

The AQUARIST AND PONDKEEPER

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Editorial

AN enthusiastic aquarist might be forgiven for thinking that "tranquilliser" is a convenient description for his furnished aquarium, for enough has been written and spoken about the relaxing and soothing effect of watching fishes in aquaria. He may think this about the word even if truth be told he does not really believe in the sedative effect of aquarium-keeping. For himself, at least, he probably knows too well that he spends many fretful hours with his fishes, waiting anxiously for eggs to hatch or indeed worrying whether eggs are going to appear at all, and he may even be conscious of hair-tearing episodes in his aquatic career when he has, late at night, tried to net a wary specimen in a large well-planted tank; or when before setting out to catch the 8.15 he has had to deal with an aquarium that showed a stubborn tendency to leak in an increasingly sieve-like manner. However, for quite different reasons from those due to private shortcomings in this matter of attaining a peaceful calm through fish-keeping, the aquarist would be wrong to interpret "tranquilliser" as a term developed to describe his hobby.

Tranquillisers are drugs coming more and more into use to allay the mental turmoil engendered in man by the stresses and strains of modern civilisation. The scientist's curiosity about the mode of action of such substances has led him to try their effects on Siamese fighting fish. One surprising finding was that the tranquillisers caused fighting fish to swim backwards. Perhaps this is an expression of the drug's action in depressing the normally assertive behaviour of this species. Whatever it is, it seems that the fish is in less need of tranquillising than many humans. For example, in reports from New York about the new Aquarium at Coney Island it is said that many New Yorkers have become irate at being asked to pay 90 cents for admission. To restore their tranquillity, which the fishes have upset, perhaps a shot of the drug could be included in the price. If they went into reverse who would care?

In the Water Garden in AUGUST by ASTILBES

DURING this month it is important to remove all dead water-lily flowers as soon as they close for good. If you can cut off a fair length of the stem at the same time this will prevent dying back and too much decaying material being left in the pond. If any leaves die they should also be removed. In a small pond it is amazing how soon the water can become fouled if there is too much decaying vegetation left in the water at the end of the growing season.

Other water plants should also be carefully watched. Some pond-keepers are inclined to think that a great deal of vegetation should be allowed to remain in the pond for future manuring. This can be greatly over-done, as there is always likely to be plenty of mulm in any fairly well-run pond to give sufficient manure for the water plants. The droppings from the fishes are utilised by the plants and this tends to keep the water pure. If too much of other forms of manure are present in the pond the water plants are not so likely to do their job of keeping things sweet.

When Fish have Bred

Many ponds may have had some of the fishes breed therein. The resultant youngsters are often a problem to the pond-keeper. If the pond is fairly large or has at least one part thickly covered by underwater plants it is possible that many of the fry will be safe from the parent fishes and escape being eaten. It is in small ponds with insufficient cover where most of the fry will be surely eaten. Some aquarists are very fond of catching up all the fry they can see and transferring them to comparatively small tanks, with the result that few are reared. Once the fry get an inch long overall there is a very good chance of them surviving and growing on. Goldfish of all varieties do not show much interest in the young ones once they are of this size; it is mainly when they are very tiny that they are eaten.

Where there are a number of fry in a pond it is a good plan to feed them with fine packet food in a shallow part of the pond. Some ponds are constructed with a shallow part which can be divided off from the main pond once the fishes have spawned. This is an excellent plan as long as the division is complete. It is not of much use to separate the large fishes only, as if there is the smallest crack the fry will find their way through into the main pond and be in danger of being eaten.

If there are any perch or pike in your pond you are not likely to be able to breed any other types of fishes, as these fishes are carnivorous and would make short work of any youngsters. Apart from the varieties of the goldfish there are a few other fishes which can be bred in the garden pond. The golden orfe is a great favourite with most pond-keepers. It is a very lively fish and one which delights in swimming about just under the surface of the water. It is a very active fish and will catch flies and even wasps which fall on the water. It is, however, a fish which requires a well-oxygenated water and it rarely breeds in a very small pond. It is more likely to breed in a fairly large pond where there is either a fountain or a small waterfall to give some running water which would ensure that the water was well oxygenated. The orfe spawn on water weeds or partially submerged tree roots at the pond side. The eggs are rather larger than goldfish eggs. If a very shallow part of the pond is available the fry will gather there to be out of danger from the parent fish. To encourage the orfe to breed they should be well fed with garden worms or other forms of live food.

Rudd, Roach and Minnows

Common and golden rudd will also breed in the garden pond, and as the small fishes shoal well they can be very

attractive. Do not trouble to try to breed roach in the pond. Roach are rather similar in appearance to the rudd but appear to be far less hardy in a small pond. They are also more prone to develop fungus disease. Minnows could only be bred in the pond if running water was supplied and plenty of clean gravel covered the bottom. The water need not be too deep for the fish during the summer, as the more shallow the water the better will it be oxygenated. The trouble is that with shallow ponds the winter may take toll of the fish or freeze the water over too thickly and crack the sides of the ponds. If a pond was so constructed it could be lowered during the breeding season and filled up again for the winter.

When considering the introduction of fresh kinds of fishes for your pond do take great care to ensure that they are of a suitable kind and that they are free from disease and pests. It is so easy to introduce dangerous pests into a pond with new fishes but once they are there it may be a very difficult task to clear them out again.

One of the worst pests likely to be brought into the pond with adult fishes is the fish louse *Argulus*. This creature is only about a quarter of an inch across when fully grown but it can attach itself to a fish and cause damage to it by sucking its juices. The pests are rather difficult to see on the body of some kinds of fish as they are almost transparent. They appear like a miniature plaice and are able to swim freely in the water. Often they cannot be noticed until a sore patch appears on a fish, when the louse can be seen at this spot. They can be picked off with tweezers or the fish can be immersed in a solution of a teaspoonful of Dettol to a gallon of water. The lice soon leave the fish in this solution, but a close watch must be kept on the fish whilst it is being treated and it must be removed from the solution if it turns over. As a rule all lice can be cleared from fish by giving two such treatments.

Many pond-keepers like to have a varied group of fishes in their ponds. This is all right as long as several different varieties of goldfish are not kept there for breeding purposes. All the goldfish varieties can breed among themselves and will pair with any other variety. Where show fish are concerned it is imperative that only the one variety is kept in the pond. When only the look of the pond is the main interest there is nothing to stop the pond-keeper from keeping any number of goldfish varieties together in the pond. Unless the pond is fairly large it is most improbable that many fry will ever reach maturity.

If anyone is fortunate enough to possess two ponds it would be a good plan to keep one pond for perch. These are very handsome fish, but it must be remembered that they are carnivorous and would eat any smaller fishes in the pond. They can be fed with garden worms and any other form of live food available. A small pike could also be kept but do not attempt to do this unless you are able to keep up a regular supply of live small fishes for food, or plenty of worms.

Before adding any fish to your pond make sure that there will be plenty of room in the pond for the extra fishes and make sure first that they are perfectly healthy. Overcrowded ponds are likely to be a source of trouble, but if only a few fishes are in a pond they will have a better chance of thriving.

British Aquarists' Festival 1957

5th and 6th October

at Belle Vue Zoological Gardens, Manchester

THE PORAQUÊ

by JOHN B. BOURSOT

ON the mainland of South America there lies to the north a vast primeval region of some three and a half million square miles of wilderness. Immense equatorial rain forests shade the hot steaming lowlands of the interior in perpetual gloom. They are the home of monkeys, iguanas, gorgeous birds and the lithe powerful jaguar. To the west, snowy peaks tower above the high windy plateaus and icy desert slopes of the Andes where the tiny trickles that are to become the world's largest river are born. On the lower warmer slopes of eastern Colombia, Ecuador and Peru they are sizeable rivers, the head-waters of the Amazon, and enter the territory of the neon tetra where, in such tributaries as the Putumayo, these pretty characins enjoy the heavy shade of overhanging vegetation and the soft cushion of ooze and rotting leaves on the bottom. For 3,000 miles the Amazon winds on across the continent, now flowing deep and wide beneath the leafy walls of impenetrable jungle, now fanning out here and there into sunny expanses of marsh and swamp where the head-sized blooms and immense leaves of the giant water-lily float serenely on their inverted reflections.

With an average width of 40 miles in the lower reaches, the Amazon is continuously swelled by innumerable tributaries and nameless forest streams till it becomes a mighty rolling flood of muddy water flowing into the Atlantic through a 207 miles-wide mouth fringed by tidal marshes and mangrove swamps. In the mouth lies Marajo, an island the size of Denmark. This river system, draining the lands of eastern Colombia, Ecuador, Peru and most of Brazil, and the similar systems of the Orinoco and Essequibo which drain the greater part of Venezuela and British Guiana, are not only the habitat of most of the aquarium favourites from the New World, they are also the home of many remarkable and often highly specialised forms such as *Vandellia* and *Pygidium*, small eel-like parasitic catfishes; *Paratrygon* and *Elipenurus*, two species of freshwater sting ray, and *Electrophorus electricus* the poraquê or electric eel of world fame. Although commonly referred to as an eel, it is in no way related to the true eels.

Unpacking the Poraquê

Seven years ago a friend sent me a present of a small electric eel by plane. Armed with thick rubber gloves borrowed from the electric-light company, who guaranteed them to withstand 10,000 volts, I set out for the airport, where a Customs official produced a large cardboard box which he set on the floor. Strips of adhesive paper were ripped off and the four flaps of the box opened to reveal a large tin buried in newspaper packing. On the lid were the words electric eel. Timely warning and the suggested use of the rubber gloves brought looks of sympathy for my mental condition into the faces of the astonished officials. With their bare hands they tugged off the lid of the tin, revealing a small, very cramped electric eel making pathetic attempts to get out. To my surprise nobody felt any shocks while handling the tin and, after going through the usual red tape, I brought the eel home in triumph.

A previously prepared 24 in. by 8 in. by 12 in. tank with sand, stones and plants showed up the poraquê to a nicety. It measured 17½ in. in length and was as thick as a man's thumb. Except for a rather dorso-ventrally flattened head



The author's electric eel, a specimen capable of giving a shock equivalent to 550 volts

with a cat-like outline the entire fish was extremely eel-like. Its colour was a uniform blackish brown except for a shade of dirty orange flushing the under-side of the head and body. At night this orange changed to the rich orange-red of flames seen through smoke. Two very small, rather useless, round, fleshy pectoral fins looking like ears waved up and down whenever the eel made the slightest movement. A strong well-developed anal fin running the entire length of the under-side of the tail was the only other fin. A graceful, superbly efficient succession of ripples running aft along the fin sent the fish forwards. It rose horizontally when the ripples, starting at both ends at once, ran towards each other, and sank when the reverse took place. But in moments of sudden fright the eel would shoot forwards or backwards in an explosive burst by making use of the same movements characteristic of true eels.

A day or two after arrival the eel began feeding ravenously on small *Mollisia sphenops*, instantly paralysing them with a discharge of electricity as I dropped them into the vicinity of the head. It then jerked vigorously backwards and forwards, manoeuvring them into position and swallowing them in a flash with a noisy gulp. Although I enjoyed watching the eel's rapid growth of two or three inches a month, its robust strength quickly strained my patience. Plants were uprooted, stones were carried from one place to another, and sudden violent fits of burrowing brought lasting ruin in the ensuing hurricanes of whirling sand. Attempts at restraint were met by cramping shocks. In a bare tank of stones and sand with the eel almost touching both ends at once a problem was fast approaching. Despite constant removal of individual droppings, resembling 2 to 3 in. fragments of lead from a pencil, complete changes of water became a frequent necessity.

Hazards of Servicing

In tropical cities not lying higher than 1,500 ft. heaters are unnecessary, and a complete change of water is not unduly hazardous where electric eels are concerned. By siphoning out the water till the eel lay on its side, half exposed, the tank was ready for immediate replenishment straight from the tap. When making such a change the eel enjoyed receiving the first five or six pailfuls on to its head, which it rested on top of a large stone to steady itself. As the water rose above the level of the stone the eel would form a tight ring beneath the falling water, obviously enjoying every moment of it. When caught unawares it would sometimes send a heavy discharge of current up the outflowing water into the pail and on to one's hands. The eel delighted in

being gently stroked with a stick under the chin and belly, keeping perfectly still at the surface during the operation.

But a change of tank now became urgent, so I bought an old 39 in. by 19 in. by 10 in. cement tank, covered the bottom with a little sand and put in one large stone. But how was I to transfer the eel? The heavy rubber gloves had been returned. A pair of thin surgical gloves gave insufficient protection, so my only hope lay in a 2 ft. deep butterfly net with a long wooden handle. But the now 2 ft. eel proved surprisingly difficult to catch by stealth, quickly retreating from the net either forwards or backwards, and even slithering out tail first when already half-way inside. But a rapid change of technique solved the problem. A quick upward jerk of the net and a sharp downward half-turn of the opening held the eel prisoner at the bottom. Water poured down the handle, and with it a sustained stream of electricity! Hurrying with numbed hands to the new tank I unceremoniously dumped the irate fish into it. The slimy state of the net which looked and felt as though it had been smeared in white of egg was proof of the extreme efficiency of the fish's slime glands.

Growth went on apace, and the menu now included dead golden and zebra cichlids (*Cichlasoma aureum* and *C. nigrofasciatum*) shorn of their dorsal, anal and pelvic fins with a pair of scissors. Most of the zebra cichlids were parasitised in the gills by digenetic trematode larvae awaiting final development in some mammal. The anterior chambers and vitreal cavities of the eyes bore heavy infestations of wriggling *Diplostomum* larvae hoping to be swallowed with their host by a water bird in order to complete their metamorphosis. And numerous *Clinostomum* larvae, also awaiting maturity in the throats of herons, snowy egrets and the like, formed yellowish cysts under the skin, especially at the base of the fins. Shrimps, headless prawns and small frogs were literally pounced upon when dropped on the eel's upper lip. Although small pieces of liver were appreciated, chunks of slimy regurgitated beef pointed to certain limitations of digestion.

