The Aquarist

and Pondkeeper

FEBRUARY, 1962

MONTHLY
Vol. XXVI No. 11

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Founded in 1924 as "The Amateur Aquarist"

THE BUTTS, HALF ACRE, BRENTFORD, MIDDLESEX

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VOL. XXVI No. 11 1962

Editorial

BEGINNERS to aquarium-keeping are usually recommended to fit a cover to their aquarium. The reasons for making this provision are many, and include the reduction of water and heat losses, prevention of escape by jumping fishes, avoidance of formation of dust films, separation of water and overhead lights and the restriction of access by the household cat. One of the most important of the functions of an aquarium cover is seldom mentioned, however, which is that it keeps humans and their possessions out of the water. In one's own home it might be thought that members of the family might be free from the temptation to dabble fingers in the tank or be unlikely to drop tobacco ash into it, but do not rely on it! However narrow the top edge of a tank, it will be used as a resting place for something or other, and sooner or later, depending upon how injurious the object is to the fishes, it will find its way in. And if you give a children's party, be prepared for a session of netting jelly, chocolate éclairs and plastic aeroplanes from tanks that are improperly covered. As for the consequences of adult parties in rooms with aquaria whose contents can easily be reached, just be warned that the innate urge of some humans in the party mood to make pharmacological and other experiments on aquatic life is almost bound to assert itself, and in will go the gin or the coffee, or round and round will be swirled the ball-point pen or nicotine-stained finger.

The problem of coping with this human failing with aquaria in contact with the public at large is much greater. We recall the restaurateur who thought that glass-covered shallow aquaria as table tops would be a novel idea; his customers quickly showed him that cake crumbs, ice cream and tank water make a good (if smelly) Infusoria culture. However, what must be an all-time record for this sort of thing took place in Scarborough in 1925, when a tramcar ran through the roof of the underground Aquarium. No tank cover can be proof against things like that.

In Preparation for the Season

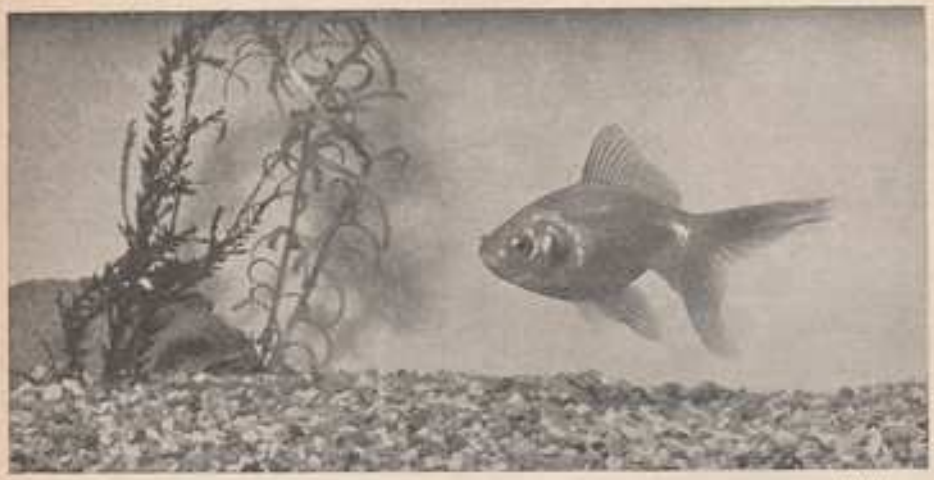


Photo: W. J. Hamm

by A. BOARDER

First article in a series designed to prepare the novice breeder for a successful season this year

THE breeding of fancy goldfish is one of the most satisfying hobbies I know, but also one which only the aquarist with plenty of patience should cultivate. There is no short road to success and many heart-aches may be encountered on the way; but the ultimate success will bring a feeling of having achieved something worth while, and a lasting pleasure in having produced something really good. The value is not only that which is apparent at the time but lies in having formed the nucleus of a good strain.

The aquarist who has been breeding tropical fishes has probably become used to the fact that in about 4 months he can see the value of his youngsters and may even start to breed from them. On the contrary, the coldwater breeder must wait for at least 2 years and perhaps 3 before he can be sure that what he has bred will turn out to be a winner and worth keeping in the strain. The formation of a good strain should be the aim of all breeders of fancy goldfish. It is not enough in itself to produce one or two winners; the value of a strain is seen when it is possible to breed a few first-class fish at least each year which are good enough to win in the best company and which are likely to increase the perfection of the strain.

Variability in Progeny

I think what makes this side of the hobby so interesting is that one never knows what a spawning will include in the shape of good specimens. In a thousand fry it may be that only a very few will be of extra quality, and perhaps not one which would make a real winner. Any tropical breeder who may have been breeding fishes which reproduced themselves almost identically in their young will be surprised at the unequal development and quality of the fry from fancy goldfish. This makes the whole procedure one of great challenge, but one which gives immense satisfaction when one or two really good fishes are bred.

I hope in this series of articles to go through the whole procedure from the acquisition of stock, conditioning, breeding and rearing to the ultimate sorting for exhibition and inclusion in the strain. This reference to a strain means that the aim of the serious breeder must be to get together a number of fish that will breed, if not all true, to produce a good proportion of shapely fishes of some worth to the average aquarist or pondkeeper.

I would like to start with a word of warning. Let no one expect to make a quick fortune at breeding these fish. If this is the intention of the aquarist I say do not waste your time with fancy goldfish, because the breeding is a very

haphazard method of making money; the proportion of unsaleable fish to those which command a good price can be 100 to one. Of course, the old adage "to start right is to continue right" is very true in this case, and considerable patience must be exercised at the outset if success is to be achieved in the long run.

The first steps must be to get the necessary ponds and tanks for the job. A good outdoor pond is essential for conditioning some of the parent fish and will be very useful for rearing most of the types. As these fish are of a fair size no tanks should be used under 24 in. by 12 in. by 12 in. deep. A number of these must be available and also some hatching tanks. These can be made from concrete (3 parts of sand to 1 part of cement). An outside former must be made first so that it can be dismantled when the concrete has set. The inner forms must be separate so that they can be taken out once the mix has set. I have made many concrete tanks with the finished sides only half an inch thick, with no reinforcement at all, and they are very strong and hold water admirably. Those I made were 24 in. by 12 in. by 9 in. and had a taper to the sides so that the top was wider than the bottom. I have found these tanks invaluable as hatching tanks and some have been in use for many years.

Obtaining Breeding Stock

Having obtained the pond and tanks it will be necessary to look round for the fishes one needs for breeding. In the first place one will, no doubt, have a particular liking for one type of fancy fish, be it shubunkin, fantail or veiltail. Whichever kind it is the same procedure is essential at the outset. I suggest that the best place to look for fish for the formation of the nucleus of the strain is a good fish exhibition. Look at the winners in the class for the type you prefer. Ask plenty of questions of club members about the amount of winning done by the owners of the fish you admire. Try to ascertain how long the owner has been breeding this kind of fish and then find the owner and endeavour to obtain some young fish from the strain you choose. It may be far better to purchase a number of fry from the breeder; the younger the better. By so doing you may get an opportunity to buy some fry which are too young to have been properly sorted, when your chances of obtaining some really good ones will be much better than if you wait until the fish are of such a size that it is easy to sort out the grain from the chaff. The main point to remember at the beginning is that fish which are part of a well-established strain are more likely to be of use to you than fish picked up at random from a source you have no knowledge of at all.

Many fish you see may look good in themselves, they may even have won, but I would rather breed from a badly shaped fish from a good strain than from a well-shaped fish whose background is unknown to me. Fancy goldfish can reproduce youngsters resembling some of the strain many generations back, and it is this inheritance which is so very important when trying to establish your strain. Let us quote an example of what might happen when you see a good-looking fish but do not have any information about how it was bred.

You may see a good fantail and be inclined to buy it, but this fish may be the result of a first cross between a fantail and a common goldfish. This is quite possible and a few fish resembling either parent are almost sure to be produced. Should you purchase such a fish your hopes of ever breeding anything good from this fish are nil. The fish which would never win a prize may have a min-shapen tail, but this does not mean that you should discard it if it has come from a good strain. If it has been bred right it is sure to produce at least a good number of fish like the former generations in the strain. Perhaps the fish was damaged in its youth, a very easy thing to happen among a crowd of healthy youngsters of differing sizes. If the suspect fin was so damaged it will have no bad effect whatsoever on the progeny of such a fish. Therefore go into the background of your fish and see that there are a few years at least of good breeding behind the strain or your efforts may be useless.

It may be asked how much one will have to pay for such a fish. My advice is to get the fish as young as possible, for you may have to pay high prices for larger fish. Do not try to knock down the breeder in his price and do be reasonable. I once had a man who wanted one or two extra good specimens of 2 year old fantails, and he asked the price of two very fine fish. I told him they were 15s. each and he thought this very dear. I then told him I had some at 2s. 6d. each. He bucked up considerably and when shown the fish at 2s. 6d. he said that they were not like the others. Can you beat it?

I also had a big breeder who wanted some (two) fantails; he said that he was not particular about finnage, all he wanted was some fish of my strain. After sorting through a hundred or more youngsters which I said he could have at 5s. each we found two very good fish. He examined them for 5 minutes and then found that one had a slightly bent tail. He wanted this one changed. Can you beat that?

My next article will deal with the keeping and conditioning of the fish before actual breeding is commenced. Meanwhile procure the Standards for fancy goldfish from the Federation of British Aquatic Societies and study the variety of your choice. Get to know what to look for and then at least you have a good chance of starting right.

FISH PARASITES—3

Skin Flukes

Fluke (magnified)

SKIN flukes are so small that they can be seen only by microscopical examination after a smear of slime from the fish's body is taken and studied. Attacks by this micro-parasite nearly always prove fatal and early diagnosis and treatment is essential if the fishes are to be saved.

The indications of an attack will be a loss of colour and folded fins, but the most important symptom of all will be the presence of blood spots; these may be seen with the aid of a magnifying glass on various parts of the body and particularly at the base of the fins. There will be extreme lassitude, with the fish resting frequently near the surface of the water. An increase in the fish's breathing frequency will become most obvious.

When these symptoms are seen, treatment with methylene blue should be commenced immediately. A stock solution of methylene blue is prepared for the treatment of skin flukes by dissolving 1 gram in 100 millilitres of water; 1 to 2 millilitres of this solution may be added for each imperial gallon of water in the tank. As there is no necessity to change the water after using this solution of methylene blue, the treatment may be used quite safely in ponds.

R. E. Macdonald

Danger Signs in the Garden Pond

by ASTILBES

THERE are many danger signs in the garden pond which may be immediately apparent to the experienced pondkeeper but which may mean nothing at all to the inexperienced aquarist. The immediate recognition of trouble signs may be the means of saving the life of a valuable fish. Obvious signs are given, which even a novice could recognise, such as fishes gasping at the surface of the water for oxygen, but there are other pointers of impending trouble which may not be recognised in time by the inexperienced. When fishes are at the surface, if fresh water is run into the pond it is probable that the fishes in trouble will cease their mouthing at the top and return to the lower depths of the water unconcernedly.

Very often the worst time for most pond fishes is during the night. This is perhaps more noticeable when a pond is well planted with water plants. During the hours of daylight these plants, at least the underwater oxygenating ones, are giving off oxygen. At night they cease to do this and can give off gases which are poisonous to fishes. Therefore many danger signs can be seen in the early morning and any experienced pondkeeper will usually have a quick look at the pond each morning. The sight of clear water with the fishes at a mid-level in the water soon reassures him. The novice may not be able to recognise that all is well so quickly and so the endeavour in this article will be to give a few tips to the uninitiated as to what to look for and what to do when trouble seems likely.

