of the water. If this is shallow then



the concentration of lime could be dangerous, but if the pond is about two feet deep I do not see that there would be anything to fear.

**My pond is in the shape of a rough triangle with sides about six feet long. It has a depth of from six inches to two feet. Will it be suitable for breeding?**

The pond would have been better a bit larger and half a foot deeper in places. Still, it is large enough to breed goldfish. All you need do is to provide some fine-leaved water plants at the shallow end only and remove them to hatching tanks as soon as enough eggs are laid in them. The smaller the pond the more danger there is of the parent fish eating the eggs and fry.

**You recommend planting water plants in individual pots. What size should the pots be?**

As large as flower pots! Seriously, the size depends not only on the size of the roots of the plant but also on the type of plant. For water lilies a pot of about seven inches in diameter would do, whereas for *Myriophyllum* one of four inches would suffice. The type of lily also would make a difference in pot size. Some kinds will grow in six inches of water, obviously the miniature ones, and they require smaller pots. I recommend pots for planting because when the pond is cleaned out each year, and this is imperative for small ponds, the plants are easily removed from the pond for cleaning. Potting also tends to restrict the growth of the plant and only experience can tell you how necessary this is with some plants.

**I propose to make a waterfall from a small pond into a large lower one. What size piping shall I need, what type of pump and where can I get it?**

Any of the leading aquarist dealers who regularly advertise in *The Aquarist* would be able to quote you for a pump. The usual kind is of the fan type. That is, a small electric motor revolves a fan at speed. This drives the water forward, like the propeller of a ship in reverse. The only point to remember with this type is that it does not work by suction and so it is necessary to get some water up to the thrusting fan before it can work. A valve and strainer is usually fitted to the pond end and to start the water running one must fill the feed pipe with water before starting the motor. When I use one for emptying the pond I start the motor and then give a strong suck to the outlet pipe. This draws the water up the feed pipe to the fan chamber and the water continues to run. If you use this type of pump for your waterfall it needs to be housed and hidden near the pond. The fan should be so placed that water is in contact with it all the time, then it will be self-starting when switched on. A half-inch pipe would do, but don't use copper or brass, as these metals can harm the fish.

**I have some young veiltail goldfish and one or two are standing on their heads and off their balance. What is the cause and can it be cured?**

Many of the so-called deep-bodied fishes are subject to this "swim bladder trouble." It is often noticeable when the weather turns colder. Some fish are born with the tendency to develop this trouble, but others can get it through a chill or by an upset in their digestive system. Usually a fish improves in warmer and shallower water. Do not give much food to such fishes and if you feed at all give no starchy foods, just worms (white or earth), shredded liver, *Daphnia*, glass worms or chopped, cooked cabbage.

**My pond was covered with ice for a time and when it melted the water looked almost black, and the goldfish were at the top gasping for air. What was the cause and what should I do?**

The water in your pond had gone foul. This may have been through several reasons. Many decaying leaves (including water lilies) and decaying uneaten food could have caused the trouble. The impurities were there before

the ice. As the matter decayed so foul gases were given off. These escaped mostly from the surface of the water and fresh oxygen was absorbed there. This allowed the fishes to breathe. Once the pond was frozen over the foul gases were trapped underneath and the ice prevented oxygen from entering the water. Once the ice melted the foul water could be seen. The only thing to do in such cases is to see that plenty of fresh tap water is added to the pond as soon as the ice melts. A lot of this trouble in ponds is caused by pondkeepers continuing to feed the fish when the weather has turned cold. The fish become very quiet and do not wish to feed so much. All the food uneaten soon causes trouble. In small ponds the presence of a few dead earthworms will soon cause the water to turn foul.



Photo: Laurence E. Perkins  
Young fantail goldfish demonstrating the alert and vivacious appearance of healthy fish

**When I wish to buy some goldfish is there any easy sign to look for to indicate a healthy fish?**

The surest sign I know of a healthy goldfish is the erect dorsal fin. Look at the centre fantail in the photograph. Note the dorsal fin of this fish; as long as you see a fish carrying this fin as upright most of the time you will know it is healthy. It would be easier to give you some signs of ill-health. Some of them are:—fins carried in a folded position most of the time, fish wobbling aimlessly at the surface of the water blowing bubbles, hollow bellies and drooping tails and lack of desire to root about at the bottom of the tank looking for food.