Fearless Behaviour

Electric eels are fearless creatures, immediately investigating any disturbance in the water, and occasionally launching a bold attack. My eel will swim to within a short distance of the disturbance, draw up its body into a series of mild curves like a viper ready to strike and, in a sudden burst of fury, with head out of water will hurl itself against the offending object, thrusting it backward with savage violence. This form of defence, accompanied by withering stabs of electricity, is invariably effective, and if all ends well dripping walls and pools of water on the floor are the only aftermath. But should the eel be near a corner of the tank, its thrusts often raise it dangerously high above the rim and, finding resistance gone but still bent on attack, it plunges down on to the floor, creating a state of emergency.

The frightened aquarist should not lose his head. The fact that the eel is able to live out of water for a week provided its mouth in particular is kept wet gives its owner time to think what to do. He should cover the eel with layers of newspaper which adhere to the slime and, before they have time to soak up the water on the floor, grasp the eel at its thickest part and return it to the tank. Failing this, a dry garment, table-cloth or folded bed-spread will do. If the aquarist attempts to pick up the eel with his bare hands he will receive a jolt through his shoulders to the tune of about 550 volts.

Resting on any but the smoothest surface causes the anal fin to bleed. But back in the tank all signs of minor injury disappear almost while you watch. Of all suitable fishes for the aquarium, the electric eel, if thoughtfully kept, is perhaps the least susceptible to disease. White spot, velvet, fungus, fin rot, pop-eye, costiasis, dropsy, etc., seem to be unknown. Temperatures of 69° F. for a fortnight

followed by a sharp rise of 12 degrees or more as the result of a total change of old water for new, with or without chlorine, straight from the tap; stagnant, dust and mucus-laden water thick enough to clog fatally the gills of a 6 in. catfish or cichlid in an hour or less; an occasional sojourn of unknown duration on the floor during the night, and innumerable tiny flakes of dried paint sticking to the slime of the body, seem to have no effect on its health whatsoever. But I fancy clean water is preferred, for it will sleep for long periods after a complete change of water.

A species of red parasitic nematode, 3 to 4 in. long, was once voided by my eel. The eyes of electric eels are dimmed with cataract during babyhood, probably as the result of their own electrical discharges, or those received from their mother and other eels. Nothing is known of their breeding habits, though 1 in.-long babies have been observed swimming round the head of a large individual returning from flooded land. Owing to worthless gills electric eels must breathe by gulping atmospheric air at the surface once or twice a minute. If denied this they promptly drown.

(To be continued).

Cacti in the Fish House



Mammillaria bocasana, the conspicuous cactus in the centre foreground of this group, is a free-flowering species suitable for the fish house

TO get the maximum amount of flowers from your cacti it is essential that they get all the sun possible. Very few will ever flower if no sun can reach them. Although all cacti should flower every year as long as they are adult and of a sufficient size, a great deal will depend on the types grown. A very free-flowering genus is the *Rebutia*. These are mostly small plants and even one not more than an inch across can have many flowers as large as the plant. As they do not make large specimens they are ideal for the small grower who has little space to spare. The *Opuntia* or prickly pear types are not as easy to flower as some kinds as they require rather warmer winter treatment.

High temperatures will increase the need of cacti for water; do not neglect this just because the plants can withstand periods of drought. Remember that they cannot grow without some moisture being available for them. At no time should their soil be soggy with water, of course, for this will kill them; added water must be able to drain away from the pot. Any signs that the drainage hole has become blocked should cause you to take action at once; re-pot the plant in fresh potting soil in a clean pot.

Keeping and Breeding the Midwife Toad

(*Alytes obstetricans*)

by ROBERT BUSTARD

THE midwife toad is a small hardy species, common in many parts of Western Europe, which is frequently imported into this country. It measures about 1½ in. and, although somewhat drab in appearance, is of great interest owing to its unique breeding habits. In coloration it is olive-grey above and creamy-white below, the back having darker spots here and there. This little toad flourishes very well either in close confinement in a small vivarium or in the outdoor reptiliary, where it can be safely left to hibernate during the winter.

Midwife toads are strictly terrestrial and seldom enter the water, thus they have evolved strange breeding habits. Whilst most frogs and toads go to the water to mate and lay their eggs, the eggs of the midwife toad are laid on land. The eggs are laid in strings, each egg being joined to the next by a gelatinous material, and there may be about 60 to 100 eggs in a string. They are immediately taken by the male, which wraps them round his hind legs. The task of looking after the eggs until the tadpoles are ready to hatch falls entirely on him. Sometimes he may collect strings from several females and thus have a large collection of eggs.

One of the specimens in the photograph has only one string whilst the other has several strings of eggs. These toads are mainly nocturnal and the male hides with his precious eggs during the day, choosing a damp spot so as to keep the eggs moist. He may occasionally visit the water to moisten them further. He is, however, not much hampered by this apparent burden and can still make his evening feeding excursions. In all he looks after the eggs



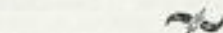
Photo: Robert Bustard

Two male midwife toads, with clusters of eggs, photographed as they set out to look for food at dusk

for 3 to 4 weeks, by which time the eggs are ready to hatch and he goes to the water, where the tadpoles hatch immediately. The tadpoles then develop in the usual way and metamorphose in about 4 months.

It is quite possible to watch all this by keeping these charming little toads in captivity, where they become very tame and will often breed. The best conditions are undoubtedly the outdoor reptiliary or cool greenhouse where they will be under natural conditions. However, this toad does well in a small vivarium, which should have a layer of moist earth and moss growing in it and other damp-loving plants such as ferns. Some flat stones or pieces of bark

(Continued on page 102)



This semi-formal pond and rock garden will be recognised by members of aquarists' societies who have visited the fish hatcheries of Shirley Aquatics Ltd., at Shirley, near Birmingham. It is situated at the entrance to the hatcheries, in front of the home of the proprietor Mr. Roe

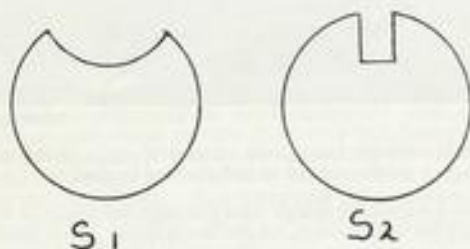
Photo: J. L. Anderton

Microscopy for the Aquarist—33 by C. E. C. COLE

LAST month I said that I had told you all I could about transmitted light. I have since been reminded that so-called "oblique" and "annular" light are forms of transmitted light. They might be termed "selective-light" methods, inasmuch as they select certain transmitted rays from a cone and use only them. This leads to surprising results on occasion, and the conclusions drawn from the methods must be subject to a degree of suspicion. However, they are used and the tyro may use them without being aware of it on occasion, so it is as well for you to know about them and the way they work.

Oblique Illumination

Let us take "oblique" illumination first. This may be obtained in one of two ways. Light may be directed upon the mirror in the normal way, but the position of the mirror



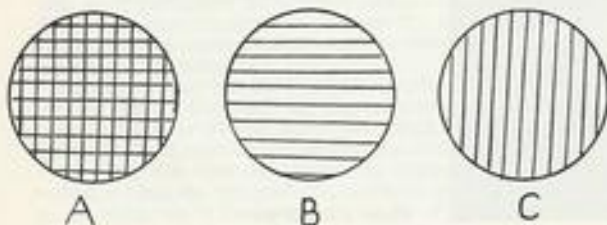
Stops for oblique illumination. With these a creature marked as in A (below) could appear as in B or in C

is changed so that the rays do not enter the objective and travel straight up it, but at an angle. Instead of the light being evenly disposed about the optical axis, only part of the back lens of the objective is illuminated.

An alternative method is to utilise a special stop in the filter carrier of the substage condenser which blocks out all except a portion of the solid cone of transmitted illumination normally used. It is with this stop that the peculiar and unreliable effects of oblique lighting can best be demonstrated. Should you have one in your miscellaneous equipment, get it out and have a look at it. I have illustrated one for those who have not got one.

The light beam is narrow and is only a very small portion of the illumination. It follows that it can produce an image of only those portions of an object which it encounters on its passage into the objective.

Supposing, for argument's sake, that the object focused on the stage possesses lines running longitudinally and laterally over its surface. If the light rays encountered only the horizontal striations it would reproduce them alone. If its position was changed by moving the disk so that the hole was in a different place it could pick up only the lateral markings. The image would thus give two entirely different



ideas of the subject illuminated. In addition the images would be clouded by diffraction effects.

With uneven surfaces, with low and medium powers, however, where very transparent objects are being examined the greater intensity of shadows obtained with oblique lighting enables more to be seen. The difficulty lies in knowing how far to trust what is seen. Unless it can be confirmed by true axial illumination it has little real value.

Annular Illumination

Annular illumination is obtained by using another stop, as shown, which cuts out the central portion of the cone of illumination, leaving the image of the object to be formed only by the outer portion of the cone. The size of stop used should not be large enough to produce a black background.

Aquarists who wish to try these methods of illumination should not place too much reliance upon what they see by them.

Keeping and Breeding the Midwife Toad

(continued from page 101)

should be added to provide cover and also a small pool of water (a pie dish will suffice), which is essential if breeding is to be contemplated.

My specimens live in an outdoor reptiliary where they breed naturally and find much of their own food. I introduce gentles and bluebottles for them and the other inhabitants. If kept indoors they will need to be fed regularly. Midwife toads do not really like worms, although the odd earthworm will be eaten. They much prefer flies and bluebottles, which will require to have their activities somewhat restricted if the toads are to be able to catch them. Most other insects, especially if active, will be readily acceptable.

The breeding habits of this little toad are so interesting that it is well worthwhile to take trouble to ensure success. Outside facilities, as mentioned above, being the key to success. Another point in its favour is its charming "bell-like" call which has earned this toad its alternative name of "bell toad." I strongly recommend this species to the beginner as it is very hardy and easy to keep.

Here and There

THREE sucker fish, one of them 12 in. long, were attached to a blue shark landed at Looe, Cornwall, last month by an Edinburgh businessman, Mr. A. Menzies Simpson. The shark was the biggest to be caught this year and weighed 161½ lb.; it measured 8 ft. 3 in. (The British record blue shark was 180 lb.) The sucker fish were removed alive from the shark and were presented to the Plymouth Aquarium.

AN aircraft loaded with more than 20,000 tropical-aquarium fishes flying from British Guiana to Miami had to be unloaded at Trinidad when it was forced to land there because of engine failure. The fishes were stored in plastic bags in batches of about 100, and many died during the wait for a new plane to finish their journey.

PRESERVED tropical fishes were displayed in a set-up aquarium in a New Zealand exhibition. The fishes had been caught in the Islands of N.Z. and were edible varieties used by the Islanders as food. They formed part of a display connected with life in the Islands.

Fancy Goldfish Breeding—7 by A. BOARDER

THIS month the emphasis will be on the fantail goldfish, how to feed the young and sort them according to quality. Once the youngsters are about a month old they may be sorted quite easily. Not that this is likely to be a final sorting, for until the fish have completely changed colour it will not be possible to be certain whether a particular fish will make the grade or not. From your original sorting at a month old you will be fortunate if you have more than 20 per cent. of these fit to show when they finally complete their development.

Sorting by Tails

To sort the youngsters you will need a clear-glass tank, which need not be large, and a white bowl will be a great help. Half fill the bowl with clear water and then place some of the young fantails in it. Now examine their tails. Any tri-tails, that is those with a single top lobe and a double bottom lobe, must be discarded immediately, also, of course, any single-tailed ones. You need to look for the fish with a completely divided tail, that is having two distinct tails when viewed from above. Under the old rules for judging the tail had to be joined for the first quarter to assist in keeping the tail from drooping, we were told, but under the latest rules the tail should be completely divided. Why these standards are messed about with like this I fail to see.

Having found all the youngsters with a divided or nearly divided tail, place them in the clear tank. They must now be examined for body shape. This should be oval, with a nice rise from the nose over the top and down to the caudal peduncle in one clean sweep. There must be no suggestion of either a flat back or a hump back. The lower curve of the body should match the top, nice and deep and well cut-in behind the pelvic fins. Do not worry over-much about

7. The Fantail

the thickness through the body at the moment; as long as the outline is all right as seen from the side there will be plenty of time later on when the fish has developed more to see how the thickness improves.

The fishes should now be sorted for their dorsal fins. These can vary considerably, from very thin and sharklike



Photo:

L. C. Mendville

This fantail shows the fault of a drooping caudal fin ("tail")



Photo:

Lawrence E. Perkins

A young fantail in which the colour change from bronze to golden has not yet been completed

to very full and flowing. Neither is required; a dorsal fin must be fairly high and held strongly erect. Good fins can develop to better ones but a badly shaped one will never improve. The pectoral and pelvic fins are not likely to give you much trouble. I very rarely find a fish which has not quite good fins here. It is with the next pair, the anal fins, that there will probably be trouble. These must be paired, and if a fish has none or single anals it will be disqualified at a show. The anal fin can vary more than any other fin with the exception, perhaps, of the caudal. Some fish have no sign of anal fins but are otherwise perfect; others have only one anal. Others have a pair with one much larger than the other or with one sticking out at the side of the tail. I have found hundreds of fish which had their only fault in the anal fins.

When judging a furnished tank at Hendon I saw what I thought to be a perfect team of four young fantails, but discovered later that one fish had anal fins paired at the base but joined at the top. At large shows I have seen a fish with incomplete anal fins in a team of four in a breeders' class, and so it will be realised how very difficult it is to breed these fish anywhere near true.

Selection for Colour

Having at last sorted out the best of the youngsters by shape and size of fins, shape of body and lack of faults anywhere, you have by no means finished. If the fish you are breeding are the visibly scaled types, now referred to as metallic, you will have to wait for them to change colour before you can be certain that you have any winners among the fry. All the scaled types are deep bronze when young, and the time they take to change to the desired red depends a good deal not only on from which strain they were bred but also how they are reared and under what conditions of heat. Not until the final change will it be possible to know for sure if any fish is good enough to show or use for breed-

ing. It may be three months but it is more likely to be a year.

The ideal colour for the scaled fantail is a rich warm red all over with no silver or black markings at all. It is not easy to breed such fish as so many develop a white mark or two, especially at the ends of the tail. Any judge who has bred these fish will know that it is far more difficult to breed a fish all red, and so he will always prefer such a fish to one with white or silver markings however small.

If any of the fish are wanted for exhibition it is a good plan to have them in an indoor tank where they can be under fairly constant observation. It is surprising how one can spot small faults in a fish when it is often before one's eyes.