A sure sign of trouble is the appearance of a number of bubbles on the surface of the water in the early morning. This sign indicates that the fishes have been mouthing at the surface for oxygen and that therefore the water is foul. The fishes may have ceased this gasping by the time you have looked at the pond because with the increased light the plants have started to give off oxygen. Another cause of the fishes going from the surface may be that a breeze has sprung up and ruffled the surface of the water after a very calm night. This helps considerably to reoxygenate the water. Calm still nights can be the cause of deaths among fishes if the water is in any way impure.

Where a number of bubbles are seen in the morning it is essential that some fresh water is run into the pond and a search made in an endeavour to trace the cause of the fouling of the water. This may have been caused by the decomposition of uneaten food or perhaps some small animal such as a mouse or frog has died in the pond and caused the trouble.

Where actual froth appears on the surface in the mornings it is a sure sign that there is something decaying in the pond. It may be that a number of leaves from water lilies are giving off foul gases and the remedy is obvious. Another danger sign is when oily patches are seen on the surface. This is invariably caused by the decaying of dead water lily leaves or flowers. If you see such signs you will find a leaf near the surface or on it. Just move it slightly and you will see the oily film from it spread on the water. Remove the dead leaves and flush the pond so that the top

Photo: W. J. Howes

Dying water lily leaves may cause an oily film to appear on the pond's surface

of the water runs over. This will carry away all trace of the oil.

Another sign of danger is when the water turns milky. This is usually an indication that there is an excessive quantity of Infusoria in the water. The cause is often that too much dried food has been given and this uneaten food had decomposed and encouraged the formation of the Infusoria. It is well known that Infusoria is fine food for newly free-swimming fry but the larger fishes will ignore it, apart from that which is taken into their mouths when "breathing". The cure for the trouble is to cease feeding completely for a week. Probably after a few days the water will clear again, and, of course, if plenty of the water is run off and fresh introduced it will help matters. This is not always the case as the fresh water may only encourage the Infusoria to multiply for a time, as long as the bacteria on which the Infusoria feed are present in the water.

One of the most dangerous signs is when the water plants or any filamentous algae take on a pinkish-mauve colour. It is apparent from this slimy material that something very wrong needs swift attention. The colouring may be accompanied by a bad smell, and so it is imperative to change most of the water at once and look for anything which may have caused the trouble. This may arise in water that has not been changed for a long time or which has become poisoned by something decaying in it. If prompt action is not taken when such a sign is seen it is possible that the fishes will soon die through the very poisonous condition of the water.

Smell provides another test of the purity of the pond water. Although there may be nothing to see the smell

should tell the pondkeeper that something is wrong. This unhealthy smell is easily recognised by the experienced aquarist, but it must not be confused with the natural smell of water containing plants and fishes. Again the cure is to remove most of the water and refill the pond.

Too Many Algae

Water which has become over-populated by green algae can also cause trouble. It is not an unhealthy sign to have a fair amount of green algae in the pond, as this minute form of plant life gives off oxygen under good light and so is beneficial to the fishes. However, if the algae obtain too strong a hold and the water becomes very thick, there is a great danger that the growth will suddenly die and then cause serious pollution. This trouble is difficult to cure, as if some water is removed and replaced by fresh this may only encourage the formation of fresh algae. If the algae do die and fall to the bottom it leaves the water looking quite clear; but take care, this can mean danger, as the dead algae can decay and pollution will soon follow. If such a happening occurs give the pond a good clean out or at least change nearly all the water as soon as possible.

Now let us consider the fishes. Many fishes, including the goldfish, like to swim in a shoal, and one of the surest signs of trouble is when a fish sulks by itself away from the shoal and appears to want to hide in a corner. This fish may be ailing, and a bath in a salt solution for 3 or 4 days may help to restore it to good health. The salt bath should not be stronger than a heaped tablespoonful of salt to a gallon of water. Let the salt dissolve gradually and after 3 days add fresh water to lessen the strength of the solution before the fish is put back in the pond. Watch also for any blemishes on the fish, which may be caused by fish lice. The trouble is usually apparent when small round wounds are seen on the fish. If the fish is caught and examined a small transparent plaice-like creature will be found on the body. These parasites can be removed with tweezers and the spot touched with a mixture of iodine and glycerine.

Cure for Fungus

The most usual and obvious sign of trouble is the appearance of fungus. This is often brought on by the fact that a fish has received a wound, and this spot is soon attacked. If a fish is out of condition it loses some of the slimy mucous covering that has been its protection. I know of no better cure for fungus than the salt bath as recommended above. This will always effect a cure, unless the fungus has been allowed to obtain too strong a hold on the fish and has reached the insides of the gills. As the fungus usually attacks only a damaged or sick fish it is possible to keep clear of this trouble by making repeated examinations of the fishes to see that all is well.

Many fishes could be saved if treated in time, so never put off for another day the necessary treatment for any fish suspected of being off colour. As with most forms of life, a speedy remedy will often save a life, although this does not mean that one should fly to all kinds of supposed cures before one is sure of the trouble.

Glass Neon

by T. ROLAN

ALTHOUGH it is not always easy to obtain, an attractive addition to any aquarium is the glass neon, Celebes sailfin or Celebes rainbow fish (*Telmatherina ladigesi*), as it is variously named popularly. When fully developed, the male in particular is one of the most attractive of our exotic fishes. Along its transparent body, from below the first ray of the forward dorsal fin to the caudal peduncle, runs the brilliant greenish-blue iridescent stripe that had led to this fish being given the name glass neon; a similar colouring is repeated in the eye. The body is sufficiently transparent for the swim bladder to be visible. The rays of the dorsal and anal fins in the adult fish are long and separated in such a way that during the courtship display their fins look like open fans. The caudal fin has silver tips and silver outer edges with dark bands below these. As in many species, the colouring of the female is less striking than that of the male, and the body of the female in good condition becomes slightly amber and assumes a fuller body outline. In length, the fish grows to about 3½ inches.

Two Dorsal Fins

The glass neon does not have the adipose fin characteristic of the characin group but the two dorsal fins are typical of this fish. It does, in fact, belong to the family Atherinidae (silversides) and is one of the few of this group kept by aquarists.

Points to be specially borne in mind in connection with the breeding of *Telmatherina ladigesi*, which are egg-layers, are: the breeding tank should be placed in a shady position, as the fish do not like direct light from the sides and great care should be taken that no snails or snail spawn find their way into the tank on the plants as the eggs require a long incubation period (over a week) and would stand little chance of survival in the presence of the molluscs. Apart from this, it is necessary to exercise only the usual care in disinfecting the tank and washing and sterilising the gravel. Plants such as *Myriophyllum*, *Cabomba* and bladderwort can be allowed to float in it in bunches and the temperature set at about 75°F.

Lengthy Spawning

After the spawning tank has been set up, a day or two should be allowed to elapse before the fish are placed in it in order that they may settle down. Once transferred, the fish should be fed generously on brine shrimps, sifted *Daphnia* and white worms both before and during the spawning, as this is a lengthy procedure lasting possibly up to 10 days with only two or three eggs being deposited every 24 hours, and well-fed fish are less likely to devour the eggs. After 10 days or so, when spawning is completed, the parent fish may be removed.

The fry, on hatching, are quite large and soon become free-swimming, though for some days movement is achieved by a series of jerks in a semi-vertical position. Their mouths, however, are small and Infusoria is taken as first food until such time as small brine shrimps, micro worms or dwarf white worms and an occasional pinch of dried fry food can replace it. Great care must be taken not to introduce an excess of Infusoria as even fully grown *Telmatherina* do not thrive in water containing enough Infusoria to make it cloudy, and polluted water is fatal to young fry.

The Madagascar Lace Plant

by Dr. R. O. B. LIST

THERE are a number of varieties of this plant, and I am informed that, apart from those as yet named, there are still some which are to be classified. We have information on (1) *Aponogeton fenestralis*, (2) *Aponogeton henkelianus*, (3) *Aponogeton guilotti*, (4) *Aponogeton bernierianus*.

Nos. 1, 2 and 3 are similar to each other inasmuch as their leaves resemble true lace. We know of two types of *A. fenestralis*, one of which has not yet been scientifically named. *A. guilotti* is very rarely seen as yet in Europe, and *A. henkelianus* is found only in the region of the two great rivers Betsiboka and Ikopa. On the other hand, *A. bernierianus* is found only in the region of small streams and ponds.

The Botanical Gardens at Kew have on record that they had their first *Aponogeton fenestralis* about 100 years ago, and it would appear that they were very successful in propagating these plants as well as increasing their size. It is reported that one plant there had over 173 leaves, which would indeed make it a very grand specimen. Records show that the botanical authorities in what was then known as St. Petersburg were also very successful. There was started an exchange in business with Germany, and reference to the plant is found in the annals of the Botanical Institute in Rostock. It would therefore appear that we have to thank those in Rostock who were responsible for passing these plants on to German botanists and aquarists, and from them to us. Hugo Baum of Rostock is the man whom we have to thank. He propagated these plants in a vast number and his variety of *Aponogeton fenestralis* had the very big and broad leaves which became known as the Rostock variety. That name appears to have fallen by the wayside in recent years, however.

References are also found to Helmut Pinter of Stockholm, who as an importer, as recently as 1950, became responsible for the propagation of the long-stalked, narrow-leafed variety.

A. henkelianus and *A. bernierianus* are rarities, and although I have seen them abroad, they have always been single specimens. One is fortunate if one has one *A. fenestralis* here, but we differ a little from the German aquarists. Apart from and in addition to keeping fishes, a very large majority of German aquarists cultivate plants, but not on an individual basis from the beauty or wonder point of view, but in large quantities on a comparative scale with a view to improvement. This system also ties up with the continental way of doing things.

We in this country dispose of our surplus fishes and plants, when we have them, with the express purpose of making room and adding to our finances. The offers made to the dealers create the market. On the continent, particularly in Germany, dealers do not appear to wait for offers, but create a demand, and they know exactly where to go for their supplies. If the market demands any particular type of fish or plant, a card index gives the information that Mr. X, Mr. Y and Mr. Z will supply, as they are known to concentrate on the particular types required. Therefore X, Y and Z do very little else. This system may be due to the fact that facilities do not allow for the erection of fish houses or rooms, as they are known here.

As a further example, I have been present at conversations where a dealer makes his wants known, which have comprised 300 zebra fish, 200 angel fish and a few dozen of one specific plant. This would not normally be known as a small parcel, but it takes only three individual suppliers to fulfil the order and yet each of the three supplies just one of the lots.

One may reason that quantity will spoil quality. But that is not so. I have seen very few rejects in an order, and always top quality in form, age and size.

I also read from the chronicles of that great aquarist Albert Wendt, now deceased, that he saw in Rostock an *Aponogeton fenestralis* that had been in the care of Hugo Baum for over 25 years. The specimen of which he spoke was very thickly leaved, blossomed with regularity, gave seeds which were fruitful, and lost very few leaves naturally. If that is true and I have no reason to doubt it, why do we not have such success with our plants? That is a problem to which we must try to discover the answer.

Aponogeton fenestralis

The majority of the plants that we know as such have a 4 in. long and approximately ½ in. thick rhizome, that has on it several bud points. The flower stem, which carries on it usually two or more flowers, has a length on flowering sufficient to bring it over the water surface. The flowers, when full, have a pleasant smell and are of a yellow whitish colour and each flower carries six pollen and three seed containers. When the plant is in flower, the leaves tend to become a dark-green olive colour, with the leaf stems becoming a reddish brown. The leaf surface, as opposed to the underside of the leaf, can be olive, dark or dirty green in colour and in age becomes a very dark green. New growth leaves are a light red brown in colour. At the beginning the new growth leaves have no openings in the leaves and these openings only appear when the leaves grow. When the leaf is fully grown, the openings are complete and then only enlarge further with fresh growth.