**How large an aquarium, and stocked with what fish and plants, do you suggest getting for an outlay of two pounds? I do not want anything which needs heaters, thermostats, etc., and I want fish as colourful as possible, easy to keep and breed, but not goldfish.**

Look out for a second hand tank which is about 24 ins. by 12 ins. by 12 ins., or buy a frame and glaze it with coarse glass except the front piece. Collect some water plants from a river or stream and buy a pair of paradise fish. This should cost you less than two pounds and you have a good chance of breeding the fish in the summer. Paradise fish will live well in an ordinary living room temperature all through the year. I recently found some of mine in an unheated outdoor position lying on their sides at the bottom of the tank. I placed them in slightly warmer water and they were swimming about as usual in a few minutes. The temperature of the water where they were at first was 34° F. If they can live through this they will certainly survive in an indoor room.



# 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.

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

### White Spot Treatment

MR. A. Brearley's suggested treatment for white spot using T.C.P. sounds very attractive (*The Aquarist*, February). He does not, however, tell us whether at the end of the treatment one needs to change the tank water. Also, does light cause T.C.P. to alter—by direct light is direct sunlight meant or would this term include the normal room electric lighting and/or diffused daylight as well? If there are no unforeseen snags the T.C.P. treatment will be very popular, as this chemical is available at short notice and the dosage advised is most convenient to administer.

D. BOXALL,  
London, W.2.

### Postal Plants

AS a nurseryman who sends out a great many water lilies and smaller aquatics during the course of a season I take exception to Mr. I. McCallum's complaint about plants drying out in the post (*The Aquarist*, January). We always send out such plants carefully wrapped in moist, live sphagnum moss, and sent in this way plants will keep perfectly for a fortnight; in fact some water lilies I received last year from France were longer than that in transit and were growing strongly when unpacked.

I wish Mr. McCallum luck when one day he has to unpack a portion of *Azolla* or *Salvinia* from his vermiculite. Such plants are always sent out wrapped in two or three layers of moist newspaper and then enclosed in the sphagnum to save the customer the bother of unpicking these small plants from the tangle of moss.

T. C. CLARE,  
Ascot.

### Holed Angel

IN reply to your correspondent in the February issue of *The Aquarist* concerning my "watch-chain" angel fish, this specimen did actually come from Germany. But about four years ago I had one absolutely identical which came from English stock and was sold to Mr. Couzens of Seven Kings, Essex; when I saw that fish nearly twelve months later it was a fine mature male looking after a family.

A large number of aquarists will remember my "arch-angel," which was born with part of its body missing in a semi-circle from the base of the caudal peduncle to the third ray of its anal fin. This also was an English-bred fish and it grew into an otherwise perfect specimen of a

body size of 2½ ins., when, I am sorry to say, I lost it through my own neglect.

C. WRIGHT,  
Kingston Exotic Fisheries, Surrey.

### The "Bennett Cure"

REGARDING the claimed cure for swim bladder trouble (*The Aquarist*, March) surely it is claiming a lot to say "your fish will be cured"? It could be so if all swim bladder troubles were the same, due perhaps to incomplete air introduction at birth.

However, I think that many cases have physical defects, and to dump a fish into a temperature raise of 50°F. will certainly not cure a defective organ and is possibly going to cause many a beginner to experiment unkindly with an incurable case.

B. CALROW, *President*,  
Hendon and District Aquatic Society.

ONE well-intentioned "sure cure for swim-bladder trouble" cannot affect over-developed or undersized air-sacs, neither would it ease the pressure caused by chronic constipation, nor clear up inflammation of the organ concerned. It is drastic treatment for one condition only—semi-deflation caused by prolonged chill.

If a porous rubber ball is partially deflated by pressure, it can be restored to shape by immersion in hot water; that is the principle of the "Bennett Cure." A rubber ball is a simple structure, but an air-sac is a complex organ, and re-inflation can be effected with a gradual rise in temperature, without risk to heart, gills and nervous system.