Feeding and Space

The feeding and housing of the fish from now on is most important. It is not enough just to feed them. They must have plenty of space in their tank in which to develop. I do not mean only the minimum amount of surface area, that is an inch of fish to each 24 sq. in. of surface area, but much more than that if you expect your fish to grow on well and develop at the maximum rate. In a tank stocked to the limit the fish may get enough oxygen and remain fairly healthy, but much more than this is necessary.

There is something strange about the way fishes will deteriorate when they have insufficient room in a tank. This question of space for fish is far more important than many aquarists imagine; I would go so far as to say that it is one of the most important points to watch when trying to grow good fishes on for exhibition. Space seems more important than food, as I have known a single fish in a well-established tank by itself grow much better than fish well fed in a tank with several others, although the fish by itself was not artificially fed at all.

Now let us consider the feeding problem; does feeding have any effect on the subsequent shape of the fish? We are often told, and I have been inclined to believe it myself, that the types of food given to short-bodied goldfish will determine to a great extent how deep the body actually develops. To-day I have my doubts; I am not completely convinced that the food will make all that difference. I am sure that no amount of feeding with whatever foods are supposed to fatten a fish would make a good-bodied fish from a runt. One must breed for body shape as surely as one must for colour and tail formation. It may be that a good body may be improved by judicious feeding, but I am still to be convinced about this point. One thing I am



Photo:

L. C. Mandeville

A promising team of young scaled fantails



Photo:

L. C. Mandeville

Last stages in the colour change are seen in this young fantail

certain of is that if the fishes get a good nourishing diet, and a mixed one, and are fed at frequent intervals in fairly warm water they will grow on well and make strong healthy fish.

Remember in showing today a fish can get 20 points for size and another 20 points for condition and deportment; that is, two-fifths of the total, with no regard to finnage, body-shape or colour. The changing from the bronze to the red can be hastened or retarded by the warmth of the water and the feeding. All fish in a spawning from the same parents will not change together. There may be many months between the first changes and when the last gets the lovely red. The colder the conditions under which the fish are kept the longer will the majority take to change. There is no question of this. One can breed for colour by using only those fish which change colour fairly early, but if some are used which have not changed or which have taken over a year to do so it is probable that their young will carry over the tendency to a late change and be valueless.

All short-bodied fish can have included in their diet some Bemax, dried shrimp and rolled oats. The oats and Bemax are good body builders, and the shrimp gives calcium and a little salt which often is appreciated by the fish. If you can keep your tanks at from 65° to 70° F., you will find that the fish will eat and thrive well. At lower temperatures, especially when the water drops to the region of 50° F., the fish become more sluggish and do not want to eat as often or as much. In consequence they do not grow nearly as fast as when the water is warmer. There is a limit, however, as the warmer the water the less oxygen will it hold, and the less oxygen available the more difficult will it be for the fish to digest their food.

Shubunkin-coloured Fantails

The shubunkin-coloured fantail should change colour much earlier and it will be found that the best-coloured ones are those which look very dark when they first start their colour change. The fish which the judge will be looking for will be the ones with bright colours. The body should be blue, with red, brown, yellow and violet markings, with a spattering of black dots or splashes all over the fish including the fins. So many fish are seen today with no blue, no red and some no black. They appear a murky brown with mottlings of a darker shade of brown with no resemblance to the required colours. There should be no visible scales, although a few are often seen and will not disqualify a fish. Hard gill plates are not required but are often seen.

The shubunkin-coloured fantails which are almost colourless or transparent are of little value either as show

(Please turn to page 107)

AQUARIST'S Notebook



by

RAYMOND YATES

AFTER his visit to the Pet Fair at Manchester, Mr. Herbert R. Axelrod, the American aquarist and publisher, has now left for Africa where he expects to spend several weeks in the Belgian Congo area in general and Leopoldville in particular. He is especially interested in obtaining *Aphyosemion* varieties, the blind barb (*Gaeo-barbus geertsii*) and other rare barbs from this district. Whilst in Manchester Mr. and Mrs. Axelrod were shown round the Belle Vue Aquarium by the curator, Mr. Brian Cheshire, and found several fishes on view which were new to them. Mr. Axelrod considered the discus on show displayed more red than he had ever seen before in these fish. A fine tank of 20 cardinal tetras caught his eye, these fish having been named in his honour by Dr. Leonard Schultz of Washington as *Cheirodon axelrodi*.

Cardinal tetras are rather larger than the better-known neon but are quite similar. There is little if any white to be seen and the red line goes right through from just below the centre of the eye to the tail. The electric-green line extends from the nose to below the adipose fin and is identical with the neon's. Cardinals tend to be rather longer in the body but in manner are just like neons. These are very hardy, not easy to scare, constant swimmers in the middle of the tank and eat just about anything which comes their way. Apart from cardinals this Aquarium has recently obtained quite a number of new species, most of which have not been on view in the north before.

A pair of *Exodon paradoxus* catch the eye with their two large spots and vivid golden areas. The golden and black eye is also striking. Unfortunately these fish do not get on well with each other although adult *Barbus hexazona* in the tank are unharmed. An unusual tank is one with anthracite chippings and coal "rockery" containing a shoal of a new glass fish called *Chanda buruensis* from Boeru Island. Lacking colour, these fish are interesting but hardly decorative. New cichlids included half-a-dozen *Nannochromis mudiiceps*, about 2 in. long. These dwarfs have much in common with *Pelmatachromis kiribensis*. The edged-white dorsal is attractive and the upper portion of the tail is patterned with bars, the lower with specks. These are not particularly shy and share quarters with quite a number of much larger fishes.

Several headstanders have been obtained and these seem quite at home, fascinating the onlookers with their quaint way of almost balancing on their noses. A fine new archer fish appears to be in splendid condition although he gets few, if any, flies. Perhaps the most striking of the new additions are some *Distichodus lusoso* and *sexfasciatus*. The vivid black and pink-red coloration arrests the eye, although it can pale at times when the fish feels in the mood. These fishes pestered each other somewhat and seemed ill-natured bed-fellows.

Fish very like leaf-fish in shape were some spotted perch (*Ctenopoma acuterostis*). However, their grim outlines belie their nature, as they get on quite well with smaller fish in their tank. A sure draw is the elephant trunkfish (*Gnathoneurus species*), which dashes about probing with its long trunk oblivious of which fish it disturbs. At 6 in. long this is quite a card. On the marine side some wonderful sea horses are on show, these being 7 in. in length and either lemon, yellow or orange in colour, apart from two in natural colours. From Ceylon these newcomers make short work of guppies or *Gambusia* and are offset by a tiny marine fish not much more than an inch in length which is an intense blue and very beautiful. This is the blue-surgeon fish (*Paracanthurus theisti*). A real beauty is the blue-king fish (*Pomacanthus*) also from Ceylon. Efforts to photograph

this fish in colour have all failed to bring out the wonderful blue tints.

"Tuesday is fish day" we are now told. With aquarists every day is fish day. Most of them can eat, sleep, think and talk fish *ad infinitum*, but how many hobbyists can cook fish? How many find tinned fish the limit of their piscatorial ability in the kitchen? Fish look fine in the tank, in the river, the pond or even on the fishmonger's slab but when they get in the frying pan they usually begin to look a sorry mess. Unusual varieties rarely prove satisfying either; I well remember catching 60 perch and preparing and frying the lot. Love's labour lost. I have never been able to look perch in the face since. A daily paper some time ago gave some tips and one or two are worth mentioning. Fish must be cooked the same day you buy it; never put it in a refrigerator. Boiled fish is a tasteless waste; poach, grill, bake or fry but don't boil. (This applies to aquarium keeping too—boiled fish make poor pets.) Small fish are best, the flavour is better.

Clown loach are well named, because few fishes ever amuse their owners in quite the same way as these droll piscatorial acrobats. The new owner is quite alarmed at first by their unusual antics because he has never been used to fishes which make a habit of standing on their heads or tails, or lying on their backs or sides. Until one is used to their ways they can cause concern. Like snakes they can get into the tiniest of places, and as they like to hide away they get every chance to explore out-of-the-way hide-outs where their owner will never find them. Feeding is no problem, although they are hearty eaters and should be well fed. I find they eat just about anything but mine like boiled ham and liver as well as dried foods. On the feed they resent the near approach of other fishes and often go for the intruder, shaking their "whiskers" in a most amusing way. The other fish always makes off.

Like "pal-fish" they make quite a job of working over rockery and prefer the rough types to the smooth, even surface, which holds no attractions for them. Sometimes they will lie on rocks with the air of being king of all they survey. They grow slowly but surely and their bright colours do not fade with size. Although the price is still high it is not too high and aquarists who have not yet owned a pair of these splendid entertainers should remedy this situation as soon as the opportunity offers. When small, say 2 in., they make excellent community-tank fish. They may appear to be slightly like *Corydoras* catfish, but when food is about they are ready and will take it on sight, whereas *Corydoras* are restricted to contact feeding.

After many years I have again got some golden orfe and I have been surprised how faddy these are in their feeding compared with those of long ago, who would take just about anything. The present ones will make short work of flies or worms or grubs but are very half-hearted with *Tubifex*, and will not touch raw fish, raw meat or even table foods like boiled ham. They will demolish liver with relish but ignore dried foods, dried *Daphnia* and dried flies. How-

ever, bread is quickly snapped up. Tasty items like crab, lobster and shrimp are passed by but water snails crushed up are rapidly consumed. Years ago they got macaroni and liked it!

The Federation of Guppy Breeders' Societies caters for the needs of G.B. Societies all over Britain and is always pleased to put guppy enthusiasts in touch with their nearest society. Apart from these it has individual members scattered throughout the country in out-of-the-way places and these are served by a mail service which answers any query and generally assists by giving hints and information. These members are looked after by the Provincial Secretary and Representative, Mr. P. C. Pavitt of 8, Maple Court, Cambridge Road, Kingston-on-Thames, Surrey. The annual spring meeting was held at the Imperial Hotel, Birmingham on 6th May last.

I was buying some characins from a dealer and being attended to by an assistant who told me he was quite new to the hobby. I commiserated with him on the job of catching such difficult specimens as I wanted but he told me it was child's play. His method was alarming, although thoroughly efficient from his standpoint. Having brought the fish to the front glass with the net behind it he gave the glass immediately in front of the fish a very heavy bang, and every time the fish concerned dashed right into the net. The other fish in the tank almost jumped out of their skins each time. I used to call in a shop in another town where hundreds of golden orfe and goldfish were kept in a concrete pond. These were not netted but scooped out as required with a large wire-meshed strainer. I often wondered just how much damage this rough treatment must do to fishes like orfe. When you find evidence of careless or indifferent handling of fishes it is a wise plan to go elsewhere in future.

Tremendous activity marked the efforts to get the new aquarium at Coney Island, U.S.A. ready for the official opening on 5th June. The ground for the aquarium was broken on 24th October, 1954. The £500,000 building is the first phase of a £3,000,000 project undertaken jointly by the city (New York) and the local Zoological Society. Eventually the buildings will occupy 5 of the 12 acres of the site. Entrance fee to the Aquarium is 90 cents. This has caused some heated comments in New York since admission to the old Battery Park Aquarium was free.

The curator, Mr. Christopher Coates, has explained how the murderous barracuda lived peacefully with nurse sharks in the same tank. It seems it is all a matter of introduction. First the sharks are put in the tank, and allowed to feel at home. This gave them a feeling of superiority. The barracuda put in later felt at a disadvantage and by the time it had recovered it felt at ease with the sharks. Forty electric eels are on view. Olaf, the only walrus in captivity in all America, has a raft to support his 1,000 lb. weight in his private pool. Mr. James W. Atz, the associate curator, has looked after the labels. Several kinds are used. One has a drawing of the fish alongside its description, a second has greater detail about species. Visitors can rent headphones to listen to tape-recorded lectures. The old aquarium had its myths . . . people often asked to see the whale in the cellar, not to mention the men who wanted to see mermaids.

What we suffer in the cause of the hobby! Coming from the Pet Fair Exhibition in Manchester I was stopped by two young Germans in a fine car who wanted somewhere to camp for the night; they couldn't speak a word of English. After visiting two police stations, several farms,

five closed service stations for air for a low tyre they finally camped on my lawn. We had a wonderful time, I wouldn't have missed it for worlds but you never know what fishes are going to let you in for next!

For years a rare and "difficult" fish, the chocolate gourami has been quite a problem to those aquarists who have obtained specimens. Its habits and requirements have been shrouded in mystery and there are but few references to it in piscine literature. Many have found it very hard to keep, others have found it extremely hardy, all have found it impossible to breed. A great service has been rendered recently to the hobby by a transatlantic contemporary, *The Aquarium Journal*, with the publication of three articles on this fish in a single issue. The writers concerned, Herr Uwe Friese of Hamburg, Dr. Eduard Schmidt of Frankfurt-am-Main and Mr. Stanley Weitzman of Stanford University, U.S.A., are to be congratulated on providing hobbyists with much new and useful data on the needs of this charming fish. The major points which have emerged are as follows.

Temperature: aquarists have kept it in water far too cool, 85° to 90° F. is better, and even as high as 95° is suggested. Colour improves with warmth. Water: slightly acid water with peat filtration is a must; at least pH 6.5 is recommended but this can drop to pH 5.5, and this lower figure may prove better. Soft water is necessary, about 20 to 30 parts per million, and not more than 90 p.p.m. The fish is very sensitive to water changes and must not have rapid aeration as it prefers very slow-moving waters. Natural waters are brown in colour and often no plants are present. Decayed leaves provide humic acid with low pH. Food: live food is preferred and essential, white and *Tubifex* worms being snapped up in preference to *Daphnia*. Insect food is best of all, particularly that rich in chiton (the hard external skeleton), and brine shrimp.

Dead specimens often prove to be very fatty and this is thought to be a reason for inability to spawn. Fat-forming food must be omitted from the diet offered. Breeding: now definitely established as a mouth-breeder, this is a shy and touchy fish which carries the eggs around in its mouth for 14 days after spawning. Any disturbance at all is sufficient to make the male eat the eggs; even the switching on of a light. No bubble nest is made, and eggs are dropped on the gravel. The fish are 2 in. long when mature, the male has slight red coloration at the end of the ventral and the top and bottom rays of the tail, where colour is weaker. When breeding, the female becomes coffee coloured and entices the male over a sand depression. As soon as eggs are fertilised they are picked up by the male, who then takes up a position just under the water surface.