The leaf "nerves", which run the length of the leaf, usually number eight to 12. This plant will grow a large number of leaves if the rhizome is left undisturbed and is not cut before propagation or afterwards. It will also flower twice a year.

The second type of this plant given as *A. fenestralis* var. *major* is indeed very similar, but the leaves are larger and can be 15 to 16 in. in length and 6 in. in breadth. It can be differentiated by its size and by the fact that the middle rib is missing, and the openings of the "lace" are larger.

The third variety of *A. fenestralis*, which is as yet un-

Photo: Shirley Aquarium Ltd.

Left, Aponogeton fenestralis; right, Aponogeton ulvaceus

named, has a very narrow leaf in comparison, and no sharply pointed middle rib. The rhizome is more rounded than the others. The leaves are a bluish green. Flowering is the same as in the two afore-mentioned varieties, and the leaf stalks can be up to 20 in. in length with a leaf length of 12 in. and a width of nearly 2 in. These plants have been heavily imported in the past few years, and in Madagascar are found in relatively quiet waters with little flow. They also appear to be quick growing, but the flowering is poor. This type throws off most of its leaves in the quiet period. There also appears to be some confusion with the variety and *A. bernierianus*.

Aponogeton henkelianus

This is very similar to *A. fenestralis* but there are some differences. The rhizome is more egg-like in form. The flowers tend to bend outwardly instead of standing upright. The flowers have a light violet and light pink colour, but when in full blossom become white. This type again has a larger leaf, but shorter "nerve" leads.

It is usually found in the Ankarobe and Antsiranana areas of the Island, in dark shady areas, on the sides of and underneath cliff and rock formations. It has often been offered in the trade as the true *A. fenestralis*.

Aponogeton bernierianus

This type has a small completely round rhizome and the flowering is similar to that of *A. fenestralis*. The flowering leaves are, however, white and reddish white. In this species, the lace effect is not complete, as the leaves do not "lace up" in a regular pattern, but leave some closed spaces, which are filled with very thin leaf material which is quite opaque. This type blossoms only once a year.

In summing up, we should come to the conclusion that once having obtained a good specimen, the rhizome should be planted and not cut in any way. It has a demand for light and the positioning of the plant in an aquarium should have a relationship with the supply of sunlight that is available. In addition, light-bulb positions exert a lot of influence on growth. Shady spots must therefore be avoided. Aeration, if used, would allow for necessary water movement, but this I do not consider as an essential, unless the plant is being kept in an aquarium without fishes.

Aquaria for Plants only

I have long advocated that we pay too little heed to our plants, and, in fact, treat them very badly. Fishes create many facets of enjoyment and the combination of fishes and plants enhances such facets even more. I would, however, advocate the keeping of aquaria solely occupied by plants. This, to my mind, is also a very worthwhile project, and we could do much to encourage it. The F.B.A.S., many years ago, issued a world area classification list, giving details of rocks, plants and fishes that are to be found in the various areas. There is much in it for not only the beginner but also the hardened aquarist, and it is to be strongly recommended.

One may ask how one nourishes plants if they are by themselves in an aquarium. Let me remind the questioner that plants in Nature are found in areas where even the word fish is unknown! We must therefore learn to adopt methods of feeding, by trial and error if necessary, but I would assure the reader that if a method is used, to which the plant gives no reactions whatsoever, that plant will not, as sometimes believed, simply fold up and die overnight. Nature has too much experience behind it to allow that to happen.

Having grown your specimen successfully, and there is no reason why you shouldn't, then commence your propagation. You have two means of doing this: by seed, if the plant flowers successfully, and by cutting or splitting the bud points on the rhizome. I gather that one or two of you might shake your heads a trifle, and even give up the effort before you have commenced it.

May I, in conclusion, ask you a question? Do you remember when *Hygrophila stricta* first came to us, how it eluded some of us; how others hand-pollinated it and how, in some cases, it nearly pushed the top glasses off the aquaria through its very sturdy growth? You found the answers then. This is therefore just another battle which, if successfully fought, will make us the possessors of one of the most beautiful aquarium plants there is.

House-Plants in the Fish House

by BARRY R. JAMES

Photographs by the author

MODERN house-plants are enjoying great popularity in this country at the moment and many aquarists are finding them a very decorative addition to their fish houses and rooms. Many thousands of these plants are being purchased every year and just as many are perishing through incorrect treatment.

Unlike the traditional aspidistra, which will stand up to an amazing amount of neglect, these newer house-plants are more demanding of their owners, and will soon die if given too much or too little water or if exposed to excessively low temperatures or other unfavourable treatment. However, this is not to say that they are delicate and needing constant attention. Provided that the basic needs of each individual species are catered for they will prove surprisingly easy to keep.

House-plants originate from diverse areas of the globe. From the steaming jungles of South America and Malaya to the cooler regions of Northern Europe and Asia, collectors have brought back specimens for observation. Then by careful selection and conditioning, nurserymen have been able to present a wide range of plants suitable for cultivation under average room conditions.

Indoor plants are grown either for the sake of their handsome foliage or for their flowers. One or two species, however, have the advantage of producing both, a good example being the well-known aphelandra, which has showy yellow flowers and attractively striped leaves.

Many factors have to be taken into account if plants are to be cultivated successfully, and probably the most important of these is the provision of the correct soil. Most house-plants when first purchased will already be growing in the correct compost. From time to time, however, depending on the speed of growth of the plant, they will need to be re-potted into larger containers, and the correct soil mixture will have to be added to make up the difference in volume.

Just as cacti are predominantly plants of dry, arid regions, most house-plants are indigenous to forests. The type of substrate found in these two regions is entirely different. In the former barren clay or sandy soils are the rule, whereas in the latter the earth is rich in minerals and humus containing large amounts of decaying vegetable matter.

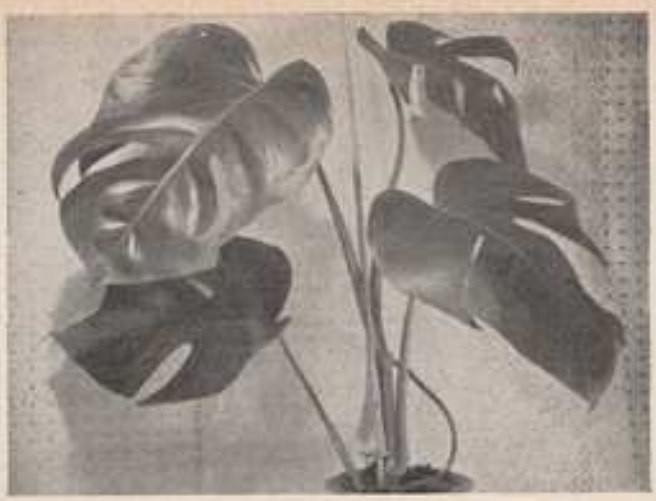
Few plants will withstand stagnant conditions, for the roots must breathe in the same way as the aerial parts of the plant. For this reason good drainage is of paramount importance. Composts should be friable and open and the bottom of the pot should contain a layer of crocks to facilitate drainage.

Although no hard and fast rules can be laid down for the type of soil needed by any individual plant, the majority will thrive in John Innes compost no. 1 (J.I.P.1). This can be bought from seed merchants ready mixed, or can be compounded as follows: peat, loam and sand in the proportions of 7 : 3 : 2 (by volume) are sifted and mixed thoroughly. To this is added powdered chalk at the rate of 4 oz. to the bushel and a fertiliser base, consisting of super-phosphate, sulphate of potash and horn and hoof mixture, in the ratio of 2:1:2 by weight. The compost should be sterilised if possible but this is not absolutely necessary. J.I.P.2 and J.I.P.3, which contain twice and three times the amount of base respectively, should be used if repotting is to be done into 5 in. or 6 in. pots.

Canary ivy (Hedera canariensis)

The biggest enemy that house-plants have to face in the modern home is central heating. This tends to produce a hot, dry atmosphere which is fatal to any moisture-loving plant. A warm but humid atmosphere such as is found in a fish house is ideal for the growth and propagation of these species. Gas and oil fumes are also potential killers, and for this reason kitchens are not always the best choice for locating plants.

Coupled with humidity, temperature is also a critical factor. Too high a temperature will produce wilting and scorching of the leaves, whereas too little warmth will produce decay, if coupled with damp conditions, or wilting



A South American plant that is easy to grow and has attractive leaves is Monstera deliciosa borsigiana

on its own. At one extreme few plants will withstand frost, and on the other exposure to full sun in the summer will prove disastrous. A mean low of 55°F with an average of 65°F would seem to be best, although temperatures reaching the eighties will be appreciated by many species if coupled with abundant moisture. Propagation of the more exotic house-plants, whether from seeds or cuttings, should be done at a temperature of 75°F to 85°F.

House-plants thrive in diffuse light, as this is the type of illumination they receive in their natural environment, where trees shade much of the woodland floor. Any light excess to their requirements will not be beneficial to the plant, but often the reverse. Window-sills, especially those facing south, are therefore often unsatisfactory. Those plants possessing variegated leaves, such as the canary ivy (*Hedera canariensis*), need more light than those whose leaves are all green, and will often lose this variegation if the lighting is insufficient. This advice also applies to purple-leafed types such as some of the tradescantia family. In general also, those species which appreciate drier conditions, such as sansivaria and chlorophytum, need more light than their moisture-loving cousins.

When buying house-plants look for sturdy growth; any specimens with dry listless-looking foliage should be avoided. Rubber plants (*Ficus elastica*) should have shiny upright leaves and a healthy growing shoot. If the leaves are turning yellow or drooping it is a sure sign that that particular plant is doomed. Inspect also the growing shoot for physical damage, as a damaged shoot will produce a damaged leaf, which in the slower-growing philodendrons and monsteras, will be an eyesore for a considerable time.

Until a little experience is gained it is advisable to stick to the tried and trusted plants such as tradescantia, sansivaria, *Cissus antarctica* etc. Such plants as caladium with showy coloured leaves should be avoided at first as they need rather more careful treatment than the other types.

Salt and the Aquarium

SALT (sodium chloride) is a very common substance and can be found in a great variety of places. It occurs in the sea, in the human body or wrapped neatly in blue paper twists at the bottom of bags containing potato crisps! Salt, when used in the freshwater aquarium, can be introduced either to provide the correct environmental conditions for certain species of fishes or may be used for medicinal purposes.

Some fishes, such as the various mollies (genus *Mollienisia*), require salt in their environment before good health can be maintained. For this, a solution is required consisting of about one teaspoonful of table salt to every gallon of water in the tank; the actual amount will depend on the species concerned. Salt water appears to increase the fertility of mollies and helps to ward off skin infections and dropsy to which these fishes are particularly prone.

When applied as a medicine, a "reviving" or short-treatment bath for diseases may be used by immersing the affected fish in a 2½ per cent solution of salt (approximately 4 ounces/gallon) for 15 minutes. This bath will also assist the fish in fighting bacteria and parasite infections by stimulating the slime cells that produce the protective mucous covering of fishes.

As a prolonged treatment, salt may be introduced to the aquarium at the rate of 1 ounce/gallon of water in the tank on the first day; by changing half the water with fresh containing 2 ounces of salt/gallon for the next 2 days and then on the fourth day by changing half the water again with a solution containing 3 ounces of salt/gallon. After the fourth day, the salt content must be gradually reduced in the same manner until only fresh water remains in the tank.

When prolonged salt baths are used, the plants in the tank should be carefully watched as exposure for long periods to a strong salt solution has an adverse effect on most freshwater vegetation.

R.E.M.