The "gasp" when the fish is suddenly transferred from 40° to 90°F. is due to shock and is merely incidental. Very few teleostean fishes retain any communication between air-sac and the alimentary canal (physostomatous condition). After the fry stage this communication is usually obliterated, and the air-sac becomes a completely closed cavity (physoclastic condition). The resemblance to "fry behaviour" has no bearing on the matter.

The main purpose of this letter is to point out that having been told to remove the fish from water at 40°F. and to replace it in water at 90°F., we are not told whether to return it to the cold water again—or whether to wrap it up as instructed under "Post-mortems" and send it to Mr. Cotton. I do feel that if the "cure" is taken too literally, Mr. Cotton's letter box will go on overtime.

W. L. MANDEVILLE,  
Birmingham.



### Florida Flag Fish

I READ with interest the article by Pisces on *Jordanella floridae* (*The Aquarist*, November, 1953). A little while ago I succeeded in getting this delightful little fish to breed. The tank was well planted with *Hygrophila* and *Ambulia* and the surface partly covered with *Riccia*. Water in the tank was old and mature so I didn't bother about taking pH.

The fishes' diet consisted of live food and large quantities of lettuce and boiled spinach. They were introduced into the tank at early morning and spawning started almost immediately. The female darted about the tank closely pursued by the male. They came to rest at one corner of the tank and here the female shed about 30 eggs. I discovered a number of eggs in the *Riccia*, but later on these proved to be infertile and had to be removed. From then on the male ignored the female and I took it that spawning had ended, so I removed her from the tank. The male never moved from the eggs once, and he was continually fanning them.

The eggs hatched out in about four days at 80 F. I fed the fry on Infusoria mainly as I couldn't get enough algae to keep them going. A few days after they became free swimming the father was removed. From Infusoria they went on to brine shrimps and they made rapid progress.

Altogether I raised 20 fish. In breeding *J. floridae* I found that a great many of the eggs were not fertilized. I wonder if any other reader has encountered this.

JOHN MITCHELL,  
St. Helens, Lancs.

### Design for a Shallow Pond

READERS who have constructed, and those who intend constructing, the raised shallow pond with three-inch thick walls and a retreat, as described in *The Aquarist*, March, 1952, will be interested to know the results of the recent freeze-up in this locality, which was the severest experienced for well over 20 years.

The ice at its zenith was seven inches thick in the centre of the ponds and much thicker near the walls, and it sealed the ponds for just over a week. In the retreat it was an inch or more thick, and this is the first time it has been known to seal the retreats. A log of wood was floated in each pond with a view to taking the ice pressure, but as their displacement was never more than three inches, they had little or no effect below that depth. Roughly 40 inches of fish was in each retreat. The walls of the ponds stood the strain without any damage whatever, and not a single fish has been lost.

It may be an advantage, and would tend to simplify matters, if the retreat was built two feet deep without a lily bed, especially for ponds in the northern part of the country. As an experiment, the ventilation space in one retreat has been closed during the winter, and the fish have not shown any ill effects. This should tend to reduce further ice forming, and to prevent complete blackouts inverted clear glass jars are placed on the cover.

W. H. MACEY,  
Plymstock, Devon.

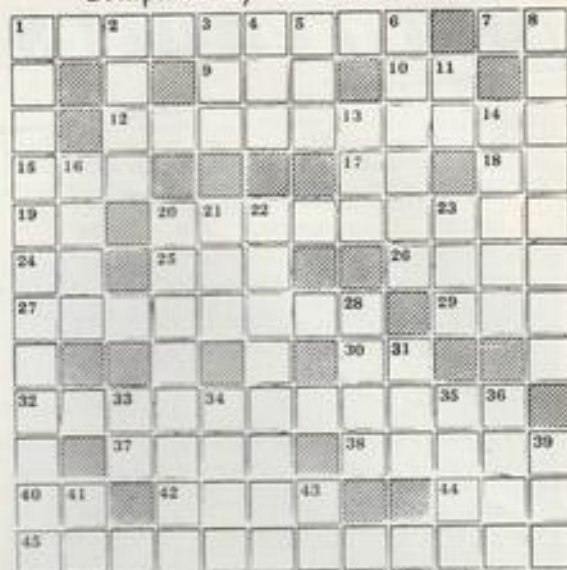
### Pearl-scale Fantails

I HAVE been interested to note that in the article on "bubble-eyes" in the February issue, reference is made to a new variety of fantail, known as the "pearl-scale" in China. I would like to point out, however, that these are not so very new, as I myself have been breeding them and am now ready to spawn from the second generation. My original stock I brought back from Malaya well over two years ago.