It is reported that another German aquarist, Herr Joseph Beck, has been successful in breeding this fish, the eggs hatching in 10 to 12 days, the young immediately taking newly hatched brine shrimp. He obtained three broods, each with 20 to 25 fish, from the same pair. Young fish, well fed, grew quickly, reaching 1½ in. within a space of 8 weeks. However, even if you only raise four or five you have attained something. High temperature means plenty of food, and vary it.

In a tank this fish needs shade and will appreciate plenty of *Cryptocoryne* or *Aponogeton*, and no other inmates because it is a faddy and slow feeder which takes its time when feeding. To be successful in keeping and breeding this grand fish it seems that each and every one of the points mentioned above must be strictly adhered to. It should also be remembered that the air it breathes is very humid indeed so a tight-fitting tank cover is a necessity. Perhaps this wider publication of the new findings on the needs of the chocolate gourami will result, in due course, in English breeders having much more success with this dainty labyrinth.

Glass Fish

(*Ambassis (Chanda) lala*)



Glass fish

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

FAMILY:—Ambassidae, derivation uncertain.

SPECIES:—*Ambassis (Chanda) lala*, from native name.

DYED-in-the-wool aquarists, long familiar with the name *Ambassis lala*, will probably raise their eyebrows when they see there is apparently a doubt as to whether the specific name is correct. I would refer them to an article on page 149 of *The Aquarium Journal* (U.S.A.) for June, 1954, written by Dr. G. S. Myers.

In this he writes: "For 30 years the present writer has been aware that this name was incorrect according to most ichthyologists." In the last paragraph of the same article he concludes "... the facts so far known indicate clearly that we should call our common aquarium glass fish *Chanda lala* Hamilton Buchanan ..." So now you know!

Whatever its name, everyone will agree that it is a little gem, of exquisite grace and charm. A small school of these Indian jewels, in a tank of their own, against a background of vivid green plants in crystal-clear water always takes my breath away.

In my very early days of tropical fishkeeping it was always my ambition to have just such an aquarium, but unfortunately I was never able to keep them alive for long. Nowadays more is known about them and their requirements, so things are easier. Dried food is out—the fish will not touch it, preferring starvation. Even particles kept moving by aeration are rejected after the fish are deceived into snapping them up. This is a real problem for aquarists without time to ensure obtaining adequate supplies, and it is best for such fishkeepers to steer clear of *Chanda* to avoid disappointments.

Let us assume that you are contemplating buying one or two glass fish and wish not only to keep them alive, but also to breed them. One of the foods most eagerly taken is *Cyclops*, and these are plentiful the whole year round. To catch them in quantity you need a very fine-mesh net. A small garden pool is an excellent place to rear countless thousands for, however many fishes are in the pool, they never seem to rid it of *Cyclops*. *Daphnia*, yes, but not *Cyclops*!

As a supplement to *Cyclops*, micro worms are recommended and thirdly, small *Daphnia*. Brine shrimp is also first class. On a diet such as this, in a fairly large tank kept at a temperature between 75° and 80° F., the fish soon come into condition. The tyro might consider that since the fish are so transparent he or she should be able to see eggs within the body of the female. The snag here, of course, is that all internal organs except the swim bladder are enclosed in a tiny opaque sac lining the body cavity. All that can be seen is the thickening of the body where the oviducts are situated.

Eggs are scattered among fine-leaved plants, and are hyaline and tiny. On a sunny morning, when the fish may be expected to spawn, be careful not to mistake air bubbles for the eggs. Surprisingly enough this has often been done

by quite experienced aquarists who, after whoops of joy, are extremely downcast to see the "eggs" float to the top of the water and burst.

Assuming the fish actually have spawned it is a wise precaution to remove them. Some doubt seems to exist as to whether they are or are not egg-eaters. I have never put it to the test, and do not intend to. Discretion is best!

In about 3 days from the eggs being thrown the fry will be free-swimming. Now is the time for the smallest of live foods to be given, but foods with more "meat" in them than infusorians. *Cyclops* nauplii are just the right size, if newly hatched. A number of female *Cyclops* carrying bundles of eggs should be present in the tank, so that as the eggs hatch the nauplii can be snapped up. It is unlikely, unless there is a severe lack of food for the *Cyclops*, that these will attack either eggs or fry. Cyprids or planarians need watching, however. Before using the tank for spawning *Chanda*, leave an angel fish in it for a day or two without food. If any cyprids are there when the angel first goes in, they will be absent when he is removed.

Planarians are different, however. You may not suspect their presence. Come down one evening after the tank has been dark for several hours, and switch on the light. If they are in the tank, you will see them gliding over the surface of the aquarium, making a bee-line for shelter. Maybe you will catch one or two wrapping themselves round eggs or fry, which will never be seen again.

Keep the fry on nauplii for 8 or 9 days before introducing new-hatched *Daphnia* of the smaller species. Check that the young *Daphnia* are not furnished with long spines at the base of the carapace. I have known these to pierce the gullets of fry, or get wedged in the buccal cavity, causing deaths of fry, who cannot crush them or dislodge them. So if you wish to cultivate *Daphnia* select the spineless species.

Cull misshapen or weak fry as soon as you spot them. Feed the others liberally, give them room and watch them grow. You will soon have an exhibit which will be the envy of your friends.

Fancy Goldfish Breeding—7

(continued from page 104)

fish or breeders. Often the earliest to change colour are not the best in the long run. The colourless ones show up first as a rule, and those which will eventually turn out to have the best blues and distinctive colours will be those fish which get darker in colour as their brothers and sisters get paler. Often with the scaled types the ones which change very early may carry some white markings when they complete the change.

The aerator should not be necessary once the fish are a month old, and even before that it is not essential once the youngsters are out of the fry stage. Fish which have constantly been in an aerated tank will not take kindly to the change when placed in a show tank or go to a fresh owner who does not use constant aeration.

(The next article in this series will deal with the veiltail).

SPANISH PONDS

by MARY R. BULL

(Photographs by the author)

THE Spanish are very keen on ponds and fountains in their gardens and patios, probably because of the aridity of their country. Every garden has water in some form and most of the ponds have goldfish and aquatic plants.

The lovely gardens of Andalusia in the south are full of ponds and tanks. Granada, Sevilla, Cordoba are famous for their public and private gardens. Granada, at the foot of the high Sierra Nevada, has ice-cold springs which the Moslems first used for pools and irrigation centuries ago. In fact, Moslem gardens were famous in Spain during all their long occupation of the country from the eight century until the end of the fifteenth. When the Spanish Christians finally defeated them, all their wide system of irrigation, aqueducts, ponds and fountains, fell into ruin and were only revived comparatively recently.

Everyone who has been to Granada remembers the beautiful gardens of the Generalife. This used to be the summer palace of the Sultans. These gardens are still laid out in Arab style with tall slender cypresses, oranges, shrubs and flowers. Great use is made of water, not only for irrigation but to add to the beauty of the plants by acting as mirrors laid out among the flower beds or along by the paths. From place to place a fountain throws up its crystal

spray. All this water gives an impression of coolness in a place where the heat of summer is positively torrid.

Most of these ponds have a uniform depth of some 36 in. They are generally built of red brick with only a very low parapet, sometimes not even that. Some are bordered by flower beds planted with roses, annuals and shrubs, while others are flush with the cement or brick paths. Many gardens have a system of ponds on different levels with the water running from one to the other through narrow brick channels.

In one part of the Generalife gardens, water runs down a hollow in the cement balustrade each side of a flight of steps. As these gardens are laid out in terraces on the steep hill side, water runs freely from one set of ponds to the other. Even in the central courtyard of the palace there is a long pond lined with fountains whose slim jets form arches between lines of cypress. This sound of falling, running water is one of the greatest charms of these enchanted gardens. The Alhambra nearby also has some ponds which mirror the red walls and Moorish arches.

Most of these pools have goldfish. Some are very large and they vary in colour from very dark brown to almost white. The fish are never fed. The aquatic plants are mostly water lilies. The winter of 1956 was exceptionally



An amusing statue at the head of a shallow pond in the Alcazar Gardens at Sevilla



Ponds and fountains in the beautiful Arabian style gardens of the Generalife Palace at Granada

cold and all the ponds froze over. Luckily, although the air was icy the sun shone warmly at midday and some part of the surface unfroze. But many of the lilies died.

Cordoba is famous for its beautiful patios. So that the passer-by may admire them, the outer door of the house is left open and only a wrought-iron gate inside is closed. When strolling through the narrow streets of the old quarter one gets enchanting glimpses of marble patios filled with ferns, and giant *Philodendron* which climb up the pillars, palms and other plants. In the centre is the usual marble fountain or a marble pond, some with fish. The patio is the centre of the Spanish home. In the stifling summer evenings, family and friends sit round chatting till long after dark.

Sevilla, capital of the south, has its share of parks and gardens. The extensive Maria Luisa park has many ponds and pools, some with ducks and geese and others with fish. Most of these gardens make great use of "azulejos." These are brightly coloured glazed tiles which the Spanish delight in. These tiles are used for fountains, pictures (set in walls of streets or houses), advertisements, lamp posts, garden seats and paths. Many have pictures of flowers, fishes or people on them and all are gaily coloured. In the Maria Luisa park there are four seats surrounding a fountain in one corner of the gardens, and each tile represents a scene from the life and adventures of Don Quixote. Near the park is the Plaza de Espana. This square is surrounded by canals where young Sevillanos go rowing in summer. The water is some 6 ft. deep and full of goldfish.

In the shadow of the famous Giralda are the shady gardens of the Alcazar (entrance 3 pesetas, gardens only). This is the palace where General Franco stays when on his visits to Sevilla. The pools are full of fish, always of the same species. Many ponds have marble statues; there is a very amusing one of a cock crowing while standing on the back of what might equally well be a small dog or a small pig.

Madrid has one of the finest parks I have seen. El Retiro is right in the city centre yet it is so shady and full of quiet corners one might be miles from traffic or buildings. In the centre is the large artificial lake full of fish and rowing boats. It is some 156 by 300 yards. On one side is Madrid's largest monument, built in 1920 in memory of Alfonso XII. But it is the Rosaleda which is of most interest to pondkeepers. This is the rose garden with a centre pond full of goldfish and water lilies.

For those who are keen on ornamental pools in their gardens a visit to some of these lovely places will give them plenty of ideas as well as great pleasure.



August, 1957



One of the greenhouses in the Botanical Gardens, close to the Retiro Park, Madrid



An artificial lake containing fish near the Maria Luisa Park at Sevilla. The buildings house Army headquarters and offices

One of the pools in the Rosaleda, El Retiro, Madrid. A guard watches to see that the flowers are not stolen

A FIVE-days all-pet exhibition on a scale previously unknown in England was held at the City Hall, Manchester from the 18th to 22nd June. Billed as "The World Pet Fair," its aim was to foster more interest in pet-keeping and to bring home to visitors the possibilities of new and unusual pets. Apart from the obvious dog, cat, bird and tropical-fish exhibits there were also snakes, lizards, alligators, chinchillas, monkeys, lion cubs, a skunk, flying squirrels, hamsters, rabbits, ponies, bush babies, tree frogs, ants, kangaroos and an ocelot. Trade and other stands numbered in the region of 70 and visitors had plenty to see.

Aquarists had a competitive display of furnished aquaria which was judged by Mr. Herbert R. Axelrod of U.S.A., publisher of American aquatic literature, who also gave a talk on "America's Fanciest Guppies." Some really splendid examples of these guppies were on show, having been flown over specially. They were raised by Mr. Frank Alger of Wood Bridge, New Jersey, and were under the care of Mr. K. Fawcett of Surrey, who was at the Fair.

The club furnished-aquaria judging resulted in a first place for Bury Society, Burnley taking second and Middleton Society third. In the individual section Mrs. Loder of Burnley took the major award, Mrs. Wardle of Bury was second and Mr. Matthews of Stretford came third. All the tanks were well set up and there were some particularly attractive tiger barbs, thick-lip gourami, neons and harlequins on display. Mr. Axelrod was most enthusiastic about Manchester water, which he thought just perfect for fish-keeping. This is mainly brought 80 miles from the Lake district and is very soft (pH.7). Surprisingly for such a much-travelled man, Mr. Axelrod found northern accents rather hard to follow and paid me the rather doubtful compliment of saying he could understand me best because I spoke like a southerner!

Attendance at the show was very good considering the intense heat, with the thermometer steady around the 80° F. mark, and in the first 2 days over 16,000 people visited the show. Children were well catered for and lucky ones were able to take tea with the chimpanzees, have pony rides and enter their own pets daily for judging of "My favourite pet." Demonstrations of police-dog work by alsatians were given several times daily. The judging of eight finalists for the title "The Pet Queen" was held on the third day. A pet-dog show with unusual aspects came on the last day, novelty classes including dog with longest tail, most comical dog, longest ears, fastest tail-wagger, cheekiest dog, the most appealing begger, etc. Birds were in evidence with 20 classes and some grand aviaries and similar constructions were on view. Cat lovers had 34 classes in their section of the show.

Other aspects of interest were a fully equipped pet shop, cacti, a garden and pond with fountain and goldfish, the stall of the Manchester Home for Lost Dogs, the People's Dispensary for Sick Animals section and the scenic showing set with real trees and Welsh mountain range backcloth. Catering facilities included restaurant, cocktail bar and snack bar.

There were a few drawbacks; some of the stands were understaffed, the aquaria section listed winners with no indication of which tanks had won and some of the exhibits (at least for a time) bore no indication of what they were. The public want to be informed at a glance, not left guessing. Few will expose their ignorance by asking direct questions. This was not an aquarist show but it gave visitors the opportunity to get new ideas and to see at first hand the undoubted popularity of pets in general with the public. Aquarist trade stands at the show included Arbe

Perspex Aquariums, Robert Jackson of Hale, Liquifry, McLynn's Aquaria, Es-Es Products, Spratts, T.F.H. publications and Tachbrook Tropicals. The next British Aquarists' Festival takes place in October at Belle Vue, Manchester. Let us hope the weather and the attendance is equally favourable then.