The Rosy Barb

Detailed instructions on the care and breeding of *Barbus conchonius*

IT is no accident that the barbs are amongst the most popular of tropicals found in aquaria. Of the 300 or more different species of barbs widely distributed in seas round India, Ceylon, the Malayan peninsula and parts of Thailand, only a few are suitable for aquarium life, but those that are prove to be the most accommodating of fishes in that they exhibit very nearly all the requirements that the amateur aquarist would list when choosing an agreeable inmate for the community tank. They are active, extremely colourful and, with the possible exception of the tiger barb, well behaved and peaceful. Furthermore, the barbs offer some of the most suitable species for the novice to breed, being mostly ready spawners and producing fry that present no particular difficulty in rearing.

Of the barb species available, the rosy barb [*Barbus* (or *Puntius*) *conchonius*] is high on the list of those most generally kept. Growing to little more than 2½ to 3 in., its size makes it very suitable for the community tank and, for the amateur breeder, it has a notable advantage in that the young fish can be sexed reasonably accurately at about 8 weeks, when the characteristic darkening to the forward edge of the male's dorsal fin has already taken place and contrasts with the female's dorsal fin, which remains almost colourless. There are several other easily apparent differences between the male and female adult fish. The female has the greater depth of body and a greenish gold appearance, which is quite overshadowed by that of the more colourful male, whose rosy hue deepens, when in breeding trim, to a height red that spreads even to the finnage.

Successful breeding of these fish starts with the prepara-

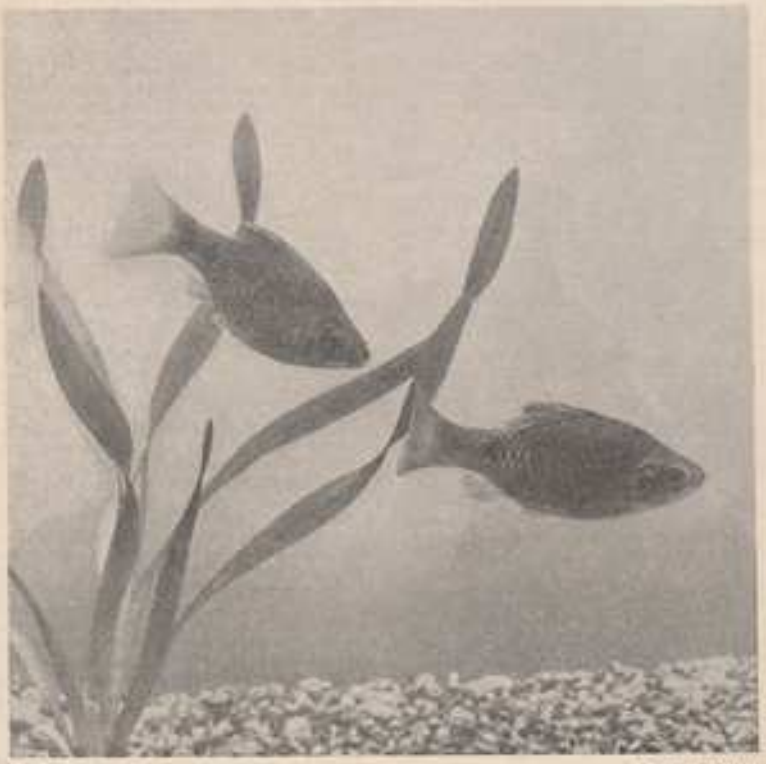


Photo: Laurence E. Perkins

sory conditioning of the parent fish, which should preferably be aged between 9 and 12 months. The process may be started in the community tank, with the generous feeding of live food: chopped earthworms, *Tubifex*, white worms and *Daphnia* will give a varied diet. Meaty food such as the dehydrated meat food sold for dogs can also be given. Then, after a week or two, the parent fish can be chosen for transfer to the previously prepared spawning tank. The choice should be governed by the activity and colourfulness of the male and the plumpness of the female, which indicates the presence of ova.

A breeding tank 18 in. by 10 in. by 10 in. may be used, but the larger 24 in. by 12 in. by 12 in. is certainly preferable since the spawning is likely to produce anything up to 500 eggs. The tank should be filled with clean tap water that has been allowed to stand for about 7 days and one half planted thickly with either natural spawning media—fine-leafed plants such as *Myriophyllum*, *Ambulia* or *Cabomba*, or arrayed with bunches of artificial media such as willow-root, coconut fibre or nylon wool. The bottom should be covered with coarse gravel, since quantities of the eggs, which do not appear to be strongly adhesive, will fall from the feathery clumps of plants and will be eaten by the parents unless such an egg-trap is provided.

When transferred to the breeding tank the fish, still being generously fed, should be kept apart by a glass panel across the tank. They are separated until the temperature of the water is brought up to 75° to 80°F and they are exhibiting great excitement at the sight of one another through the glass partition. As spawning usually takes place in the early morning, the glass panel should be removed during the evening and the fish allowed to settle down together. Shortly, the male will commence to display in front of the female before chasing her into the clumps of plants or artificial spawning media. Dozens of small eggs may be seen falling on or near the plants and this process goes on for 2 or 3 hours. Towards the end of this period it is advisable to make certain that the parent fish are still engrossed in spawning. Barbs are avid egg-eaters and as soon as their excitement has died down they will turn their attention to devouring as many as possible of the ova. The adult fish must therefore be removed from the breeding tank as soon as the spawning is complete.

The fry should hatch within 48 hours at 80°F and will be seen hanging from plant leaves and sticking to the sides of the aquarium, where they will remain for 3 or 4 days absorbing their yolk-sacs. Once they become free-swimming, however, they should be given large quantities of Infusoria or tube food for large fry. Some breeders have found that the best way to introduce the Infusoria is by the slow drip method, allowing about one drip from a siphon tube every 6 to 8 seconds for the average brood. The fry will grow quite quickly and within another 3 or 4 days will be able to take newly hatched brine shrimps. Some 10 to 14 days later, small *Daphnia* or a little dried food should be given, and from then onwards a normal adult mixed diet may be gradually introduced.

A fortnight after hatching, the young fry will be showing their dorsal fin and it may be necessary at this stage to cull the brood in order that those retained, out of a hatching numbering possibly 300 fry, will have room to develop and grow. The fry that cannot be retained will provide live food for the community tank; if, however, it is only necessary to remove some fry to a new tank they should not be netted but handled by being scooped up in a cup or drawn up into a wide glass dip-tube. At 6 weeks the fish should be nearly an inch long and showing all the characteristics of the parent fish except that the males will not take on their rosy coloration for from 5 to 6 months.

The trouble taken to breed good specimens is well repaid with the barbs. They are hardy fish and thrive on a normal diet of live food or one of the prepared dried foods. Furthermore, as a group they are long-lived, particularly if they are kept at a lower temperature of from 62° to 70°F, and for some 3 or 4 years will be colourful and active inmates of the community tank.

SHUBUNKINS

Have you an Imagination?

WITH the coming of a new year all true "dyed in the wool" coldwater fish breeders' thoughts inevitably turn to new spawnings; of hopes to be fulfilled, of ideals to be achieved. Will this year bring those brilliant glowing colours of red and orange, of deep blue and black? What marvellous fish we can produce in our imagination when snug beside the fire! It is a good thing to dream but very much wiser to dream objectively.

While working out some possible pairings for my shubunkins recently, the thought struck me how very few fanciers appear to have an ideal type of shubunkin clearly worked out in their minds. I have talked "fish" with many people at shows and many people visit me with the object of purchasing fish; but one thing stands out very clearly: it is only the exception who has a preconceived notion of a standard or ideal type of fish he aims to breed. I think every enthusiastic breeder should work out what he thinks an ideal shubunkin should look like and every step, whether purchase or mating, should lead towards the ultimate production of fish corresponding to this preconceived ideal.

No doubt many breeders would argue that all this is quite unnecessary, that we already have standards drawn up for our guidance. We have—no less than three! But, frankly, these existing standards are merely the expression of a collective opinion of groups of interested persons who met with the purpose of expressing such an opinion. It is not my intention to quarrel with any standard laid down by a society or even individual person, but we must bear in mind that standards are revised from time to time and no doubt reconsideration will continue for as long as aquarists keep fishes. Looking backwards at the diversity of fish that have won at important shows I am sure there is enormous scope for the expression of the individual within the existing framework of show standards.

A breeder with many years of experience behind him has seen many fine fish and has a clear-cut idea of what he likes and is aiming to achieve. The comparative newcomer to the hobby has probably very few fish and has had far fewer opportunities of inspecting outstanding specimens than the old hand. The shubunkin has enormous possibilities of colour, colour of a richness and brilliance at least equal to anything known to our "tropical" friends. Many human achievements are the direct result of the visionary dreams of some individual. Man's horizons are limited only by the extent of his imagination, so, fellow aquarists, draw your chair up to the fire and dream your dreams, and when your imagination is stirred draw the outline of your ideal fish and apply those rich glowing colours as you would like to see them, and start planning your way to achieve your ideal, because nothing is impossible to those who have the courage, determination and patience to make dreams come true.

Johnson H. Hood

How Well do Fish See?

by DAVID GUNSTON

ALL fishes with large and prominent eyes can, of course, see, but the question is how well can they see, and how in fact do they see? The vision of fish must be of two kinds: seeing objects under water, and seeing objects on land or in the air from under water. Fishes do not see both classes of objects in the same way. Most fishes have quite good sight for their needs, although by our standards they tend to be rather short-sighted. In all cases varying conditions in the water and the air alter a fish's capacity for seeing things clearly, and the actual excellence of vision does vary with different species of fish, usually according to their needs.

A typical fish eye is not unlike a human eye as far as its functioning goes. It works on the same basic principle of light entering through a curved lens and being bent to form a miniature image on a screen, or retina, from which optic nerves carry image-messages to the brain. But there are certain quite marked differences. The fish's eye is flattened and streamlined, rarely bulging sufficiently to interfere with its slim form offering the minimum resistance to the water. It can be moved from side to side only very slightly, and the iris, although it may be of a wide variety of colours, cannot be altered to reduce or enlarge the pupil in size as ours can. As the amount of light under water is seldom if ever enough to cause such contraction, something we find necessary on entering any brilliantly lit area, fishes have no need for a movable iris. Nor have they any need for eyelids, since the water itself constantly keeps the surface of the eye, or cornea, free from dust and dirt. This lack of eyelids causes some people to assume that fishes never sleep, as they are never seen with their eyes shut, but all fishes sleep regularly.

Further, the lens of a fish eye is not elliptical, as in human beings, but spherical, like a transparent glass marble. It is, in fact, the unpleasant-looking white ball that sometimes appears on our plates when a whole fish is served, but in life it is perfectly transparent. It has the advantage of a special reflecting membrane behind the retina, which is absent with us, and which serves to increase the amount of light in the image registered when the light is poor, as in deep or muddy water, or after dark. With this aid a fish may well be able to see an angler at dusk when he cannot see it.

Apart from the main physical differences mentioned, the eyes of a fish present one most important feature of their own. They are, of course, placed opposite one another on either side of the fish's head. As with all animals the image received by the right eye is transmitted to the left side of the brain, and vice versa. The fish has only quite a small blind spot immediately in front of its nose, and its largest blind area is immediately behind it. There is always a triangular area ahead of its nose which is covered by both eyes. Any object here is seen best of all, and if it is food or bait, the fish will rush towards it. This common field of vision varies with different kinds of fishes, according to the shape of their heads. In the trout it extends to about 30 degrees, but in other species much less.

Equipped with these various adaptations to an underwater existence, the fish has now to contend with the unusual (to us) world beneath the surface. There are many kinds of fishes, including most of the oceanic types, whose lives are centred wholly in the water, and which seldom if ever have any need to look upwards into the sky or outwards into the world at large. Their vision is perfect in its own sphere. But when you come to many other kinds of fishes—trout, salmon, bass for just a few examples—a two-fold vision is essential, for they come close to shores and banks, and need to see what is going on on land close by.