COLIN D. ROE,  
Shirley Aquatics, Nr. Birmingham.

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



### CLUES ACROSS

- Eleocharis acicularis* (9)
- The degree of acidity or alkalinity of water or soil (1, 1)
- One of the components into which an electrolyte is broken (3)
- Hail (2)
- Arrowhead (10)
- This bit is a tasty morsel (3)
- The answer is on and in fish-bone (2)
- Letter of credit (1, 1)
- It is less than a bite (2)
- A *Cryptocoryne* (9)
- The established church (1, 1)
- A dogfish starts a fuss (3)
- Bring forth young (4)
- This grass is *Cyperus alternifolius* (8)
- Dead (3)
- Is a char away from the *Anacharis*? North America (1, 1)
- Little brother of the great reed mace (5, 6)
- A plant, the stem of which dies every year (4)
- The octopus—*sepio* (5)
- Half a reed for sappers (1, 1)
- This seed is a fish lure (4)
- Anything soaked (3)
- Variety of *Anacharis* (6, 6)

### CLUES DOWN

- The art of cultivating gardens (12)
- The present month (4)
- Long light boat (3)
- French king (3)
- The eggs of this insect were once popular goldfish food (3)
- 5 down in shy surroundings for a mean dwelling (6)
- The floating water lily is *Eichhornia crassipes major* (8)
- Alternative of *cranda* (2)
- From head to — (3)
- Pertaining to the bowels (5)
- Mixed mate for a separate article (4)
- Had a beer (anagram) (4, 4)
- Once Home Secretary (3)
- Rarely used name for America (8)
- A favourite British drink (3)
- Notably dead Queen (4)
- To point at with a weapon (3)
- See 7 across (1, 1)
- French river (4)
- Fall in 31 down, young lady (4)
- Above (4)
- Watering place upsets the serpent (3)
- The Spanish part of *Elofa* (2)
- Small capitals in printing (1, 1)

### PICK YOUR ANSWER

- Which of the following species is not a characin? (a) *Aphyocara rubripinnis*, (b) *Phago maculatus*, (c) *Neotroptis ayaleopteris*, (d) *Pristella riddlei*.
- Corydoras kneri* is popularly known as: (a) the banded catfish, (b) the black-spotted catfish, (c) the blue catfish, (d) the bronze catfish.
- The genus *Neohabrobranchius* is native to: (a) East Africa, (b) North America, (c) South America, (d) West Africa.
- The flowers of the Madagascar lace plant (*Aponogeton fenestratus*) are: (a) Blue, (b) Red, (c) White, (d) Yellow.
- Featherfoil is a popular name of: (a) *Cabomba*, (b) *Ceratophyllum*, (c) *Myriophyllum*, (d) *Ranunculus*.
- "Neither battle the better . . ." The missing word is: (a) Herring, (b) Mackerel, (c) Pilchard, (d) Whiting.

(Solutions on page 24)



THE Aylesbury Aqualife Association is planning to hold a three day show in June at Aylesbury. Last month a table show of cold-water fishes was staged and judged by Capt. L. C. Betts, visiting the society from London.

FIRST of the two March meetings of the Basingstoke Aquarist Society was devoted to a talk by the chairman, Mr. F. Mapson, on care and maintenance of fish in aquaria. At the second meeting Messrs. S. W. J. Franks and G. Tappenden demonstrated various aquatic organisms to members with the aid of two microscopes. This newly formed club meets on the second and fourth Fridays of each month at 7.30 p.m. at the Cricketers Inn, Basingstoke.

A MONTHLY news sheet is now being produced by the Bedford and District Aquarist Society, the first issue appearing last month. The society is planning an evening visit by coach to the South Bank Aquarium in London.