RAYMOND YATES

FRIENDS & FOES

No. 59

Water Beetles (*continued*)

Larva of the water beetle *Ilybius*



COLEOPTERA

FAMILY:—Dytiscidae.

GENUS:—*Ilybius*, from Greek *ilyos*—mud, and Greek *bios*—life; thus "living in mud" or mud-dweller.

THERE are seven known species of the genus *Ilybius*, some more common than others, but all are bottom dwellers, scurrying over the mud seemingly busy about nothing. In appearance they look just like black beetles about two-fifths of an inch in length, with the tip of the abdomen projecting a little beyond the end of the elytra. Closer examination reveals a light patch about two-thirds down the length of the elytra, and a second just before its extremity. These patches form a useful means of identity. The beetles and larvae are both carnivorous, feasting upon *Asellus*, *Gammarus*, bloodworms and other aquatic friends of the aquarist. During the long, hard winters the beetles hibernate in the mud, and are sometimes found at the bottom of water barrels.

Although, as stated, they spend most of their time on the bottom of lake and pond, many specimens may be taken when resting in a clump of submerged grass. When so caught the creatures may be kept at home in small containers, and observation kept upon them. They appear to live quite happily if fed with their natural foods. If a little mud is provided they will spend considerable time churning it up, by vigorous movement, as though hunting. If hungry they are quick to pick up any small creature which is started from the mud by their activities.

C. E. C. Cole

Firemouth Cichlid

by PETER FAWCETT

IN November 1956, I bought four young firemouth cichlids, each approximately half an inch in length. For the first two or three weeks I kept them in a tank in the fish house, but they were very timid and disinclined to show themselves. I transferred them to a community tank in the living room, and they settled down quite well.

Early in April 1957, when the fish were 1½-2 in. in length, I noticed that two of them had paired off, and were keeping the other two at one end of the tank. I ignored this, as they did not appear to be doing any damage.

Late in the evening of 12th April, I noticed this pair cleaning one of the rocks in preparation for spawning. I immediately thought of moving them into the fish house but my wife reminded me of how timid they had been, and suggested that I removed all the other fishes. I was dubious but I caught them, and put them in the fish house. The firemouths had turned very pale (probably due to the disturbance) and I thought I had made a mistake, but I decided to wait and see what happened next day.

At 6.45 a.m. on 13th April the female was busy cleaning the rock again. I gave them a good feed of *Daphnia*, which was rather a treat as until then they had been fed mainly on Bemax and other dried foods. At 2 p.m. I noticed the female was placing her eggs on the rock with the male close by. I cannot say when the spawning was completed as I was not present. However, I came home and found the female fanning the eggs. The female seemed to do all the fanning right up to the time of hatching, giving the male an occasional dig, for being lazy, I suppose.

Holes were dug in the compost by the female, with a little help from the male. The eggs hatched early on the morning of 16th April, and the young were moved from the rock to one of the holes. During the next four days they were moved from hole to hole at frequent intervals, the



Photo: Laurence E. Perkins
Firemouth cichlid

female constantly fanning them. On one occasion as the female was moving her brood a few at a time in her mouth, the male appeared to be helping her. On closer inspection I noticed he was actually taking back the ones that the female had moved!

Earthworms alternating with Bemax was the parents' main diet now. By noon on 20th April the young were free swimming and I added a few drops of Liquifry when I fed the parents.

When the fry were about 10 days old I was feeding them brine shrimps and Grindal worms. It was not until the fry were five weeks old that I decided to remove the parents. I then caught and counted the youngsters and put them in batches of 50 in separate tanks, arriving at the grand total of 150 fine young firemouths. This being my first experience of breeding cichlids, I feel I have been most fortunate.

American Review

THE world's largest mobile aquarium is what *The Aquarium* calls the Aquarama, a 50-ft. long motor-drawn trailer which is currently touring America and Canada. It is fitted out with exhibition aquaria showing tropical marine specimens and throws open its doors (for a small fee) to the public at large fairs and country shows. A number of novel features have been developed to allow the tanks and specimens to travel safely. An electric generator giving 100-200 volts A.C. is installed for use during journeys between towns and for when the site is without a suitable supply line. Covers to the aquaria are tight-fitting and baffle plates prevent the water surging to and fro under the motion of the monster trailer.

In an article (in the same journal) from the Laboratory of the New York Aquarium, the bacterial organism responsible for the whitish patches of damaged tissue seen on the surface of the heads of the larger species of cichlids is identified as *Pseudomonas*. This rod-shaped motile micro-organism is present in the internal organs of infected fishes as well, and experiments have revealed that it is readily passed from an infected fish to a healthy one by contact. The infection does not usually result in the death of the fish even although in some instances a raw patch may

develop on the head which ultimately causes exposure of the brain. The organism is one that is very resistant to drugs so that at the present time no certain method of treatment can be advised.

Formation in New Jersey, U.S.A. of the America Guppy Association Inc. has been announced. It is hoped that this will be the parent association of branch societies throughout America, Canada and Mexico. To this end specimens of the fine strain developed in New York are promised to each society applying for affiliation. Such requests have already been received from Australian and Egyptian groups of aquarists, among others.

British Herpetology

ARTICLES in the most recent issue of the *British Journal of Herpetology* include an account of the reptilian fauna of Dalmatia, some observations on keeping zonures and geckoes in captivity, a description of an aqua-terrarium for keeping amphibians, hints on rearing crocodiles and a review of books of interest to herpetologists. The *Journal* is purchasable through the secretary of the British Herpetological Society, c/o Zoological Society of London, Regent's Park, London N.W.1.

Reproduction in the Livebearers

by

HAROLD L. ROSENTHAL



Sex difference of anal fin is exhibited by this pair of wagtail platys (male below)

OF the approximately 40,000 species of fishes that are known to-day, only a few have become well established as suitable aquarium species. Undoubtedly, new interesting fishes will be imported to take their place along side the well-known characins, cichlids, labyrinth and livebearing tooth carps, but it is extremely doubtful if any new importations will ever displace the livebearing poeciliids such as the guppy (*Lebistes*), the Mexican swordtail (*Xiphophorus*) or the platyfish (*Platypocilus*).

In my estimation, the common guppy should be crowned "king of the fishes—exotic and otherwise." In what other group of fishes can one find the attributes so favourably displayed by the guppy? Its variety and brilliance of colour, its continual activity (the males are always showing off), its non-fastidious habits and ease of maintenance, make it the ideal aquarium fish—endearing it to both the beginner and the veteran aquarist alike. The guppy is not the only livebearer which is so easily maintained. All of the common poeciliids breed readily under artificial conditions—as long as two fish of opposite sex are present. If some of the young fry are wanted, sufficient plant cover must be present for them to hide in until large enough to prevent them becoming fish food. For the hobbyist merely interested in maintaining a few guppies, swordtails, platys or other poeciliids, these are the only necessities to continue a small but steady population.

Saving the Fry

Various methods for saving the young fry have been

devised, and individual aquarists have their own methods—from extremely simple to grotesquely elaborate—which they prefer above all others. The young of the livebearing group are born well developed, sturdy youngsters ready to feed and seek cover from the cannibalistic parents and other fish. The young fry of the livebearers at birth range from a mere quarter of an inch for *Heterandria* to almost five-eighths of an inch for *Mollienisia*. At this size, the young can readily feed on finely ground prepared food, newly hatched brine shrimp and sifted *Daphnia*. Although fully formed at birth, the majority of young require some time (from a few minutes to hours) to absorb the remaining yolk sac, which makes them too heavy to move rapidly enough to escape their enemies, and to fill the swim bladder with air, thus making the body more buoyant.

It is at the critical period between birth and the free-swimming stage where most young fry are lost, primarily through cannibalism. To protect these vulnerable young, I prefer a tank not smaller than three gallons for guppies, five gallons for platyfish and swordtails and at least ten gallons for mollies. The prepared tanks contain no gravel or other ornamentation but are filled with profuse growths of water sprite (*Ceratopteris*), *Nitella* or any heavily foliated plants. The water level averages five to six inches at most and may be reduced to one to two inches for small females. Gravid females are placed in the "maternity" tanks at least a week before the expected brood, and for the sensitive *Mollienisia* about two weeks before.

"Events Expected"

With a little experience, the readiness of a gravid female to spawn can be determined quite accurately by observing the fullness of the fish, but I prefer to keep a notebook which indicates at a glance the time of the previous brood. (In the ensuing years I find my notebook more and more valuable, containing bits of information that would most assuredly be forgotten.) The heavy foliage hampers the mother fish and prevents her pursuing the young into the vegetation, while the fairly large tanks and shallow water give the female plenty of room in which to disperse the young. These precautions make it much more difficult for the female to find and eat the young. Within 24 hours after birth the female is removed. To further prevent cannibalism, gravid females are heavily fed with *Daphnia*, *Tubifex* and prepared food.

The type of "maternity" tank described is suitable for the livebearers which produce young at regular intervals of about 30 days and which tend to eat them, such as *Lebistes*, *Xiphophorus*, *Platypocilus*, *Mollienisia* and *Quintana*. However, these methods are not satisfactory for the poeciliid fishes (*Heterandria*, *Poecilistes* or *Pleurospilus*) which do not bear young at 30-day intervals but produce several young every few days. These fish are best maintained and bred in a tank by themselves with plenty of vegetation for the young to hide in. The young may then be removed to another tank until they are sufficiently large to escape other fish intent on eating them. In contrast to most poeciliids, the tendency to devour the young is quite rare with *Heterandria*, although an occasional female may become cannibalistic.

Signs of Sex

After the young are born, they appear to be without sex, although the sex organs have already differentiated into either male or female. When the young are 35 days old (in the case of *Lebistes*), the females begin to increase in size disproportionately to the males and the gravid spot becomes noticeable. At about this time also, the anal fin of the male begins to differentiate into the gonopodium of the mature poeciliid male. The first colour markings of the male appear about 48 days after birth. The platyfish usually becomes sexually mature at about three months, while the swordtails and mollies become mature anywhere from four to nine months. Young *Heterandria* females develop the gravid spot at about four weeks of age but the males do not develop the typical gonopodium for about eight weeks.

With all the livebearers, immature females may receive the sperm from mature males, and retain the viable sperm in the ovary until maturity is reached. If virgin females are required for the purpose of line breeding, the unsexed young should be isolated from adult males immediately after birth. Since immature males are not capable of fertilisation until the gonopodium begins to develop, all the young may be kept together safely for not longer than three weeks of age for *Lebistes* or three months for *Xiphophorus*, depending on the characteristics of the species. At this time (earlier if possible), the immature fish must be maintained in individual aquaria until sex can be easily determined.

The fact that some fishes bear living young has interested many for well over 100 years, and knowledge concerning the mode of reproduction has grown into voluminous quantities. For those sufficiently interested to keep, breed and raise the livebearing tropical fishes, the following discussion of the reproductive methods of the more common varieties may be welcome.

Ovoviviparous Fishes

The term "livebearer" may infer a mode of reproduction similar to the higher mammals, including the human race, in which the unborn young are completely nourished by the mother. This is not so with the livebearers. In fact, if one opens the abdomen of a gravid female (after killing the fish), embryos will be found which contain a large amount of yellow yolk. Closer examination will show that the developing embryo is almost identical with the embryos of the egg layers. It can be inferred immediately that the livebearing fishes merely retain the eggs in the ovary—and that the yolk of the egg supplies the necessary nourishment for the developing embryo. However, in a closed space such as the abdomen of a gravid female, oxygen must be obtained by the embryo in order to survive. The developing embryo, therefore, must be and is intimately associated with the tissues of the ovary and the necessary oxygen is derived from the blood stream of the mother. For the poeciliids such as *Gambusia*, *Lebistes*, etc., the protection of the embryos in the abdomen and the supply of oxygen is the only association between mother and young.

The embryos of *Heterandria* are more intimately associated with the female since the amount of yolk furnished by the egg is insufficient for its needs. A large portion of the nourishment, as well as oxygen, is obtained from the mother. For this reason it is believed that *Heterandria* represents the most highly evolved species of the Poeciliidae, while the other poeciliids represent intermediate steps between the egg-laying fishes (oviparous) and the livebearers (ovoviviparous). An even more intimate relationship between the mother and the young is present in the family Goodeidae—a discussion of which is beyond the scope of this article, however.

Frequency of Brood Production

It is well known that most livebearers produce broods at regular intervals of about 30 days—depending on temperature, lighting, and the species of poeciliid involved. In nature, conditions of temperature and intensity of light vary considerably with the seasons, and it is to be expected that fishes will respond to these changes. For example, the guppy, swordtail, molly and platyfish bear young (under average room temperature, 72°F., and constant light conditions) at regular intervals of 28 to 32 days. If the average temperature is increased to 78°F., the brood period may be decreased to about 25 days, and if the amount of light is increased at the same time (in intensity and length of time, conforming to the summer season) broods may occur with intervals as low as 22 days. On the other hand, decreasing the temperature to 68°F. will prolong the interval to 34 days or more. Decreasing light in conjunction with a lowered temperature below 60°F. (representing the winter season) may completely arrest brood production.

Of all the livebearers, the guppy produces broods of young with the greatest regularity and is least affected by changes in temperature or lighting. At the other extreme, species of *Mollienisia* and *Gambusia* (which are not strictly tropical fishes) are greatly affected by seasonal or artificial changes in temperature or light. Under natural conditions brood production ceases completely as the cool seasons of the year commence, rising to a peak during late spring and summer as the water becomes warmer and the days longer. Even in the aquarium, under constant conditions of temperature and light, the interval between broods lengthens slightly and the brood size becomes somewhat smaller during fall and winter, indicating that seasonal fluctuations are inherent but can be modified to some extent by environmental conditions. Although these variations depend to some degree on individual female fish, aquarium-born and reared specimens tend to lose the inherent cyclical periods, and usually produce young at quite regular intervals.

Still a third group of livebearers is exemplified by the mosquito fish, *Heterandria formosa* and *Poecilietes* species. These little fish at first glance appear to have lost any appearance to cyclical spawning. At temperatures of 70°–75°F., small broods of two or three young are born regularly at intervals of four to six days. However, during the winter months under natural conditions the interval between broods may increase to 30 days or more or may cease entirely as the temperature and light conditions decrease. In the heated and artificially illuminated aquarium, broods are produced regularly for months on end.