Under water, if you have fish-type eyes, things appear much as they do on earth, although visibility is poorer and the light diminishes as you descend. Distance is unknown, but nearby objects appear in focus. It is only when you look up out of the water that the picture changes considerably. This is simply due to reflection, the power that water possesses of bending light rays. Everyone knows how a stick looks bent when it is dipped into water, and the same optical illusion affects the sight of a fish under water. The man standing on the river bank sees a fish in the water, not where it actually is, but above its true position. Similarly the fish judges the figure on the bank to be where the direct line of sight shows it, which is actually above where it really is. However, it is important to remember that refraction like this does not apply to food or something on the surface. Objects such as these are seen without distortion and are judged by the fish correctly in position. It is sometimes said that a fish can, by means of this strange illusion of refraction, see a man before he sees it. This overlooks the truth that the illusion works both ways, and the man would see the fish at the same time. What does sometimes happen is that a fish may be lying under an overhanging bank, and yet by refraction be seen by a fisherman, thanks to the bending of the light rays, when if it were only visible in its true position, the man would not see it.

As water is denser than air, its surface in practice acts as an opaque mirror, because of what is known as total refraction. Thus all a fish really sees is through a circular aperture or window immediately overhead. Owing to further strange bending of light its field of view through this ceiling window is unrestricted, and the whole nearby scene appears panoramically in a circle. Objects are visible but they do not appear in their true size nor in proportion. So objects more or less overhead seem larger to the fish than they really are. Also, visible objects change in size according to the depth at which the fish happens to be. They appear larger when the fish is deep down, and smaller when it is near the surface. This is because the nearer the surface the fish comes, the correspondingly smaller his window on the world, and the smaller the images appearing in the circular field of view.

Fishes have eyes that are peculiarly sensitive to any movement, however slight, and the wriggling worm is for them something immediately attractive—provided that it keeps wriggling. This strange overhead window system of

vision, caused as it is by refraction, acts as described when the water is steady and calm. When the surface is ruffled, fresh difficulties present themselves, since the waves present all manner of new angles to the light. Sometimes the image is brought back to normal, and the fish momentarily sees the man on the bank as he really is in his true position, and a fraction of a second later, the image is even more distorted, and the figure appears overhead, upside down, or just blurred in a fantastic wobbling dance.

By keeping behind a fish, the angler has his best chance of undetected approach, and by keeping well down on the bank, he stands a good chance of using the power of refraction to conceal his presence. If he stood erect, his image would protrude into the fish's line of sight, and he might lose a catch. A fish will jink to one side when it spots food ahead, by the way, not to get a better view of it, but to be able to judge its distance and position more accurately before moving forward to take it. With all these limitations and difficulties, a fish clearly has to take especial care over judging distances and positions of objects seen.

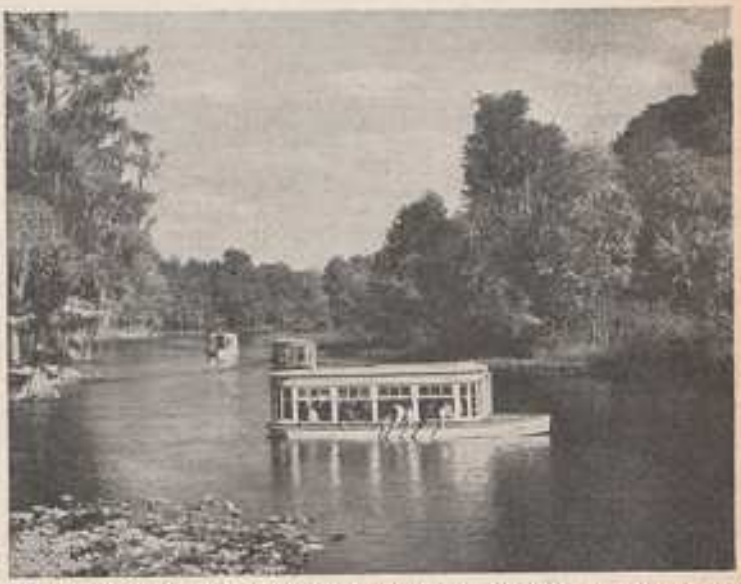
Conclusive experiments with fishes such as perch, shanny, minnows, trout and black bass have proved that fishes in general have a colour sense, and some can tell accurately even slight differences in colours, although further evidence is needed in some cases to show that other species are not merely going by varying degrees of brilliance in the objects shown them, and not by their colours at all. Tope and skate are quite colour blind, but the use of dyed worms and multicoloured flies for most other fish is fully justified. There seems good reason to believe that most fish can detect the colours of their natural food, whether vegetable or animal.

Silver Springs of Florida

A GIANT NATURAL AQUARIUM OF ENCHANTING BEAUTY

by MICHAEL LORANT

FLORIDA'S Silver Springs, with its unique attractions, is a giant natural aquarium in the 'Sunshine State' of America. It is truly a natural wonder of enchanting beauty. The main spring is a subterranean river that flows from the earth through a vast cavern 50 feet below the surface of the circular basin that forms the head of the spring. The water, which flows from this cavern at the rate of 600 million gallons each 24 hours, is as clear and pure as the air, revealing the beauties of even the deepest pools and grottos. Fourteen spring groups, with colourful names such as 'The Bridal Chamber', 'Christmas Tree Springs', 'The Blue Grotto' and 'Devil's Kitchen', join the flow of the main spring to form the Silver River. It is over this crystalline stream that the famous electrically powered glass-bottomed boats operate so silently that every word of the interesting legends related by the guides is easily heard. Underwater rainbows, veil-like formations of plant life and bubbling springs of many colours confront the visitor as he looks through the wide glass bottom of the boat. Great schools of fishes, 27 varieties of them, pass by in never-ending procession. At one place along the way, aptly called 'Fisherman's Paradise', visitors can feed the fish, which come to the surface to take bread from the hand. At another point, large schools of catfish turn the water black with their numbers and play 'football' with a doughball tossed overside.



Visitors to Florida's Silver Springs cruising along Silver River in one of the glass-bottomed boats

The Coloration of Fishes

by R. E. MACDONALD

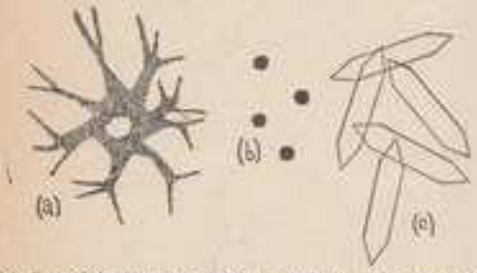
IN the majority of cases it is the coloration of fishes that makes them so popular with the average aquarist, and it will be noticed that drab species always manage to get left in the dealer's tanks even though perhaps they may be of extreme interest by way of their spawning habits or anatomical construction etc.

The coloration of fishes is determined by the presence of chromatophores that contain the various colour pigments. These colour pigments are either liquid or granular in form with the liquid type being known as lipochromes and the granular type as melamines. Lipochromes produce the yellow to red colours and the melamines give the blacks, blue-blacks and dark browns. There are no actual blue or green pigments to be found in the chromatophores of fishes, even though these colours are quite common. Blues and greens are caused by the presence of the other colours, particularly with black chromatophores, in conjunction with certain crystals; these shine through embedded layers of yellowish fat and thus only appear to be so coloured.

Pigment Cells

Chromatophores, commonly known as the pigment cells of fishes, are able to expand or contract very quickly. The fluctuations of the chromatophores are controlled by the central nervous system and whether the colour cells are open or closed depends on the circumstances. For example, if the fish is frightened, the cells close and the colouring of the fish will appear to fade. This is very noticeable in the angel fish (genus *Pterophyllum*). Incidentally, permanent fading is always associated with illness or discomfort in fishes.

In opposition to fading or the closing of the pigment cells, expansion is always a good sign, for a fish that shows good colouring is in excellent health.



(a) Expanded pigment cell (chromatophore); (b) contracted pigment cell; (c) guanin crystals

There are many other reasons for the intensification of the colour of fishes. For instance, this is particularly noticeable at breeding time when the fishes become very excited. Aquarists who have observed breeding habits will already be familiar with this phenomenon and take it as a prelude to spawning. It is really a "flush" of colour caused by excitement and quite distinctive from the gradual

Chameleon cichlid (Cichlasoma facetum)

brightening caused by a natural increase in the output of hormones as the fish becomes more fervent in its courting.

Another stimulus that could brighten a fish's colouring is the fear of attack by more vicious species. In this case the fish exposes extreme colours to bluff the enemy into thinking twice before taking a chance. There are also the flashing colours produced when a fish goes into combat. When parents of some particular species of fish are watching over a brood, it has been observed that they also undergo variations in the intensity of their colours which are obviously used as signals to the fry.

Colour Changes

Fishes can not only make a change in intensity but also a change in pattern. Camouflage is achieved in this manner, particularly by fishes that live where there is dense vegetation. Other fishes are known to change their colour patterns from thin daytime horizontal stripes to thick, dark vertical ones at night.

With the majority of fishes, colour or pattern changes occur according to conditions or the environment prevailing at the time, but a fish that apparently has a total disregard for this natural assumption is the chameleon cichlid (*Cichlasoma facetum*). The variations in colour and pattern that occur, even when there are no apparent reasons for these, take place so quickly and so often that the effect is most disturbing; indeed it certainly must be so for the other fishes occupying the same tank.

Guanin crystals play an important role in the brilliance of the colours and are found in the form of a crystalline deposit in the skin of fishes. These crystals possess a strong refractive action to light, i.e. they deflect the incident light where it enters obliquely from a medium of a different density, and it is these that produce the impression of brilliant colours as well known to all who keep fishes.

Top light (e.g. the light given by the lamps in a tank hood) affects the guanin crystals to show the fish to their best advantage, and this effect is noticed most when compared with that of daylight shining through from the sides of the tank.

The delicate hues shown by some fishes are caused by the guanin crystals being very near the surface of the skin, and when the crystals are covered by the colour cells the result is a luminous effect that has made the neon tetra an

extremely beautiful fish. When the fish possesses scales that have a glittering silvery sheen, the guanin crystals can be found beneath the scales as a layer known as the "argenteum".

It is worth remembering that fishes look much more colourful if shown against a dark background, for with too much light, they tend to pale and the effect of refraction is lost.

Abnormal colour patterns are seen in fishes that are colour mutations. These colour mutations can occur as one of four different forms. These are: (1) alamoy (inability to produce guanin crystals); (2) melanism (black colouring only); (3) xanthocism (golden colouring only); (4) albinism (absence of pigment). Almost all of these mutations can become hereditary, i.e. fixed by selective cross-breeding, although the fixing may not be strictly permanent. It is possible for a fish born with a mutated colouring to revert to the normal colouring of the species later in life. Some mutations such as the black mollie (*Mollienisia sphenops*), an example of melanism, have become extremely popular as aquarium fishes and are always in great demand.

Finally, it is worth noting that prepared foods are now available that have been made for the express purpose of producing glowing colours in fishes. This can be achieved by the introduction of hormones to the food, by substances that stimulate the glands producing the hormones, or by feeding the fish with a concentration of vitamins and proteins. But above all, ichthyologists have learnt that the colours and patterns of fishes are affected not only by internal but also by external influences and that consequently a great deal can depend on the personal attention and consideration that an aquarist affords his stock.

HAVE A GO AT TOOTHCARPS

by J. S. MacDONALD

SURELY the ideal aquarium fish is the egg-laying toothcarp. Anyone who has seen these little aquarium gems after they have settled down in their tank would not believe that they were the same fish as were in the dealer's tanks only a couple of days ago.

Although a few discerning aquarists keep many species of these delightful fishes, on the whole they are largely ignored, which is a shame because they have so much to recommend them.