EPISCOPE projected pictures were used in a "visi-quiz" held by the Blackpool and Fylde Aquarist Society in February. At a later meeting a practical demonstration of setting up an aquarium was given by Messrs. G. N. Hadley and V. Sharp.

FEBRUARY'S meeting of the Bristol Tropical Fish Club was attended by over 50 members and visitors. After a general discussion on aquarium maintenance a table show of barbs was held and winning fishes were those entered by Mr. W. Ashley (1st) and Mr. and Mrs. R. Jeffries (2nd and 3rd).

MESSRS. T. Armstrong and E. Hardisty brought along living specimens of their fishes when they gave talks at a meeting of the Carlisle and District Aquarist Society. Coldwater fishes were represented at the meeting by London shubunkins exhibited by Mr. J. Davidson. The meeting closed with a general discussion on fish breeding.

AT the first show held by the Catford Aquarium Society this year, for livebearers and saltwater fishes, over 150 entries were staged. Best tropical fish was Mr. R. Coombes' *twilfera* mollis and best coldwater fish the fantail goldfish shown by Mr. J. Davies.

RECENT talks given at meetings of the Chingford and District Amateur Aquarist Society have been on aquatic hints and tips by Mr. T. E. Butt, F.R.A.S., chairman) and



Photograph taken on the occasion of the presentation of a fully stocked aquarium to the Chingford Hospital, Paisley, by members of the Paisley Aquarist Society. This is the first hospital in Paisley to have an aquarium installed.

**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.

aquarium plant life (by Mr. C. W. C. Creed) Each speaker afterwards judged table shows.

WHEN an inter-club table show was staged between Clapham Aquarists' Society and Chelsea A.S. in February, Chelsea were judged winners by six points.

WATER is more than just "wet" to the aquarist said Mr. A. Simkins when speaking to members of the Coventry Pool and Aquarium

meetings. Particulars will be supplied by the secretary Mr. R. Rawlinson, 16, Wooner Lane, Chatterbox, Lancs.

CHIEF Engineer of Halifax Waterworks, Mr. A. L. Gray, told members of the Halifax and District Aquarist Society something about water at a recent meeting and showed some films on this topic. After the talk a competitive show of tropical and coldwater fishes was held.

AT a meeting last month at which the Mayor of Hampstead was present, members of the Hampstead Aquatic Society heard Mrs. W. M. Meadows give a lecture on practical experiences of breeding and rearing tropical egg-layers. Mrs. Meadows described several species and said that she always uses one male to each female when breeding except with white cloud mountain minnows, where she employs four males to drive three females. This species she has found to spawn continuously for 41 days. For breeding danios, Mrs. Meadows uses a 36 ins. by 10 ins. by 10 ins. aquarium having its base lined with coarse shingle and containing four inches of water. At a water temperature of 80°F, the male and female are placed on either side of a central dividing partition of glass, during the evening. Early in the morning 36 hours later the partition is removed for the fish to spawn for one hour only; if eggs are eaten before reaching the shingle it was advised that the water be lowered to 1½ ins. Mrs. Meadows gets over 300 fry from a spawning and rears these for the first few days of life with a drip feed of Infusoria cultured from cooked spinach and raw sliced potato medium.

NEW meeting place of the Harrow Aquarist Club is the Welldon Hall, Angel Road, Harrow, where members attend on the second Monday each month.

COMPETITION to select the best furnished 18 ins. aquarium among members of the Hertford and District Aquarists' Society at a recent meeting resulted in Mrs. E. W. Drury being declared winner and Mr. C. Whiskin second. A discussion on the exhibited tanks was afterwards held. This month the society is to see a film "Coral Wonderland", produced by the Australian News Service.

MEETINGS of the Hull and District Pond and Aquarium Society are now held on the first and third Thursdays of each month at 7.30 p.m. at the Co-operative Institute, Hull. The second meeting this month will be a talk on guppies by Mr. R. Willerton.

LEICESTER Aquarist Society have had Messrs. A. Manchester and T. Saville as speakers at their last two evening meetings.