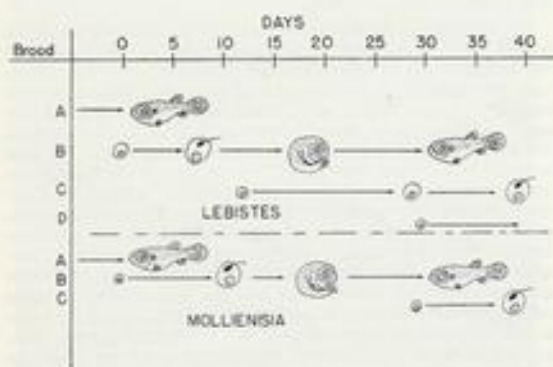
Many other types of ovoviviparous fish occur but in general these can be found to fit either of the described cases or to be intermediate between any two groups. For example, species of *Poecilietes* and *Limia*, obtainable at times as aquarium fishes, seem to be intermediate between the *Lebistes* type and the *Mollienisia* type. *Quintana*, although closely resembling the *Lebistes* type, is intermediate between *Lebistes* and *Poecilietes*.

The problem confronting us concerns the difference in the method of reproduction between the groups, *Gambusia* - *Mollienisia*; *Lebistes* - *Platygoceilus* - *Xiphophorus*; *Heterandria* - *Poecilietes*. A means of studying the events occurring in the ovary of the livebearers depends largely on our knowledge of the time a gravid female previously bore young. Since the sperm remain viable in the ovary for an indeterminate time (as long as 10 monthly broods in the case of an isolated female swordtail) it is possible to remove the ovary at definite time intervals after the birth of a brood and by microscopic examination determine the stage of development of the ova and embryos.

Sequence of Development

In this way the three groups of fishes have been studied. Although broods are produced at intervals of 30 days in the *Lebistes - Platypocilius - Xiphophorus* group, the gestation period (the time between actual fertilisation of the egg and birth of the embryos) is about 22 to 24 days. This difference of six to eight days is the time necessary for the eggs in the ovary to develop to a stage where fertilisation can occur. All of these eggs ripen at the same time (within a day or two) so that all embryos in the ovary belong to the same brood.

During the development of the embryos of a given brood, the next group of eggs remains dormant until the first brood is born. At this time eggs of the next group develop rapidly and are fertilised by the waiting sperm. As the first and second series of eggs develop, a third and fourth group are formed from the cells of the ovary, but remain quiescent until the previous young are born. Occasionally an indivi-



A diagrammatic representation of the events occurring in the ovary of *Lebistes* and *Mollienisia*; in *Lebistes*, the immature ovum (brood B), relatively large, is fertilised six-eight days after birth of brood A. The ovary produces ova (brood C) which remain dormant until brood B is born. The ova of brood D are formed during the development of the embryos of brood C. In *Mollienisia*, the immature ova (brood B) are smaller than in *Lebistes*, but mature rapidly after the birth of brood A, and are fertilised nine-ten days later. During the development of brood B, the ova of brood C are produced, and the cycle is repeated.

dual female may have two groups of embryos in the ovary at the same time, but this is a rare condition and only occurs when the endocrine organs (under the influence of strong light and optimum temperature) are superactive.

The development of the eggs in the ovary of the *Gambusia - Mollienisia* group is similar to that of *Lebistes*. However, the unfertilised dormant eggs of *Mollienisia* are much smaller than in the *Lebistes* group and require about two days more to ripen sufficiently for fertilisation to occur. In both of these groups only one set of embryos is present at any given time.

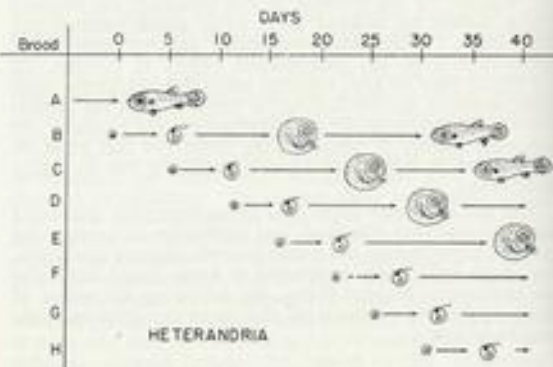
The reproductive method of the *Heterandria - Poeciliastes* group presents a different condition since as many as six to eight separate groups of embryos, in various stages of development, may be found in the ovary at one time. Unlike the other groups of poeciliid fishes in which the eggs fail to develop beyond a given point until the previous brood is born, a few eggs of *Heterandria* are formed and fertilised every few days while previous groups of embryos are maturing. The fertilised eggs continue to develop into embryos, leading to a condition of "superfoetation." At the birth of

a brood, the entire series of young move up another step, and fresh eggs are developed from the ovarian tissue.

Viability of Sperm

An interesting feature among the livebearers is the viability of the retained sperm in the spaces of the ovary for long periods of time. Once a female has been fertilised and then completely isolated from male fish, she may continue to produce young at regular intervals for many months. This situation makes line breeding the livebearers a difficult matter, since virgin females must be used in carefully controlled matings, with subsequent isolation of the female. Without these precautions it is almost impossible to separate the young of one father from another, unless the characteristics inherited from one parent are strikingly different from the characteristics of the other parent.

However, the retained sperm are not as viable as fresh sperm, and it is possible to displace the sperm with fresh



A diagrammatic representation of the events occurring in the ovary of *Heterandria*; upon birth of brood A, the ovum of brood B matures in four-six days and is fertilised, and the embryos begin to develop. When fertilisation of the ova of brood B occurs the ova of brood C develop to the point of fertilisation. This cycle may occur for as many as six-eight consecutive broods. Consequently, the ovary contains many broods of young in different stages of development, which are born at intervals of four-six days.

The gestation period, however, is the same for all broods.

sperm by repeatedly mating the female with the desired male. After a few broods, all young will be fostered by the desired male. As mentioned above, the ova of *Lebistes* does not mature for some six to eight days after the birth of a brood. During this developmental period, it is possible for fresh sperm to enter the genital tract and fertilise the eggs. After this period, mating of the female is of no avail, since the previously retained sperm will have already caused fertilisation. It can readily be seen therefore that an especially valuable previously fertilised female may be utilised for developing a highly desirable characteristic in an emergency, although such procedures may lead to doubtful parentage and are not to be recommended.

Much more can be said about the interesting livebearers, and much can still be learned about their mode of reproduction.

(This article was first published in "The Aquarist" in 1950. It has been published again to meet the requests of new readers for information concerning the breeding behaviour of live-bearing aquarium fishes.)

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I should very much like to breed *Rasbora heteromorpha*. Can you give me some information about the breeding requirements of this species?

This fish is not easy to breed. It needs sparkling, clear, acid water, a clean sandy bottom and clumps of plants such as *Cryptocoryne* and pygmy sword plants (*Echinodorus*). The temperature should be somewhere between 75° and 80°F. The rasboras normally swim in large shoals, and some aquarists have been successful in spawning *R. heteromorpha* by adopting the community method of spawning—several males to two or three ripe females. The males chase the females through the plants and, as the excitement grows, the females spawn on the undersides of broad-leaved plants. The adult fish should be removed from the aquarium when egg-laying is completed. The eggs should hatch in about 3 days, and the fry need plenty of freshly cultivated Infusoria.

I have just bought a catfish which the dealer told me belongs to the *Clarias* genus of naked catfishes. Please can you tell me something about the temperature requirements and feeding habits of these fish?

The *Clarias* catfishes are easy to feed and easy to keep in any temperature between 68° and 85°F. They are excellent scavengers and will eat almost anything dropped into their aquarium: dried food, earthworms, cooked vermicelli, cooked rice, pieces of raw or cooked meat and the like. They are nocturnal feeders, and frisk about the bottom of the tank late at night, or after dark. They should not be



Photo:

W. S. Pitt

Harlequin fishes (*Rasbora heteromorpha*) are not easily bred. One method involves keeping several mature individuals of both sexes, rather than a single pair, together in a breeding aquarium.

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.

placed in a tank housing small fishes, or else these will be swallowed down at one gulp. But they are not aggressive fishes, and mind their own business when placed with fishes of their own size. *C. angolensis*, which sometimes comes on the market, grows to a large size and looks like an eel with whiskers. They are difficult fish to catch in a net, and usually give the aquarist a soaking when they are lifted from the water. They are very hardy, live for a long time, and make most interesting pets.

One of my guppies—a female—has developed a boil-like protuberance or tumour on the side. I have been told that it is possible to cut this out of the fish. Is this true?

In most cases tumours can be taken away by slicing them off with a sharp knife, or preferably a clean razor blade. After the operation has been carried out, the raw place should be smeared with acriflavine or Friar's balsam and the fish returned to the aquarium as quickly as possible.

I have been successful in spawning some egg-layers, but find that after a week of feeding the fry with finely powdered dried food, a greyish-white mould or fungus starts to carpet the floor of the aquarium. How can I stop this fungus occurring, for I fear that sooner or later it will seriously pollute the water and endanger the lives of the baby fish?

The trouble lies in too-heavy feeding of the fry with dried food. Little and often should be the rule. Sometimes the introduction of a few large ramshorn snails, after the fry have become free-swimming, will help to keep down the amount of uneaten dried food accumulating on the bottom.

I am thinking of using sheets of Perspex to divide my large aquarium into several small compartments. Is Perspex safe to use in the aquarium?

If Perspex is given a good soaking in several changes of water before being placed in the aquarium it should not cause any trouble. But if the sheets you use have a strong camphor-like smell about them, even after soaking in water, it would be wiser not to place them in the aquarium.

I have been given a small plastic-sided aquarium to hang on a wall. An aquarist friend has told me this is too small to serve as a home for fish. Should I take this advice?

Your friend has given you good advice. These tiny wall aquaria are not much good for fish-keeping. But a pair or two of very small tropicals might be kept in one of them. We suggest a pair of guppies, or a pair of mountain minnows. The aquarium should be kept in a warm place, or a 15 watt electric-light bulb fitted close at hand to keep the water temperature above 65°F, winter and summer alike.

I have lots of tiny flat worms swarming over the sides of my aquarium, especially late at night. How can I get rid of these worms, please?

Tie a small piece of washed liver, or meat, to a thread, and suspend it in the aquarium overnight. Throw it away early next morning. Lots of the tiny worms will be caught by this simple trap, and by repeating the performance nightly over a week or two, you will considerably reduce their numbers. Introducing a few drops of a 5 per cent. solution of methylene blue to the water, until it is coloured a distinct 'blue,' will also help to eliminate the worms.

Some time ago I bought two fish which the dealer informed me were Jack Dempsey fish. But a friend has since informed me that the fish in question are zebra cichlids. The fish are young. Is it possible to confuse the one species with the other?

The zebra cichlid has a slate-grey to dirty-white ground with several dark-grey to black vertical bars on the sides. The Jack Dempsey fish, when young, has metallic coloured scales sparkling with silver and gold lights and a dark blotchy marking on about the centre of the body. As the fish grows to maturity, the body colour darkens, and the scales flash a myriad of blue and green lights.

My angel fish have spawned twice during the last 2 or 3 months, but each time eggs have been laid they have been attacked by fungus within a day or two. Please can you tell me the cause of the trouble? I am a beginner in tropical fish-keeping.

Infertile eggs turn white and are soon covered by fungus. But too much light falling on the eggs, or unhygienic conditions in the aquarium will also lead to an outbreak of fungus. Try shading the aquarium with tissue paper or the addition of more submerged or floating plants, and keep the floor of the aquarium well siphoned or dip-tubed to prevent the accumulation of uneaten food, especially dried food, turning bad on the bottom.

I have read and been told by aquarists that copper or brass in the aquarium will poison the water and so kill the fishes living in it. But I have had a small piece of copper strip in my aquarium for several weeks, and the fishes do not appear to be suffering any ill-effects. Is this talk about copper and brass being toxic to fishes just another fallacy, or "old wives" tale?

Most metals submerged in the aquarium will, in time, kill the fishes. But you must realise that it might be so long as a year before the ill-effects of the metal on them will become apparent. Some species are more susceptible to metal poisoning than others. Then again, the amount of metal submerged in the water must be taken into account. A small strip of copper or brass in a large aquarium would not affect the fishes in it so quickly as a small strip of brass

or copper in a small aquarium. You would be well-advised to remove the metal from your aquarium before it renders the water unfit for the fishes.

Can you tell me a few ways to produce Infusoria?

One method of obtaining Infusoria is to cram crushed lettuce leaves into a two pound jar, fill it with tepid water, stand in a warm, dark place and, when the water gives off a definitely unpleasant smell, hold it up against the light, and even with the unaided eye you should be able to see greyish specks (Infusoria) moving about in the water. A rich culture would reveal itself as a slow-moving greyish-white cloud in the water. You can achieve the same results with slices of raw potato, hay, banana skins or a mixture of any of these things. Half a cupful of water from an established aquarium added to the jar will help to get a culture going more quickly than tepid water from the kettle or hot-water tap alone.

Can you tell me the best conditions for breeding tiger barbs.

Tiger barbs like clear water, a bright light and plenty of fine-foliaged water plants such as *Myriophyllum* growing in the aquarium. The temperature of the water should be about 75°F., this being raised to about 78°F. as the fish colour up and the female plumps out on the sides.

I have some loaches in my tropical aquarium, but they keep hidden away most of the time, and when food is introduced, the other fishes in the aquarium snap it up, and the loaches seem to get nothing at all. How can I make sure that the loaches get enough to eat?

Loaches do a lot of their food finding after dark, so if you drop some finely minced earthworm or scraped raw or cooked meat into the tank after dark, the loaches will be able to eat in peace. Failing live food or meat, sprinkle some dried food on the surface of the water last thing at night.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have a small pond about 5 ft. by 3 ft. with a depth of about 2 ft. I put about 3 in. of shingle at the base when I made it. I have two very small rudd and two small goldfish in it. My trouble is that a slimy green weed forms round the plant life and although I manage to get some out it seems to flourish. What can I do to get rid of it?

The shingle at the base may be holding some decaying material which might encourage the algae to grow. I think that you can add a few more fish to your pond and if you do not feed them for a time artificially they can eat up a good deal of the soft algae. It is surprising how many fish will eat this soft algae as long as they are not over-fed by the owner. You can assist the clearance by hand removing and once the other water plants grow stronger the weed may be eradicated.