The egg-laying toothcarps have many advantages over other fishes and few faults. They are not fussy and are easy to breed; in fact, they are so easy to breed I cannot understand why they are not very much cheaper. Still, I must not grumble as when I have some surplus fishes the dealers are always very willing to give me a good price for them.

Now let me try and explode a few myths about the egg-laying toothcarps. The whole group of species, I am sorry to say, have a bad name for being quarrelsome. This is not true. In fact, most of them are a little shy. About this point some "bright spark" who may be reading this will say to himself "Shy! What about a large *Aplocheilus lineatus* in with a school of neons?" Quite true, but no one in their right mind would put a large angel in with them, either, but almost no one considers the angel as a vicious fish. To get back to the point; if kept with fishes of their own size, you will find you have perfectly behaved fishes and, of course, fishes that will grace any tank.

The colours of these fishes have to be seen to be believed. From the beauty of the blue gulare to the sheer loveliness and charm of the lyretail, they are without equal.

Another of the silly tales that spring up is that the toothcarps must have soft acid water for their well-being. Utterly wrong! I think it is safe to say that most of our tropicals benefit by soft water slightly on the acid side, but most of them are kept in tanks where the water comes straight out of the tap. In most places up and down the country, the tap water is hard and alkaline. This does not matter to your toothcarps. They will live and breed in almost any kind of water. My own tap water measures 250 parts per million and has a pH of 7.6, but all my toothcarps live and breed quite happily in it.

All that is required to breed these fishes is a small tank,

Photo: Lawrence E. Perkins

Blue gularis (Aphyosemion coeruleum)

a 1 gallon tank is not too small for the smaller size toothcarps, and containing one or two nylon mops. No gravel or plants are required. In fact, I have in my fish house at the present time a pair of lyretails spawning quite happily in a sweet jar!

Another advantage is that the eggs, which are large enough to see and tough enough to handle, can be picked off the nylon mops with the fingers and put into a small plastic box with 1 or 2 inches of water to hatch. This makes these fishes ideal for the man with only one or two tanks, who feels that he would like to do a little breeding.

The hatching period of 10 to 14 days makes these eggs just right for sending to friends through the post. Wherever it is very difficult to transport fishes from one end of the country to the other, by sending the eggs, the job is simplicity itself, as the eggs do not mind a little cold—in fact, too much heat retards the development of the embryo. Once hatched the fry grow very quickly. Most species are able to take brine shrimp at once, and rearing the fry presents no problems even for the amateur breeder.

So come along you hobbyists, have a go at toothcarps!

Fahrenheit or Centigrade?

by P. LEE

IT has been stated that with the current trend towards the decimal system, we will eventually use the centigrade scale for common temperature measurements, instead of Fahrenheit.

Such a change would be bound to affect fish-keepers, especially during the change-over period, when thermometers of both scales may be in use at the same time. This article is intended to prepare the uninitiated for any such change of system.

Gabriel Daniel Fahrenheit was born in Danzig, on 14th May, 1686, although most of his later life was spent in England and Holland. In 1714, with an alcohol thermometer, he attempted to obtain two fixed points of reference. His zero was obtained by using a mixture of ice, water and common salt. As the upper reference, he chose the temperature of a human being, which at that time was thought to be constant. This he called 24°. With the scale so obtained, he found that the temperature of melting ice and boiling water were 8° and 53° respectively.

With a mercury thermometer, Fahrenheit decided to multiply the values by 4, which gave a finer graduation. At this point, he discarded his zero, which he was finding unreliable, because of variations in the relative proportions of ice, salt and water. Thus the scale as we know it was formulated, i.e.

Melting point of ice, 32°F

Boiling point of water at normal atmospheric pressure, 212°F

The interval (180°) between these fixed points is called the "fundamental interval".

Anders Celsius, of Upsala, Sweden, is credited with proposing the centigrade or 100° scale, in 1742, when he took the boiling point of water as 0° and the melting point of ice as 100°. It is said that a colleague, Stromer, inverted the scale to its present form, i.e.

Melting point of ice, 0°C

Boiling point of water at normal atmospheric pressure, 100°C

In this case, the "fundamental interval" is 100°.

As a matter of interest, the two scales are numerically equal at −40°, but that, of course, is so low as to be only a laboratory proposition. Let us now consider the methods of conversion from one scale into the other.

If we compare the "fundamental intervals" of the two scales it will be seen that they are in the ratio 180 : 100, or, to put it rather more simply, 9 : 5.

Thus there is a direct relationship. In any calculation, however, we must also take into account the 32° on the Fahrenheit scale before the lower of our fixed reference points is reached.

We can express our relationship, therefore, as a basic mathematical formula:

$$°C = \frac{5}{9}(°F - 32) \quad \text{and} \quad °F = \left(\frac{9}{5} \times °C\right) + 32$$

A further method would be to reduce this formula to a ratio table, shown in Table 1. Note that when converting from °C into °F, the final step is the addition of 32°.

Similarly, when converting from °F into °C, the first step is the subtraction of 32°.

Table 1

Add 32 *after* obtaining the °F		Subtract 32 *before* finding the °C	
°C	°F	°F	°C
1	1.8	1	0.56
2	3.6	2	1.11
3	5.4	3	1.67
4	7.2	4	2.22
5	9.0	5	2.78
6	10.8	6	3.33
7	12.6	7	3.89
8	14.4	8	4.45
9	16.2	9	5.0

Examples in the use of the Table are:

4°C = 7.2°F
7.2 + 32 = 39.2°F

38°F − 32 = 6°F
6°F = 3.33°C

This Table can also be used for tens as well as units. For example:

20°C = 36°F
36 + 32 = 68°F

72°F − 32 = 40°F
40°F = 22.2°C

or,

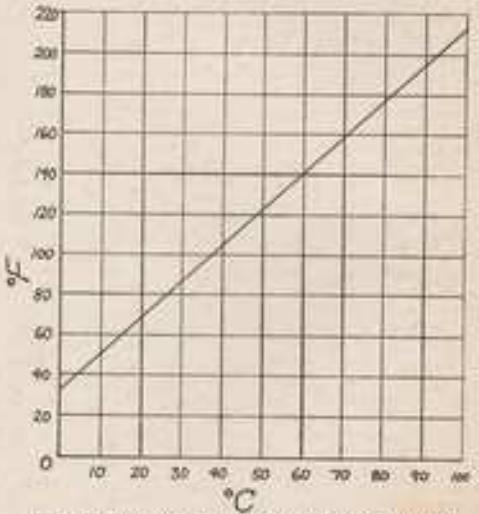
23°C is split up: { 20°C = 36°F ; 3°C = 5.4°F

36 + 5.4 = 41.4
41.4 + 32 = 73.4°F

75°F − 32 = 43°F

43°F is split up: { 40 = 22.2°C ; 3 = 1.67°C

22.2 + 1.67 = 23.87°C



Graph for interconversion of Fahrenheit and Centigrade temperatures

Another convenient method, where a high accuracy is of no importance, is by use of a simple table, or abac. This is shown in Table 2, and is self-explanatory.

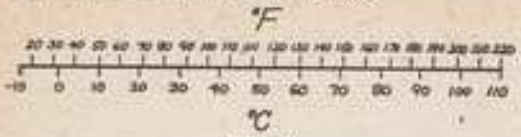


Table 2

Finally, another method of conversion is to use a graph, where one axis is used for °C and the other for °F. Use of the graph is best shown by example. Let us say that we wish to obtain the equivalent of 80°F. We first of all find 80° on the °F scale and then move across the graph in a horizontal direction, being careful not to deviate vertically from our 80° position. When the diagonal line is reached, we travel vertically downwards until the scale marked °C is reached. The point at which this scale is crossed is the equivalent value that we wanted to obtain. For 80°F we find from the graph that the corresponding value in °C is 27.

Checking this with the accurate mathematical method, an exact value of 26.666°C is obtained. The graph, then, can be considered as reasonably accurate.

In closing, perhaps we should note that, according to British Standard BS.1991, we should no longer refer to the 100 degree scale as centigrade, but in future we are recommended to say "degrees Celsius".

Some Unusual Guppies

by W. G. PHILLIPS

A WELL-KNOWN politician once said "Who reads Editorials?" Judging by the numbers of people who have asked me if I had read the one that appeared in the November issue of *The Aquarist* last year, I would say that most fishkeepers do!

For the benefit of anyone who did not read this particular Editorial, it concerned guppies maintained at University College London by Dr. Alex Comfort for the study of gerontology (old age). Writing in *Gerontologia* (a scientific journal), Dr. Comfort reported that female guppies remain fertile up to at least 3 years of age and that one female in particular, was still fertile when over 5 years of age.

This announcement came as a great surprise to many guppy breeders, who up to now had accepted the life span of the guppy as being about 2 years, and very few ever manage to keep them alive that long. It says much for the work of Dr. Comfort in prolonging their lives to at least more than half as long again as their considered normal length of life.

When referring to the males, however, Dr. Comfort wrote in his paper that when they are kept apart from females for about 7 months, most of them "fail to mate successfully". This, I would say, was the greatest surprise to most specialist guppy breeders.

A longer sex life for female guppies has no advantage for the specialist breeder, who rarely requires more than one brood, or perhaps two at the most, from his females, but the reference to his segregated males having a shorter sex life than normal certainly gives food for thought, when one considers the breeding methods adopted by some of our most successful guppy breeders.

For the benefit of those less informed in these matters, this is the method I refer to. A virgin female, or perhaps two, is mated to the best male available (of the same type). Their brood is sexed and segregated, as early as their sex can be determined. The young females are then kept virgin until they are required for breeding. In the meantime, they may be culled severely, as only the largest and most virile are required to produce the prospective winner and continue the line.

The young males are kept segregated from females, to be grown on until they are fully matured, which may take anything from 7 to 9 months or even longer, depending on the time of year they are born and, of course, on the variety. The long tail-fin type of veiltail etc. take longer than the short tail-fin varieties to reach their best, from a judge's point of view.

Quite recently, I mated four males, for their first time, with two virgin females each, quite successfully. Two of the males were 10 months old and two 11 months old. All eight of their females dropped their first brood in 36 to 40 days after being placed in with their respective males. Could it be the severely restricted diet (*Tubifex* worms) Dr. Comfort's males are subject to and not their segregation that was responsible for their inability to become fathers?

The most astounding news to me was to read in the *Gerontologia* paper that guppies do not eat their young, although the average size of the brood, quoted therein, are not very convincing. Many ways have been tried in the past by various guppy breeders to save the fry from the ravages of their parents. Guppies seldom attack their young once they are free-swimming. Most females will, however, devour many (sometimes all) before they reach that stage, some even when supplied with plenty of *Daphnia*.

Of all the various methods employed to save the very young fish, such as floating plants and various types of breeding traps, I have found the home-made one consisting of a piece of glass with three rubber suckers to be the most effective. By using such a contraption I have had some astounding results, in some cases where a female was previously thought to be barren.

The Editorial referred to the keeping of strict records of births, deaths, size of broods etc. by breeders. I have always found this most interesting and essential to achieve success, and I feel sure this new information will spur others to do likewise, as it is then and only then that one can compare findings with those of others. But, whatever findings and satisfaction one obtains these will be entirely one's own, as the findings will be ignored by the very ones you hope to impress most, namely one's club associates and, of course, scientists!

In the paper referred to above, Dr. Comfort suggested that the failure of isolated males to mate successfully when placed with a female might be a behavioural fault. This is something that develops, perhaps, in males kept isolated individually but not in males kept in a group apart from females, since in the latter instance the males continue to 'practise' their display and courtship manoeuvres. EDITOR.

our readers write

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

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

Hawaiian Mouthbreeder

MAY I add to the "Observations on the Hawaiian Mouthbreeder" by Barry R. James in the December issue of *The Aquarist?* As it was a new fish on my wholesale list I also obtained four, and they did not impress me much on arrival. The one thing which surprised me was the speed of growth (*Daphnia* was plentiful then). Otherwise they spent most of the time in the rear of the tank, digging large holes, and showing great nervousness when being fed.