ENTOMOLOGIST Mr. C. Henderson, who is also a member of Loughborough and District Aquarist Society, gave a talk to fellow-members on *Hydra* and water life through the ages at the February meeting.

### F.B.A.S. Assembly

A GENERAL Assembly of the Federation of British Aquatic Societies was held in London last month. It was announced that in view of



reports concerning falling membership figures from aquarist societies in many parts of Britain a committee had been formed to organise a publicity campaign for the F.B.A.S. on behalf of the hobby. After the treasurer had spoken of a satisfactory monetary balance for the time of year a motion put forward that the annual subscription required by the F.B.A.S. from affiliated societies should be reduced or that certain concessions should be arranged was discussed and defeated by an overwhelming majority. A short address was given by the Editor of *The Aquarist*, guest of the assembly, who gave his reasons for thinking that the causes of falling club membership were to be looked for in the clubs themselves and said that the phenomenon was not to be taken as indicative of a general fall-off of interest in the hobby. Two short colour films were shown before the close of the assembly. One depicted fighting fish spawning and the other followed the breeding habits of the black widow. These 8 mm. films are available for hire through the F.B.A.S. at a charge of one pound for one day plus 10s. for each extra day, excluding transit periods.

### Bulletin Review Notts "Bulletin"

IN the February issue of the Bulletin issued by the Nottingham and District Aquarists' Society is a report of the February meeting of the Coldwater section of the society. The losses experienced in fishes during the severe freezing period were discussed, and one member told of a gudgeon frozen solid in a sink; it was resuscitated without harm to it. At a meeting of the Breeders' Section, Mr. Inman reported a successful cure of fin rot by immersion of the fish in a solution of one gram of phenoxatol in four gallons of water.

### "The Canadian Aquaria"

FEBRUARY'S issue of this small publication of the Canadian Aquaria Society gives further news of the public aquarium to be maintained in Toronto by the society. In the aquarium is to be installed plant for water distillation and also storage tanks for the distilled water. This will be used for replacing evaporation losses in all the aquaria to avoid harmful accumulation of dissolved solids, and members will also benefit individually for supplies are to be made available to them.

"Tropical Topics" issued by the Aquarium Hobby Club of Indianapolis THIS American club magazine is a duplicated production and contains 10 pages of reading matter, size approximately 8 ins. by 11 ins., enclosed by a stiff paper cover. The editor is Bob Mahrling, who is to be congratulated on a well-planned bulletin. A number of excellent line drawings illustrate the articles and advertisements and the front cover of the Christmas number, the latest to hand, carried a tasteful sketch of an old-time festive scene together with seasonal greetings to club members. This issue contained accounts of breeding experiences, a report of the club's stand at the Indiana State Fair, and, amongst many other items, an interesting article on the effects of vitamins on fish life. This contributor reported that about 50 per cent. of the vitamins on the market were extremely toxic to fishes and that, furthermore, no guppy had survived over six months on a diet of vitamins! English bulletin editors who would like to exchange bulletins with this club should write to the Corresponding Secretary, Mrs. Beatrice Seal, 644, East 50th Street, Indianapolis, Indiana, U.S.A.

R. W.

### N.A.S. Show

THE seventh National Aquarium Exhibition to be staged by the National Aquarists Society in London on 10th, 11th and 12th June, is to have two additional classes for entries in the schedule. These will be a class for common goldfish open to novices, i.e. to those who have



## 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*. The design is pictured above (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

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

never gained an award in an open show, and a class for juniors' furnished coldwater aquaria, open to aquarists under 18 years at the time of opening of the exhibition. A new trophy to be presented for the best entry in the breeders' classes is the Blair Perpetual Trophy, presented to the exhibition by the now defunct Blair Aquatic Society. Schedules of show classes can now be obtained from the competition secretary Mr. C. R. Macdonald, 73, Tudor Gardens, West Acton, London, W.3, and the organisers are recommending that entries should be made at the earliest possible date.