I have an out-door pool with ten fairly large goldfish. I have been told that there are two or three females in amongst them. Can you tell me how to tell the difference between males and females?

In the breeding season most of the males develop small white tubercles on the gill plates and also on the pectoral fins at times. All do not do this, however, but it is generally possible to sex the fish by examining them from above, when the females will look much fatter than the males and often appear fatter on one side. Once they have laid their eggs they may look more like the males. When the fish are preparing to spawn the male fish chase and vigorously nudge the female fish to encourage them to lay.

I have a tank which is 10 in. by 10 in. by 18 in. deep. I have 5½ in. of fish in my tank; can I add another one?

The trouble with your tank is that it is too deep for its

surface area. You have only 100 sq. in. of surface area and so can have only about 4 in. of fish. You already have over the limit and so you must not think of adding more.

Is there such a fish as a catfish and could it live at a temperature of 60°F.?

There are very many species of catfish. Some are tropical and some are coldwater. The coldwater type would live in a temperature of 60°F., but it must be realised that these catfishes can grow very large and become dangerous to other smaller fishes in the tank.

I am trying to breed white worms and have them in peat and fed with white bread and milk. There are a number of small white pests rather like tiny spiders in the box. The worms seem to keep away from them and go to the bottom of the peat where they cannot get any food. What can I do about it?

The pests are a form of mite, and I do not think that they will do any harm to the worms. They are not likely to cause the worms to go to the bottom; the worms would come up for food, but only in the dark. Have you darkened the box to encourage them to feed in daylight?

I have a fairly large pond and the water is all green. There are some oxygenating plants in the pond but I cannot see much of them at the moment. I have been told that if I empty the pond and change the water it will only go green again. What do you advise?

It is true that if you refill the pond with fresh water it might soon go green again, but I still think that it is worth a trial once or twice if it is not too big a task. You see, the green is caused by tiny single-celled plants called algae. If the oxygenating plants you have were growing strongly

they would help to kill or crowd out the algae. At the moment the algae have the strength and quantity to overpower the plants. If you empty the pond and put fresh water in the oxygenating plants will have a chance to grow and so stand a better chance of fighting the algae. One or two changes of water may enable your water plants to get stronger, when the trouble from the algae may cease.

I bought a fantail about an inch long and after a few days it developed some dark-red streaks on and around the gill covers. Then it lost its balance and cannot swim properly. I cannot see any signs of gill flukes; what is the trouble?

The red-blood streaks around the gills does rather incline me to think that gill flukes are the trouble. The fact that the fish is ill could cause it to lose its balance. It may not be that there is anything actually wrong with the swim bladder, it may get right once the condition of the fish improves. Give the fish a Dettol bath, in a solution of a quarter-teaspoonful of Dettol to a half-gallon of water. Watch the fish whilst it is in the solution. Remove it in 10 minutes or sooner if it turns over. Replace it in fresh water and keep it a bit warmer than usual, about 68° F. could be satisfactory. Give live foods for a time if it will eat at all. Many people give a fish a Dettol bath and are afraid when the fish turns over after a time, fearing that the fish will die. Most fish act in this manner in the solution after a given time but soon recover when they are placed in fresh water. The treatment gives a cure from the pests as long as the fish is not returned to a tank which is badly infested with the parasites.

I have been making artificial caves for my tanks out of concrete. They have been soaking in water for a month or so. Will they be safe to put in my tanks now?

The concrete may be safe by now as most of the free lime will have gone into the water. Whether they will be safe for your tank depends on one or two points. If plenty of concrete is placed in a small tank which normally holds little water the concentration of free lime can be enough to harm the fishes. Some species of fish are more prone to trouble from lime waters than others. "Caves" can be a source of trouble in a tank as uneaten food can be washed into them where it decays and pollutes the water. Also, a fish may get trapped at the back of them.

Can you tell me which plants grow well together for a 36 in. by 15 in. by 15 in. tank and how many plants I shall need?

To enable your tank to flourish and keep in good order for some time I think that it is wrong to try to grow too many kinds of plants together. I would advise you to stick to four kinds only. If you were setting up a furnished tank for a competition it would be another matter, but for your purpose the smaller the number of varieties the better will they grow. Try the following plants: *Lagarosiphon major* in one back corner, *Egeria densa* at the other back corner, *Hygrophila polysperma* about the middle distance of the base and *Vallisneria spiralis tortu* at the front corners. Try to plant all in clumps, say, of at least eight shoots. Do not worry if the tank looks a bit bare for a time, the plants will soon grow. Once the *Lagarosiphon* and *Egeria* grow up to the top of the water, layer some of them by placing a stone on each shoot, when it will take root and send up fresh shoots. This can be carried out so that the back of the tank will soon be screened. This will be a better idea than sticking individual shoots of a plant at regular intervals all along the back. The *Vallisneria* will soon send out runners which in turn can be trained where needed.

I want to keep some goldfish in my tank but I have been told that they will cloud the water. I would have plants as well. Is it correct?

Goldfish will not cloud the water of your tank any more than other species of fishes. Cloudy water can be caused

Bloodworms

Can you please identify for me, and tell me how to get rid of it from a pond, an aquatic blood-red jointed worm about 1 in. long, which I found eating lilies from the inside, under water.

The creatures which you say are attacking and eating your lilies from the inside are the larvae of a fly, the *Chironomus* midge. It is somewhat doubtful whether they would in fact attack healthy leaves, and I suggest that they are doing their normal job of scavenging among dead and decaying vegetation. I am afraid that there is no way of getting rid of them, for the flies lay "egg ropes" under water, from which these "bloodworms" hatch. Chemicals would probably destroy the plants.

Both tropical and coldwater fishes greatly relish *Chironomus* larvae and pupae as food, and will seek out and devour as many of them as they can. When not eating, the larvae construct mud tubes in which they rest, and it is probable you will see numbers of these on the bottom of your pond.

C.E.C.C.

by fish churning up fine sand or silt from the bottom and can be avoided by having coarse gravel or sand on the bottom. The removal of much of the droppings from the fish at least once a week will also help. If the tank gets too much light the water can turn green through the formation of algae; to remedy, reduce the light. If too much dried foods are given and are not all cleared up by the fish the water can become polluted and Infusoria will form and cloud the water with a milky hue; to remedy, do not over-feed. Once the water plants grow well in a tank they will keep the water clear as long as other conditions are right.

I have a fairly large pond in my garden but the depth is only 12 to 16 in. I have been told by a dealer that goldfish would not be safe in the winter and he has recommended golden orfe. How can I keep goldfish in the pond, even if it means some warmth in the winter and fresh water in the summer?

I don't quite agree with the information given to you. Golden orfe require more oxygen than goldfish and if they were trapped under ice for some time in the winter and the water was in any way foul they would soon die. It is not the cold which kills goldfish in the winter but the foul oxygen-lacking water which is fatal. In the summer the golden orfe would again be in trouble in the warm water, far sooner than would goldfish. You can improve matters in the summer by installing a fountain or waterfall and in the winter you could have an immersion heater of the soil-warming cable type, which is plastic covered, to enable you to keep at least a fair portion of the pond free of ice. Normally shallow water is sooner warmed and sooner cooled than deeper water.

I have a problem concerning the rearing of goldfish. Some time ago I successfully bred a number of goldfish and kept them for a time at a temperature of 75° F. Later I put them into tanks. I gave a number away to friends but here is the mystery. After 18 months they are only about a half to three-quarters of an inch in length. None of them seems to have grown as they should have done, or is this the normal rate of growth?

It is quite possible to grow on young goldfish to the size of yours in two months. By the end of the first season they can be 3 in. long over all, but a great deal depends on when they were hatched. Fry hatched in April or May have a very good chance of growing on well before the cold weather. Fry hatched very late in the year do not get this chance and many such fry never seem to grow on well. It may be that your fry never had sufficient space in which to develop. To rear 1,000 fry to an inch in length you

would need at least 84 tanks each 24 in. by 12 in. by 12 in., and even then unless they were fed correctly they might not thrive. It is a fact that many fry do not grow on well unless they get the right conditions and food in the very early days, especially in the first fortnight after hatching. The young fish may yet grow on well if they are placed in an out-door pond where they can get plenty of swimming space and the right kind of foods. On the other hand some fish which were stunted in youth never grow on well.

I have a small pond in the garden which gets rather green in the summer and then when winter comes the water clears at first and then turns milky and stinks. The fish are then in trouble. What is the reason?

The green water is, of course, caused by algae, and if this gets very thick it can cause a great deal of trouble when it dies, as the tiny plants pollute the water. Pollution is also caused by the decaying of water-lily leaves and other vegetation in the water. Small ponds should be cleaned out thoroughly each late autumn and so help to keep the water clear for the whole of the winter.



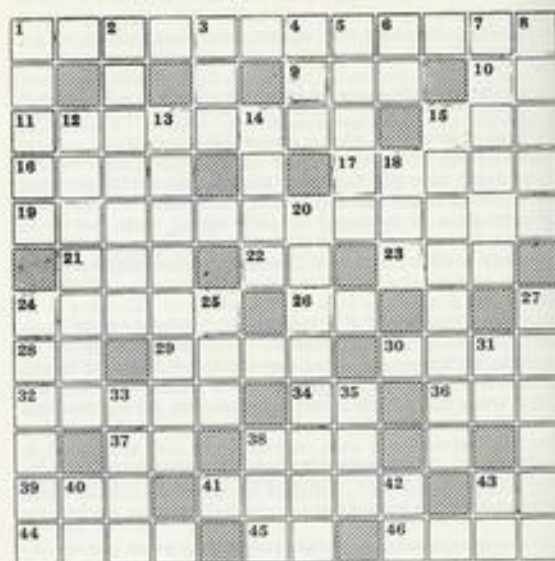
Shubunkin goldfish of mature size can be bred in an aquarium if only a small number of youngsters is required

I have a pair of shubunkins which I hope will breed this year. I have only one tank, 24 in. by 12 in. by 12 in. When the eggs are laid is it essential to raise the water temperature to 75° F. to hatch the eggs?

The fish could breed in your tank but you will have either to remove the parent fish once they have spawned or take the eggs away. If there is plenty of water weed in the tank the eggs will adhere to these and then some can be taken out for hatching in a safe place. If left with the parent fish most of the eggs will be eaten or if some fry are hatched they would probably also be eaten. The need for raising the temperature of the water is to see that the eggs do not take too long to hatch out. At 70° F. they hatch in 3 to 4 days. If at a lower temperature they take longer, as long as a fortnight if not at more than 50° F. for most of the time. Whilst the eggs are hatching and developing they are subject to attacks by various pests and so the need for a fairly quick hatch is apparent. The sooner the fry are out of the eggs the less chance of them being eaten or damaged.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

- Variety of anacharis (6, 6)
- Small island in a river (3)
- Indefinite article used before vowel sounds, as an eel but not an newt (2)
- Vain mist for dietetic elements (8)
- Silver (3)
- Black as ebony (4)
- Roe added with gutterals is a mistake (5)
- Herpetology (7, 5)
- Herb of grace for regret (3)
- For example (1, 1)
- Common exclamation when upset in Moy? (1, 2)
- Fine linen thread (5)
- End of the imago (2)
- Motoring body (1, 1)
- Egg-shaped (4)
- Breathing organ of fishes (4)
- Nip in the south-east and this marsh bird appears (5)
- Half of 29 Across is enough for Mr. Capone (2)
- A kind of earthworm (3)
- Sappers (1, 1)
- Organ of sight (3)
- Prefix signifying "on" (3)
- B—— leak in your tank? No, it is not suited to it (5)
- Silent service (1, 1)
- One of the suckers of 2 Down (4)
- A long time in short (2)
- These are a riot when shaken up (4)

CLUES DOWN

- Young eel (5)
- This "terror of the deep" is of the same family as the tiny *Hydra* (7)
- Genus of trees (3)
- Anglers and aquarists can carry this without being scapegoats (3)
- When the trout does this the fly fisher gets busy (5)
- Get it? (2)
- A rod in your reward is a mockery of the original (6)
- Irate (5)
- Spanish (7)
- A net pole (anagram) (8)
- Perhaps 9 Across (4)
- This sounds an odd sort of flower (4, 4)
- Railway Transport Officer (1, 1, 1)
- Not viviparian (8)
- Led around the ash for the birch? (6)
- She started man's troubles (3)
- Lacking in the pigmentation normal in the species (6)
- No need to look far for this in the loch (2)
- Beautiful plant for the water-side (4)
- The bleak is green at heart (3)
- 14 Down without water (3)
- A mass of mixed types (2)
- He will be Sir —— (2)
- and he as King Emperor (1, 1)

PICK YOUR ANSWER

- Horace Walpole's cat, "drowned in a tub of goldfishes," was named: (a) Gray; (b) Po-yang; (c) Selma; (d) Strawberry.
- The scintetail is the popular name of: (a) *Rasbora daniconius*; (b) *R. leptocoma*; (c) *R. pauciperforata*; (d) *R. triostata*.
- Hemigrammus pulcher* was named by: (a) Ahl; (b) Ladiges; (c) Myers; (d) Regan.
- Corydoras tabatinga* is the erroneous name for: (a) *Corydoras arcuatus*;

- (b) *C. melanostriatus*; (c) *C. nattereri*; (d) *C. palmas*.
- Apoecichthys jordani* (the blind cave fish) was first collected in: (a) 1916; (b) 1926; (c) 1936; (d) 1946.
- Hydrocladius* (water key) is represented by: (a) three species; (b) six species; (c) nine species; (d) 12 species.

G.F.H.

(Solutions on page 120)

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.

RECENT events at **Riverside Aquarium Society** included a table show for annabandids. Mr. Barnes, Siamese fighter taking first place. A table show for A.O.V. pairs was won by Mr. Daynes with a pair of *velifera* mollies. Mr. C. Barnes has been elected chairman. The secretary/treasurer is Mr. T. Thewless, and show secretary, Mr. E. Daynes. The semi-finals of the Diana Charles Trophy, played away to Staines, was won by Riverside by 20 pts. to 17 pts.