I decided I could make better use of the tank, and put them in a 4 ft. tank of grown cichlids and gouramies. Despite fierce competition, they continued to grow at the same speed, also lost all shyness, being never out of sight. Here they continued digging operations, but this time in the front of the tank, and soon had the tank base showing, with a 6 inch gravel wall against the front glass. From past experience of cichlids, I have my plants behind a glass partition, so every 2 or 3 days I filled the hole back in, only for it to be dug out again.

During one of these operations I noticed that a female was refusing food, and her mouth was only partly opened. As this was the same sign as shown by Egyptian mouthbreeders incubating I decided I could lose nothing by transferring her to a breeding tank after netting her, (no small task in a large tank of rockwork, among about 30 grown fishes!). However, I was successful, and transferred her in a jar to travel to the fish house. On the point of turning the fish out, I discovered she had released a brood, which eventually turned out to be eleven. In the tank she soon picked all but one up, and was still holding them the following morning, but the odd one was dead on the tank bottom. I fed with white worms, and at lunch time the fry were free-swimming.

Although I left them together for 2 weeks, she did not again pick any up, nor did the young show any interest in her. At this stage the female was between 3 and 3½ inches. After the 2 weeks' rest and plenty of live food, she was returned to the community tank. Six weeks later I again found her incubating and once again netted her. It was evidently about the same time, for she had again released the brood before I could put her in the tank. Yet in each instance she retained them during the netting process.

Once more I left them together for 3 weeks, but no attempt was made to molest the fry. There were 42 young in this brood, which I fed on brine shrimp to begin with, then Grindal worm and on to normal dry food, white worms and Tubifex. Now, 10 weeks later, she has been incubating eggs for 9 days in the breeding tank (I caught her early this time it seems!).

From my experience of this fish so far, it appears to be an easy and frequent spawner, fairly prolific and with no particular requirements for water conditions whether in a community tank or breeding tank. As I have not had the pair alone so far, I do not know if the female would guard the young but I hope to experiment with this shortly.

Now a word or two in general. For those who "like them big," I am certain these fishes will prove popular, for the male is really beautiful when in colour, which appears to be fairly often. They are heavy eaters, and require a good amount of live diet to grow them on well. So far I have found them quite docile even where small fish are concerned, and to their own fry. For the ordinary community tank they will prove too large (one kept at a nearby university for observations was over 8 inches), and for the aquarist who takes a pride in his well-kept and planted tank my advice is—don't introduce this fish! Three days and it will look like a discarded gravel pit. On my wholesale list it is still listed only as Hawaiian mouthbreeder, but I think there is good possibility it is *Tilapia mossambica*, subspecies *T.m. natalensis*.

L. A. THEWS,
Didcot, Berks.

I WAS interested in the article on the "Hawaiian mouthbreeder" by Barry R. James in the issue of December, 1961. This fish is, of course, *Tilapia mossambica*, which was introduced into Hawaii from Singapore in 1951.

The history of this particular strain is of interest, because although it is an African fish the strain originated from five fish found in an estuary in West Java in 1939. These were found to be good pond fish and were distributed all over Java. Specimens sent to the British Museum were identified as *Tilapia mossambica* "native of East African rivers." In 1942 the Japanese introduced 22 into the lake in the Singapore Botanic Gardens, from whence the strain has been introduced into Malaya, N. Borneo, Sarawak, New Guinea, India, Pakistan, Burma, Thailand, Cambodia, Vietnam, Hong Kong, Philippines, Hawaii and the West Indies. Unfortunately in ponds the fish are too fecund, spawning at 3 months, and here in Malacca at least once every 3 months. Thus the fish runts and mono-sex culture has to be adopted. To overcome the inbreeding effect this Institute imported fresh stock from Zanzibar, which proved to be slightly different in appearance, although obviously closely related. The two strains are inter-fertile and the

hybrid is very much larger than the parents. More surprising, if a Zanzibar male is crossed with a local (Malayan) female all the offspring are male. We are studying the genetics of this cross at the Institute.

Mr. James' fish that turned jet black are males; the female remains much lighter. Inspection of the urogenital organs easily reveals the oviduct in the female.

As an aquarium fish *Tilapia zilli* is more brilliant, but is a grass-eater and not a mouthbreeder, although still a nest-builder. Therefore careful selection of water weeds is necessary. We have succeeded in crossing this with the closely allied *Tilapia melanopleura* and now have a nice brood of about a thousand fry. The results of this cross should be interesting.

I should stress that although we are naturally interested in aquarium fishes our main work here is research on fishes cultured in ponds for food.

(Dr.) G. A. Prowse,
Director, Tropical Fish Culture Research Institute,
Malacca, Malaya.

IN the article "Observations on the Hawaiian Mouth-breeder" by Barry R. James (*The Aquarist*, December) I found his observations on this cichlid quite interesting. I am not perfectly sure when this fish was introduced to this country but surely it should be known as *Tilapia mossambica*. It is claimed to have been discovered in the tributaries Rovuma and Limpopo, South East Africa. Four inches seems to be the average size in captivity and they seem to be avid feeders.

A friend of mine has several of these cichlids of nearly 3 in. size. The females are rather drab but the male stands out at breeding time, taking on a colour of black with white throat and jaws with a brilliant orange edge on the caudal fin and dorsal fin (the lower part of the dorsal fin showing a pronounced black spot). The male is a very lovely fish and both sexes are extraordinarily active and constantly on the look-out for food. Algae, live and dry foods are taken with gusto. In an article written in, I believe, *The Aquarium Journal* quite some time ago it was said that the Mozambique cichlids can grow to several pounds weight in their natural habitat. The female has the eggs fertilised in her mouth by breathing in inseminated water.

C. W. Mabbey,
Sheffield, 11.

Decline in Showing?

THERE has been mention recently of the possible decline in the popularity of showing fishes. Different people draw various conclusions. May I add mine?

As an aquarist of not long standing I have entered a few local shows, cloth beetle shows etc. with some success, but I am rather concerned about the 'feeling' that some exhibitors show. Some aquarists, it seems, are not happy unless they are 'in the cards,' a variation of the 'pot hunters' in other fields of competition.

Let us aquarists please show our fishes in a sporting manner and accept the judge's decision in the right way without any 'belly-aching.' We all feel, at times, that our particular fish is better than another, but we must accept the fact that other people have different views.

Now the question of a winning fish. I have met aquarists who should know better, complaining that their fish that won at Timbuktu last month should also have won this month somewhere else. Surely an aquarist, however raw, should be aware that a fish can change its characteristics in an hour or two. If a fish is not 'showing' well when the judge comes along it can be right down the list. Judges, too, have different ideas of how many points a fish is worth.

(Please turn to page 241)

The AQUARIST Crossword

Compiled by J. LAUGHLAND

CLUES ACROSS

1. Millions fish (5)
4. Make watertight with clay (6)
9. Roe goes across in a poetic way (3)
11. Pronunciation of rue in German river (4)
12. A word for exotic aquarium fish (9)
14. Alternative of 12 Across (2)
15. Fish eggs (3)
16. Girl would seem to lose direction (2)
19. Alp is born snail for tropical tank (9)
22. Uptilt for the angler (4)
24. Bear bows head in failure (4)
25. Coral beheaded (4)
29. Fem. char to bevel (7)
30. Ena is in what pertains to punishment (5)
32. Degree of oddity (1, 1)
34. Call (3)
35. Mooring organisation (1, 1, 1)
36. Public prosecutor in U.S. and in dare (1, 1)
37. As 30 (1, 1)
39. Bright warning or exotic fish (6)
41. Cut or slip (5)
43. Form of fiber (4)
44. Spawn (5)
45. Guides sore wrongly after saint (6)

CLUES DOWN

1. Mollusc with muscular 'foot' under belly (10)
2. Means sterile sometimes (4)
3. Sing in the manner common in the Tyrol (5)
4. Small edible crustacean (5)
5. Old drums make low spirits (8)
6. As 30 Across (1, 1)
7. Looking like freshwater goldfish, perhaps (7)
8. Something in the herring can go wrong (3)
10. — cavern (2)
13. Snake at the end of its tether with ground between (4, 6)
17. Mud (4)
18. Part of the archer fish and of a castle (3)
20. —— *pro nobis* (3)
21. Famous trade fair gets a bit of a bill (1, 1, 1)
23. Good planting medium for aquaria (4)
27. A plant the stem of which dies every year (4)
28. Spheres (4)
32. This means you (2)
33. Measure of land (4)
34. Common fibre (3)
36. Cleopatra's snake (3)
38. Mullet but not of fishes; keep back water by a bank (3)
40. Ere (3)
42. Male of herring (2)

(Solution on page 241)

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.

AT a recent meeting of the **Northampton and District A.S.** a panel of experts comprising Messrs. J. Smith, J. Wright, R. Shealey, W. Smedley and J. Hoelook answered members' questions. The Table Show results were: Swordtails: 1, Mr. Wilson; 2, Mr. Shealey; 3, Mr. Mortiboy. Platys: 1, Mr. R. Shealey; 2, Mr. Wilson; 3, Mr. J. Wright. Guppies: 1 and 2, Mr. Webb; 3, Mr. Mercery.

* * *

AT the **East London Aquarist and Pondkeeper Association's** monthly meeting the attendance was smaller than usual due to the inclement weather. However, a nice cosy chat was held and the evening turned out to be a good one with a variety of subjects—all fishy—being discussed.

Early in January a talk was given by Mr. B. Newman, a member of the club, the subject being fish breeding in general. Mr. Newman is known throughout the club for his success with the breeding of Neons and Cardinals.

* * *

AWARDS announced at the annual general meeting of the **Ruxley and District A.S.** were as follows: Tropical Cup: Mr. R. Deason; runner-up, Mr. W. Smith. Coldwater Cup: Mr. M. Smith; runner-up, Mr. J. Williams. The officers elected were Chairman, Mr. V. Robinson; Treasurer, Mr. E. Bennett; Secretary, R. Deason, 19, New Street, Rugby.

* * *

THERE was a change of officers of the **Bath A.S.** which took place at the general meeting, and they are as follows: Chairman, Mr. V. Haynes; Vice-Chairman, Mr. R. Mears; Secretary, Mr. J. Stevens, 3, Norfolk Buildings, Bath; Treasurer, Mr. R. Challenger; Committee Members, Mr. D. Lewsgrove. Future meetings will be held in the Board Room of Sainsbury Wine Vaults, 16/17, Alfred Street, Bath, at 7.30 on every Fourth Thursday in the month.

* * *

THE twelfth annual general meeting of **Pontypool A.S.** was held recently and was attended by 27 members.

Membership during the last year increased from 9 to 65 and continues to do so. This has been due mainly to some inspired work by a few officials who have by hard work completely reorganised the society. Numerous films and tape recordings have been used as a medium of instruction. Two well-known aquatic experts addressed the society during the year, and it is hoped to invite more speakers this year. 1961 also saw the publication of the first editions of the club magazine. By acquiring a duplicating machine it is hoped to print a free monthly copy for every member. An exhibition of fish, held at a local fete, was seen by 4,000 people.

During 1962 it is hoped to consolidate the position of the society by increasing the facilities available to members. The Secretary is: Mr. Frank Jephcott, 7, South Road, Cwmbran, Mon.