## New Societies

**Ashford and District Aquarist Society.** Secretary: Mr. G. J. Downe, 13, Church Road, Ashford, Kent. Meetings: Third Wednesday each month, 7.30 p.m., at The Swan Hotel, Tufton Street, Ashford, Kent.  
**Fleetwood and District Aquarist Society.** Secretary: Mr. R. T. Birch, 10, Melbourne Avenue, Fleetwood, Lancs. Meetings: First and third Mondays each month.  
**Hertford and District Aquarists' Society.** Secretary: Mr. G. W. Brookfield, 42, West Street, Hertford, Herts. Meetings: First Thursday each month, 8 p.m., usually at 42, West Street, Hertford.  
**Stockport and East Cheshire Aquarium Society.** Secretary: A. Jordan, 47, Woodmoor Lane, Stockport, Cheshire.

## Secretary Changes

CHANGES of secretaries and addresses have been reported from the following societies:  
**Altrincham Aquarist Association** (Mr. D. Malam, Holly Bank, Grove Lane, Hale, Cheshire); **Carlisle and District Aquarists' Society** (Mr. E. Simpson, 51, Prescott Road, Longsowerby, Carlisle); **Kingston and District Aquarist Society** (Mr. A. J. Burland, 47a, Twickenham Road, Teddington, Middx.); **Stockport and District Aquarist Society** (Mrs. J. Pay, 23, Oakfield Avenue, Frieswood, Manchester 16); **Torquay and District Aquatic and Pondkeepers' Society** (Mr. R. J. Manuell, 9, Congella Road, Ellacombe, Torquay); **Wigan and District Aquarists' Society** (Mr. L. Buchanan, 33, Whitley Crescent, Wigan); **Wimbledon and District Aquarists' Society** (Mr. L. Williams, 87, Merton Hall Road, Wimbledon, London,

S.W.19); **Wolverhampton and District Aquarists' Society** (Mr. G. B. Kelly, 216, Lea Road, Penn Fields, Wolverhampton).

## Aquarist's Calendar

5th-10th April: **Southport Aquarist Society** exhibition of tropical and coldwater fish and aquaria at Broadbent's Stores, Chapel Street, Southport, Lancs.

12th April: **British Herpetological Society** (London Group) meeting "Snakes and Lizards," 7 p.m., at the Linnæan Society's Rooms, Burlington House, Piccadilly, London, W.1.

20th April: **Hampstead Aquatic Society** invite visitors to hear the vice-president, Mr. George Cansdale, speaking on "Snake Hunting in West Africa." Details from Mr. P. W. Meyer, 1, Troyes House, Lawn Road, London, N.W.3.

1st-15th May: **High Wycombe and District Aquarist Society** show at The Library, Queen Victoria Road, High Wycombe, Bucks. Show schedules and other details from Mr. R. Adkin, 7, East Drive, Totteridge, High Wycombe, Bucks.

4th-8th May: **Bury and District Aquarists' Society** Show. Show secretary: Mr. G. D. Grimshaw, 1, Garston Street, Bury, Lancs.

6th May: **Kingston and District Aquarist Society** invite visitors to their meeting to be addressed by Mr. McInerney on Marine Fish-keeping. Details from Mr. A. J. Burland, 47a, Twickenham Road, Teddington, Middx.

21st May: **British Herpetological Society** (London Group) meeting "Amphibians," 7 p.m. at the Linnæan Society's Rooms, Burlington House, Piccadilly, London, W.1.

29th May: **Rochdale and District Aquarist Society** open show of furnished aquaria, tropical and coldwater fishes at the Fire Station Hall, Rochdale. Show schedules from Mr. N. Gott, Crossways, Kendal Avenue, Norden, Rochdale.

10th-12th June: **National Aquarium Exhibition** at the Royal Horticultural Hall, Vincent Square, Westminster, S.W.1. Schedules from Competition Secretary, Mr. C. R. Macdonald, 73, Tudor Gardens, West Acton, London, W.3.

11th-12th June: **Chester and District Aquarist Society** Annual Open Show at the Drill Hall, Volunteer Street, Chester. Details from show secretary, Mr. C. Morrison, 22, Belgrave Place, Handbridge, Chester.

12th June: **Federation of British Aquatic Societies** General Assembly, 2.30 p.m. at Friends House, Euston Road, London, N.W.1.

## Crossword Solution

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

PICK YOUR ANSWER (Solution)

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

THE AQUARIST