A MOST instructive talk by Mr. Mackrell was given to **Leeds and District A.S.** He spoke on breeding some of the more difficult fish. The return quiz with **Bradford and District A.S.** was also a highly enjoyable occasion. The open show is to be from 18th to 21st September, and show secretary, Mr. G. Boothroyd, 6, Well House Drive, Leeds, 8, will be pleased to forward entry forms.

THE members of the **Nuneston Aquarists' Society** spent a very interesting evening when they visited the museum in New Walk, Leicester and were met by Mr. Hunt, Keeper of Biology. The aquarium naturally attracted most attention, especially the pike (12 lb approx.), a truly magnificent specimen. A tank of gudgeon also evinced much interest, particularly when it was noted that quite a number of the fish were sightless. It was explained that this was due to a disease which was prevalent in the water from which they were taken. Strangely enough the malady did not affect any other species, and even with the gudgeon the affliction did not appear to affect their lively activity in the tank. The feeding methods and maintenance of this section of the museum were also noted with interest.

BATH Aquarists' Society held a well-supported livebearer tropical table show at their last meeting, there being 26 (total) entries in two classes. These fish were judged by Mr. Victor Jones (Bristol Zoo Aquarium). The results were: Egglayers—1st, Mrs. Hickling (Australian rainbow); 2nd, E. Challenger (tiger barb); 3rd, G. Stone (lemon tetra). Livebearers—1st, 2nd and 3rd, E. Challenger, for lyretail guppy, *velifera* molly and scarftail guppy respectively.

The first annual show of **Ringwood Aquarists' Club** was held recently and was well supported with entries, nearly 150 fishes being entered. Mr. H. J. Pearson secured six firsts and Mrs. M. Seabright three firsts. The Botibol Trophy, awarded for the most points gained throughout the year, was won by Mr. H. J. Pearson. Mr. Botibol kindly presented the prizes, and in his speech, complimented all those who had helped to make this show a success.

AT the **Dundee Aquarium Society's** annual general meeting the following office-bearers were re-elected: President, Mr. A. Robertson; secretary and treasurer, A. Garland, 15, Morgan Street, Dundee; committee, J. Forbes, J. Sidey and A. Cross; librarian, K. Webster. New office-bearers: Vice-president, P. Greening; committee, E. Seymour and F. Ripley. Trophies and plaques, etc., for table show throughout the season were presented to winning members by Mrs. Barr of the Perth Aquarist Club.

AN announcement from the **Scottish Aquarists' Society** states that the hon. secretary, R. B. Dickson, who has been ill for some time,

has found it necessary to give up his position with the society. For health reasons he has moved from Glasgow to one of the Clyde coast resorts and it is hoped that this will have the required result and that he may be able to resume his position in the society at a later date. The executive committee of the society would like it to be made known that despite a most painful illness, Mr. Dickson has continued his activities for the society for some months now and these efforts are not without reward as the society is once more holding its annual open show in the McLellan Galleries, Glasgow, during the week commencing 14th October. The show will be open to the public from Wednesday, 16th to Saturday, 19th, both dates inclusive. Entry forms for this open show can be obtained from the temporary hon. secretary, K. A. M. Robertson, 32, Edzell Drive, Newton Mearns, Renfrewshire.

THERE were 24 classes comprising 114 exhibits at the **Hampstead Aquatic Societys'** annual show held on the 13th July. The exhibition proved extremely successful and was a credit to all connected with the organisation and display. Judges were Mr. J. H. Gloyn and Mr. S. Harker, and the results were as follows: Common goldfish, fancy goldfish, any variety shubunkin, British native and foreign coldwater—Mr. L. G. Lawrence, first in each class, including the best fish in the show, which was a golden rudd. In the tropical section, five firsts were gained by Mr. P. B. Utton and other winners were Mr. T. W. J. Pilgrim, three firsts, Mr. L. Costman, three firsts, and Mr. C. K. Walker,

also three firsts. Mr. R. O. B. List, Mr. W. G. Adams and Mr. K. J. A. Pye also obtained two firsts each.

RECENT activities of the **Yeovil and District A.S.** have included a talk by the president, Mr. N. Stainer, on "Fish, from the dealer's point of view," and also a trip to the Queensborough Fisheries at Wraybury, near Staines. Results of the members' annual show were as follows: Best goldfish, Mr. A. Dominy; best black sailfin, Mr. L. Brook; best barbs, Mr. N. Stainer; best beacons, Mr. G. Aston; best catfish, Mr. S. Langdon. The cup for the highest points was awarded to Mr. N. Stainer and Mr. S. Langdon with the highest points (giant danios). At the Yeovil show to be held on the 12th September, the society will be holding an exhibition. A feature of this furnished aquaria exhibition will be a miniature pond and numerous plants of all species.

On the 13th July at the F.G.B.S. Assembly the Newcastle section was accepted into the Federation. This new section meets on the second Monday of each month at the Heaspar Hotel, Haymarket, Newcastle 1, and the secretary is Miss Helen R. Gibson, Mayfield Nursery, Stamfordham Road, Newcastle, 5.

NORTHAMPTON and District A.S. had the pleasure of welcoming to their meeting Bjorn Toressell, president of Avesta Aquarist Society in Sweden. In an informal talk he remarked that society business in Sweden is carried out very similar to this country.

Hints on setting up a tank for the home aquaria competition, to be held in September was given by Mr. W. H. Snedker, and an interesting talk on the "Theoretical and practical aspects of water snails" was given by Messrs. G. Twisleton and W. H. Snedker. A bring and buy sale of fish and plants was held for the society's funds.

THE first meeting of the **High Wycombe A.S.**, under their new secretary, Mrs. P. Watts, was held on 11th July. Mr. S. Prayne was in the chair, and the vice-president, Mr. B. Picton, presented the Turner Cup to Mr. L. Wright, who, with his tiger barb, was first in the best fish competition. Second was Mr. Watts' sailfin molly, losing by 1 point, and third, Mr. Chatfield's firemouth cichlid, again losing by 1 point.

A quiz followed between Reading Aquarist Society and Wycombe, the home side winning by 64½ points to 63 points.

MR. V. CAPALDI was the most successful entrant in the **Bristol A.S.** members' table show for coldwater fish. He gained three firsts and obtained the highest number of points in the show—23.

Mr. S. J. Davis was runner-up with 17 points. He gained two firsts.

Class winners were: Goldfish and comets, S. J. Davies; bristol shubunkins, W. Hicks; veiltails, V. Capaldi; fantails, V. Capaldi; moons and telescopes, V. Capaldi; any other variety of fancy goldfish pond or river fish, S. J. Davis.

Mr. Davis gave a talk on coldwater fish, dealing mainly with keeping the fish, raising fry and feeding.

THE annual general meeting of the **Smethwick and District A.S.** was held in July and the following members were elected as officers for the year: Chairman, Mr. W. L. Mandeville; chairman-elect, Mr. A. Slade; secretary, Mr. A. E. Allsopp; treasurer, Mr. A. Seluy (re-elected).

The society members were particularly pleased that Mr. W. L. Mandeville, the well-known Midland aquarist, accepted the position of chairman and look forward to a year of widening activities under his leadership.

AT the recent annual general meeting of the **Edinburgh A.S.**, Mr. T. Beveridge, curator of the Carnegie Aquarium, Scottish Zoological Gardens, Edinburgh, was presented with a silver club badge to mark the fact that he had been elected the Society's first honorary life member. Mr. Beveridge is a leading aquarist in Scotland,



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 here (actual size). Two forms of the badge, one fitting the lapel button-hole and the other having a brooch-type fastening, are available.

To obtain your badge send a postal order for 2s. together with the **Aquarist's Badge Token** cut from page viii, to **Aquarist's Badge, The Aquarist, The Butts, Half Acre, Brentford, Middlesex**, and please specify which type of fitting you require.

and during the past has given his services to all Scottish societies as a judge and general adviser.

At the same meeting silver badges were also presented to Messrs. Kerr, Wilson and Henderson, who have been elected the first members of the new Fellowship formed in the society.

The death of Mr. Albert Stark, a well-known member of the society, is also announced. Mr. Stark was well-known among aquarists in Edinburgh for his success in competitions for furnished aquaria and for the quality of the fish he kept. Mr. Stark leaves a widow and two sons, all of whom are keen members of the society.

AT Chelsea A.S. annual meeting. Mr. W. Shannon was elected chairman, Mr. H. Duncan, secretary, Mr. P. How, treasurer, and Mr. A. Kelly, show secretary.

The society has had more "lectures" from its members and healthy debate at meetings.

First results of the recently-formed Breeders' Circle were offered at very low prices. These included some very good fighting fish.

All aquarists will be cordially welcomed at any meeting on the second and fourth Tuesday evenings of each month at 8 p.m. at Chelsea Community Centre.

A CLUB outing of the **Bristol Tropical Fish Club** to Slimbridge (Wild Fowl) Trust was held recently, followed by a social evening. At the July meeting, Mr. V. Jones was the speaker on various points of general interest in tropical fishkeeping, and a lively discussion took place on most of the items upon which he spoke.

A TALK on aquatic plants of the New Forest was given by Captain E. Howarth to the **Bournemouth A.C.** The club table show of labyrinths was won by Mr. N. Walker, who took the first three prizes.

The club secretary is Mr. R. Matley, "Beezeland," Dean Swift-crescent, Lilliput, Parkstone.

The annual event, held at the Dagenham Civic Centre Park on 13th and 14th July, proved



a great success for the aquarist section, which was marred only by the atrocious weather. There were more entrants than in any previous year, with a fine display of furnished aquaria—both tropical and coldwater.

The best fish on show, a fighter, was owned by Mr. A. Wilson, and with it he obtained the "Essex Open Fighter Championship" cup. Mr. L. Land, secretary of the aquarist section, won the coldwater furnished tank class, with 79 points, which was the best furnished aquaria in the entire show. Mr. W. Gawler obtained a special award for the best coldwater fish in the show.

In the inter-club furnished class, Thameside A.S. won with tropical tank display of neon fish. A special exhibition was staged by the Guppy Breeders' Society which received much attention from the public.

Thameside A.S., Thurrock A.S. and Romford A.S., the local aquarist clubs, had their respective club stands judged by the F.R.A.S. judges, and this was won by Thameside A.S., who will receive a £3 3s. aquarist book donated by the club. This event was very ably judged by Mr. R. Mealand and Mr. C. Russell-Holland of the F.R.A.S.

THE Macclesfield A.S. sixth exhibition on 12th and 13th July was most successful. Results were: Best fish in show—Coronation Trophy and Shield, Mr. S. Cass; best pair in show—Beard Trophy and Shield, Mr. S. Cass; breeders egg-layers—Society Trophy and Shield, Mr. A. Lunt; breeders livebearers—Butters Trophy and Shield, Mr. W. H. New; furnished aquaria—Stanway Trophy and Shield, Mr. R. Bradley. The Mayor presented the prizes.

Change of Date

We understand from **Oldham and District Aquarist Society** that owing to circumstances beyond control the date of their Open Show have been altered to 26th-27th October, and is being held at the Chadderton Conservative Club.

Secretary Change

A change of secretary has been reported from **The Peterborough & District Aquarists' Society**. The new hon. sec. is Mr. S. A. Bean, 195, Eastern Avenue, Peterborough, Northants.

Crossword Solution

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

PICK YOUR ANSWER (Solution)

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

Aquarist's Calendar

23rd-24th August: **Bath Aquarists' Society** annual open show at St. Mary's Church House, Grove Street, Bath. Details are available from show secretary, Mr. J. Wheeler, 33, Cameley Green, Twerton, Bath.

28th-31st August: **Midland Aquarium and Pool Society** annual show at Princes Hall, Broad Street, Birmingham.

30th-31st August: **Walthamstow and District Aquarists' Society** annual open show at Hawthorne Road Hall, Walthamstow, London, E.17. Details are available from show secretary Mr. D. E. Goodbody, 54, Somerset Road, Walthamstow, London E.17.

31st August: **Romford Aquarists' Society** annual open show at Wykeham Hall, Market Place, Romford. Entry forms obtainable from show secretary Mr. C. E. Berkeley, 37, Bridport Avenue, Romford.

6th-7th September: **Bethnal Green Aquatic Society** annual show at the Men's Institute, 229, Bethnal Green Road, London, E.2.

7th-8th September: **Chester and District Aquarist Society** annual show in conjunction with the Cactus Show at St. Peter's Parish Hall, Hamilton Place, Chester.

7th-8th September: **Accrington & District Aquarist Society** seventh annual show of all classes of fishes and furnished aquaria, at the Town Hall, Accrington. Schedules and details are available from Mr. F. W. Hartley, 47, Tremellen Street, Accrington.

14th-15th September: **Willesden and District Aquarists' Club** open show. Schedule are available from Mr. F. W. Keen, 18, Walton Close, Cricklewood, London, N.W.2.

18th-21st September: **Leeds and District Aquarists' Society** annual open show. Entry forms are available from show secretary, Mr. G. Boothroyd, 6, Wellhouse Drive, Leeds 8.

21st September: **East London Aquarists' and Pondkeepers' Association** annual open show. Schedules can be obtained from show secretary, Mr. J. Bryden, 22, Kingston Road, Ilford, Essex.

26th-28th September: **Oxford Aquaria Society** open show of furnished aquaria, in conjunction with the cactus show at the Oxford Town Hall. Schedules are available from Mr. M. Gibbs, 37, Hurst Street, Oxford.

28th-29th September: **Federation of Guppy Breeder's Societies** show of guppies at the Pavilion Cafeteria, Zoological Gardens, Regents Park, London. Entry forms are available from show secretary Mr. L. Stevens, 9, Anerley Hill, Upper Norwood, London, S.E.19.

16th-19th October: **Scottish Aquarium Society** annual show at McLellan Galleries, Glasgow. Entry forms from Hon. Secretary, K. A. M. Robertson, 32, Edzell Drive, Newton, Mearns, Renfrewshire.

26th-27th October: **Oldham and District Aquarists' Society** open show. Schedules are available from Mr. F. Greasley, 346, Feather-stall Road, Oldham, Lancs.

1st-2nd November: **Bristol Aquarists' Society** annual open show at Bishopston Hall, Bristol.

BRITISH AQUARISTS' FESTIVAL 1957

5th and 6th October

at Belle Vue Zoological Gardens, Manchester

Show schedules

are available to societies from

G. W. COOKE, SPRING GROVE, FIELDHILL, BATLEY, YORKS.