* * *

THE death has been reported recently of Mr. Harvey Dorman at his Fulham home. Harvey Dorman was for many years associated with the **Chelsea A.S.**, was an Olympia Open Show winner and one of the most active and best-known aquarists in South London. The Chelsea Aquarists Society will hold its annual Open Show on Saturday, 12th May. Details and entry forms may be obtained from: Mrs. E. Tucker, Secretary, Beaufort Court, 92a, Kings Road, London, S.W.3. The entries close 30th April. Any aquarist, whether a club member or not will be welcomed.

* * *

THE monthly club assembly of the **Guest Keen and Nettlefold A.S.** was held recently and a warm welcome was extended to visitors from the Wolverhampton Society. The main item of the evening was a Livebearer Show which was judged by Mr. Stokes (Smethwick Society) and results were as follow:— Mollies: 1 and 2, H. Fellows; 3, E. Hyde. Platys: 1, H. Fellows; 2, T. Rowe; 3, T. Lowe. Swordtails: 1 and 2, W. Jordan; 3, C. Richards. Best Fish in Show: Mr. H. Fellows, Platy.

While judging was taking place the other members were busy taking part in "Viewpoint," the questions having been compiled by Mr. E. Lane. Next month's main item will be a talk on "Fish Diseases."

* * *

AT the recent annual general meeting of the **Bradford and District A.S.**, the following were elected to office:— President, Mr. E. Little; Vice-President, Mr. E. Barrett; Secretary, Mr. R. Marshall; Treasurer, Mr. R. Norris, Social and Publicity Officer, Mr. R. Waterhouse; Equipment Officer, Mr. G. Holmes; Committee, Messrs. G. Taylor, C. R. Wilson, A. E. Thornley, F. Riding, A. Whitfield, P. Moorhouse, P. Rushworth.

Great things had been achieved by the society in the past year, and all were looking forward to the new year in the new meeting place at Unity Hall, Rawson Square, on the first Wednesday of every month. A new idea started this year is the special meetings on the third Wednesday of the month which are specially for new members of which there are a large number. In fact it is a long time since the society had such an active membership and the numbers now stand at about 70, 50 to 60 being the average attendance at meetings.

* * *

AT the sixth meeting of the **Dundee Aquarium Society**, the table show was Scott Trophy —Catfish, and the placings were :— 1, P. N. Greening; 2, D. Annan; 3, P. N. Greening. At the January meeting the table show was for A.S. Cichlid, and the programme consisted of two talks by P. N. Greening on "Fish Transportation" and "Breeding Experiences with Catfish" which were held over from the December meeting.

* * *

OFFICERS elected by the **Leeds and District A.S.** for the ensuing year are as follows:— President, Mr. P. Reynolds; Vice-Presidents, Mr. A. Bray; Secretary, Mr. G. Leonard, 28, Harrop Avenue, Morley, Leeds; Treasurer, Mrs. M. Sykes; Social Secretary, Mrs. J. Skinner; Librarian, Mr. J. Hardy; Council, Mrs. P. Haywood, Mrs. E. Marshall, Messrs. Haywood, Goodwin, Smith, Moss, Shilito, and Wilkinson; Auditors, Mr. E. Dobson, Mrs. E. Marshall; Delegates to F.N.A.S., Mr. D. Lees, A.T.A.S., Mr. J. Skinner.

* * *

THE officers elected by **Middlesbrough and District A.S.** for 1962 are as follow:— Chairman, Mr. H. R. Whittam; Hon. Secretary, Mrs. Freda Morley, 11, Sycamore Road, Linthorpe, Middlesbrough, Yorks; Hon. Treasurer, Mr. G. S. Westwood; Vice-Chairman and Assistant Secretary, Mr. J. Trevenion; Assistant Treasurer, Mr. D. Lancaster; Show Secretary, Mr. K. Whittam. Committee, Messrs. R. Heath, K. Whittam, D. Brunton, H. Morley, L. Collins, Mrs. I. Trevenion, Mrs. K. Whittam and junior member B. Clark.

The second annual show will be held in All Saints Hall, Grange Road, Middlesbrough, on 28th and 29th April. There will be the largest collection of trophies in the north, for which it is hoped there will be many entries. Schedules will be available shortly from the Show Secretary Mr. K. Whittam, 18, Devonshire Road, Linthorpe, Middlesbrough.

* * *

THE **Ouzam A.S.** will hold its annual show on Saturday and Sunday, 14th and 15th July, 1962, in the Recreation Hall, at Refuge Street, Shaw.

* * *

THE next meeting of the **Nottingham and District A.S.** will be held on the 27th February. In addition to the Discussion Group there will be a table show for Guppies—two classes, A.V. male and A.V. female. Recent show results are: Cichlids: 1, T. E. Smith; 2, D. Foster; 3, G. Wood. Coldwater: 1 and 3, A. Adcock; 2, R. Naylor.

* * *

THE result of the committee election at the **Southend, Leigh and District A.S.** annual general meeting was as follows:— President, S. Halsey; Vice-Presidents, L. Willis; Hon. Treasurer, D. Cheswright; Hon. Secretary, C. Marriott, 285, Prittlewell Chase, Westcliff-on-Sea; Committee Members, Mrs. Phillips, Mr. Phillips, Mr. Booth and Mr. Clarke.

* * *

A CHALLENGE has been offered by the **Merseyside A.S.** to any society within 50 miles to a Table Show and Quiz. Challenges should be sent to either the Hon. Secretary, Mr. S. Canavan, 32, Goshen Street, Liverpool, 15, or Show Secretary, Mr. H. Stamper, 15, Waverton Nook Road, Liverpool, 15.

Amongst the forthcoming meetings are visits from Mr. A. E. Mason of Cambridge on 8th February, Mr. Penally in March, and Dr. Pugh Thomas in April. The society is enjoying a boom in new members with a little over twenty joining since the Annual General Meeting.

* * *

WHEN the fortnightly meeting of the **Southport Society** was held in January the Chair-

The Aquarist's Badge

PRODUCED in response to numerous requests from readers, this attractive silver, red and blue enamelled 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. 6d.** to *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

man, Mr. J. Taylor, said he hoped 1962 would see more progress and collective interest in the breeding side of the hobby.

With that object in view it had been decided to form a breeding section among the members, and certain species of fish (to be decided on) would be purchased and brought on to breeding condition. The society had recently acquired some 10 large breeding tanks, and these were to be used for this purpose. The methods of breeding were discussed and fuller report of final arrangements and decisions would be given at the next meeting.

The Secretary Mrs. Woolley, announced the winners in the Aquarist of the Year competition, a competition where members at each meeting had brought along certain species of fish for inter-competition. It was pleasing to announce that junior member Master Thurston had won with 271 points, Mr. Perry had 262 and Mr. Reed 249 points.

* * *

THE **Mansfield and District A.S.** held its annual dinner recently. The Chairman (Mr. A. J. Blake) reviewed the Society's activities and successes over the past year, during which membership had increased steadily and revealed that the society was now in a position to compete at shows within 60 miles of Mansfield. He thanked everybody for their efforts.

Mr. G. L. A. Wilson and Mrs. Wilson presented the trophy awards and certificates to winners of the Challenge Shield competition: Mr. A. J. Blake, Mr. R. V. Dyson, Mr. R. Heath. The Home Furnished Aquaria competition was won by Mr. R. V. Dyson. Mr. Wilson thanked the Society for the kind and willing support given to all newcomers to the hobby.

* * *

AT the **Blackpool and Fylde A.S.** meeting the table show to decide the Cardwell Fighter Trophy and "Fish of the Year" competition, Mr. Maurice Carruthers of Clevedon, was the judge and the results were as follows:—Seniors: Mr. J. Worth; Junior: Master John Kilgour. Fish of the Year Competition: Seniors: Mr. G. N. Hadley; Juniors: Master Alan Parkinson. Other trophy results were:—Singleton Trophy for single fish, Robinson Trophy for pairs of fish and the Legge Trophy for breeders: Mr. R. Simmons won the three senior trophies and in the junior section Masters Bryan Crowther won both Singleton and Legge Trophies, and shared first place in the Robinson Trophy with Master John Kilgour.

* * *

AT the annual meeting of the **Worksop Aquarist and Zoological Society** the following officials were elected. President, Mr. V. Gabrdyl; Chairman, Mr. F. Foster; Vice-Chairman, Mr. D. James; Secretary, Mr. A. M. Deakin, 15, Sewell Road, Kilton Estate, Worksop, Notts.

The Society will be staging a display at the Vocational Service Hobbies Exhibition, Bentinck School Worksop, and this will be held Thursday, 26th April to Wednesday, 2nd May.

* * *

THE last meeting of the **Prestlance A.S.** allowed the Society to celebrate their first birthday. With a membership which has now increased to thirty-one the club looks forward to the coming year's events and lectures that are being planned, which will include visits of many well-known lecturers from other clubs and societies. The Secretary is Mr. R. A. Thomas, 54 Bowcroft Road, Crofton Park, S.E.4.

* * *

SECRETARY CHANGES

BATH A.S.: Mr. J. Stevens, 3, Norfolk Buildings, Bath. Croydon Aquarists: James S. MacDonald, 61, Albert Road, South Norwood, London, S.E.25. Leeds and District A.S.: G. Lancaut, 26, Harrop Avenue, Morley, Leeds. Southend, Leigh and District A.S.: C. Marriott, 285, Primrosehill Chase, Westcliff-on-Sea.

* * *

NEW SOCIETY

A NEW Society has been established at Cutnall, near Droitwich, and is to be known as "The Dun Valley Aquarist Society." A committee consisting of 5 members has been formed, and intending members should contact the Secretary, Mr. D. Cross, 32, Mill Lane, Warmsworth, Nr. Doncaster, who will furnish them with all available information on the society's activities.

Crossword Solution

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

Our Readers Write

(continued from page 239)

Some are severe, some are generous. It is no good complaining that judge A gave a fish 90 points and judge B only 85; probably judge A marks all his fishes higher.

What is wanted is keen competition but let us keep it sporting. There is always the next time! We must keep this side of our hobby alive and not discourage would-be exhibitors, otherwise there will be little use for societies and the hobby will degenerate to an individual hobby like stamp-collecting; but perhaps I insult the philatelists! Any other views?

E. G. ROCKALL,
Abingdon, Berks.

Longevity

THE following may interest your readers. To-day my black widow fish, purchased as a mature fish in June 1951, died. Towards the last few months its finnage became a little ragged and a few days ago it developed swim-bladder trouble.

J. E. MORRIS,
Bath, Somerset.

Guppies—Kings or Fodder?

I HAVE been keeping a tropical community tank for 18 months now. In my short experience of fish-keeping I have kept quite a variety of fishes.

Recently I decided that I would just keep the "King of Tropical Fish," the guppy. In my opinion they are the most colourful and lively of all fishes; there is nothing more beautiful to see than a tank full of guppies twisting and turning between the plants and each other.

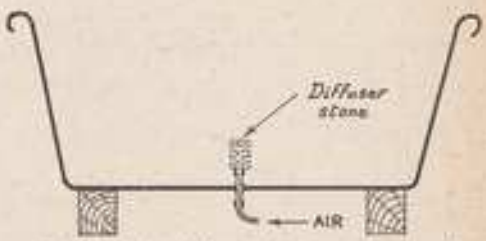
Yet I wonder why it is that the breeders of the larger varieties of tropical fishes invariably seem to raise their fish on young guppies. In fact some aquarists seem to breed guppies just for this purpose. It seems such a waste to me. Surely they could raise their cichlids etc. on some other type of food?

I. CHADWICK,
Bacup, Lancs.

Brine Shrimp Hatcher

ALL that is needed to make a first-class brine-shrimp hatcher is a plastic washing-up bowl (7s. 6d.) and a diffuser stone. Make a small hole to take the diffuser stone tube at the centre of the bowl and stick this in position with adhesive.

T. R. BEATSON,
Netherton, Wakefield.



Brine shrimp hatcher (sectional view; see letter above)

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