

The AQUARIST AND PONDKEEPER

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Editorial

DOGS and monkeys have already made their entry into Outer Space, but when men eventually project themselves moonwards it has been suggested that fish should be the animals to share the doubtful privilege of being the first earth-creatures on the moon. The suggestion is reported to have been made by Professor Albert Sparks, of the University of Washington, Seattle, U.S.A., who has selected *Tilapia*, the East African cichlid, as the species to experiment with for this purpose.

The story goes something like this. Men in space-ships will need to take food with them, but unfortunately there is little spare room or extra power for large supplies to be taken in the machines visualised. If a self-propagating food could be carried on the trip this problem would be solved. *Tilapia* is a fish widely cultured for food purposes, for it breeds readily and is fast-growing (in ponds, at least). What about the food necessary for the *Tilapia*?—the practical aquarist will ask. This will also be grown out in space, in the form of algae. Algae should thrive, it is said, in the perpetual sunlight to which it will be exposed, and these plants growing in the *Tilapia* tanks will also produce oxygen for the fish, thus meeting another demand.

In some ways this all sounds rather familiar. It is, of course, the old story of the balanced aquarium with a new twist and adapted for a new purpose. Whatever the likelihood of success for any part of this venture may be, if moon-craziness will lead to the provision of funds and resources for people to investigate new ways of culturing important food fish then some good might well emerge. But it will be quite a few years yet, we suspect, before *The Aquarist* publishes a report from the Lunaquarium.

TO compensate readers who order their copies of *The Aquarist* by subscription for the non-appearance of separate July and August issues this year, owing to the printing dispute, we are extending the periods of existing subscriptions by two months.

A Fish-House Design FROM FRANCE



The author in his fish house

IT was with pleasure that I read the excellent article by Dr. F. N. Ghadially in the December, 1958 issue of *The Aquarist* about his fish house. I felt as if I had a special link with him, as I had gone through roughly the same stages as he described, and after I had filled up several rooms with aquaria, I also developed my own fish house. In this project I met with the same problems as those which Dr. Ghadially described. However, I succeeded in finding other solutions, and I believe that this account might also be of general interest.

As the relative costs in France of heating by coal, heating by oil and heating by electricity are 1:3:10 respectively, it was clear to me from the start that I had to prepare for coal-heating. So during the winter I made use of a small continually burning stove (visible in the foreground of the picture), which consumes about one-quarter hundredweight of boiler-fuel a day. I intend to exchange this stove for a different type of stove, which will be joined to the same stove-pipe. This will then burn only during the night or, in rainy weather, for a few extra hours during the day.

Control of Heat Loss

For insulation the four brick walls of the fish house are lined with a tar-containing special hardboard (with aluminium foil on the inside), which is nailed to wooden ledges so that between the wall and the hardboard about a 1½ in. air-cushion is enclosed. The floor is made of oak and carpeted with linoleum. The entire roof of the room consists of a double-glass window with a 4 in. air-space between the sheets. It was clear to me that this glass roof would bring a very great loss of heat, but I wanted at all events to have lighting in the fish house as natural as possible, as I attach great value to the luxuriant growth of water plants and specially enjoy cultivating the rarer kinds.

While I was working on the fish house I was surprised to discover that the glass roof not only brings a loss of heat but also an enormous heat gain. When the sun is shining

by

W. SIEGL

the temperature mounts by leaps and bounds and then remains stationary for a long time. Therefore even during the winter I can keep the door of the fish house open in the midday sun. In the summer, on the contrary, on sunny days the door can remain open all day long, but the sun-blinds must then be drawn. These are constructed so that they each slide on two rods parallel to the glass roof. The blinds are made from rather transparent material, so that even when the blinds are drawn the plants get sufficient light. I hardly need to mention that with such management the water plants show a luxuriant growth. The sun-blinds have yet another purpose. Here, on the northern slope of the Alps, which are in the region of 1,500 ft. high, in the winter we sometimes have a temperature of 25-35° below freezing point. On such cold nights

I close the sun-blinds, thereby decreasing the cooling through the glass roof.

Importance of Cover Glasses

Now I would like to describe what is in my opinion the most important difference between my fish house and that described in Dr. Ghadially's article. From Dr. Ghadially's article I perceive that his tanks are not covered. I, on the other hand, cover all my tanks (I have about 50 of them) with thin sheets of glass. From this there follow great advantages, as opposed to only very slight disadvantages. First, there results from this an enormous economy in heating material. The atmosphere in the fish house remains dry, and in the winter, with continuous central heating, even very dry. As the heat conduction of dry air is about eight times less than that of air full of moisture, one can imagine what abundance of heat alone is spared by the decrease in the delivery of heat to the walls and roof. But that is not the only heat gain, as still further ones occur.

The aquarium water does not evaporate into the room, but condenses on the glass cover. Thus the heat used in the evaporation is regained once more on condensation. The aquarium assumes room temperature like any dry body and, in order to keep my tanks at 76°F, I need only 76°F. room temperature and not a temperature 12°F. greater, as was stated in the former article for uncovered tanks. Covered tanks, on the other hand, not only conserve a great amount of heat, but also avoid a fall in temperature. As one may see from the picture, the continually burning stove is not very large to heat the fish house through the winter. In a dry atmosphere at 76°F one feels so comfortable in shirt-sleeves that it is a pleasure to work in the fish house; whereas in a damp atmosphere at this same temperature the place would soon be very unpleasant.

(Please turn to page 88)

The TOOTH CARPS

A Practical Survey of the Group by members of Hendon Aquatic Society

BOB CALROW introduces the group and discusses the blue gularis

THERE is an increasing number of fishkeepers turning into specialists, and turning their activities to a single family. Perhaps no family has gained more followers than the very popular tooth carps.

These fishes are deservedly the favourites of many, for here we have the most colourful of all the fishes, of reasonable size, able to be bred and maintained by all, including the man with one tank and those whose fish-keeping time is limited to an occasional attention in the evenings. Paradoxically, too, they are rarely found in the shops, which means that there is a ready market for good fish, and for those whose activities do not permit the growth of luxurious plants in abundance, here are fishes that need no thickets in which to hide or spawn.

It is wrongly assumed by the uninitiated that the water required for this family is beyond their capabilities, and that the fishes are so touchy that only the old hand with a secret formula is able to keep them alive for more than a few days. This is, of course, not so and I strongly commend the fishes to the humblest beginner. I have successfully kept tooth carps from my first fish-keeping days, and whereas the breeding of White-Cloud mountain minnows and zebras has always evaded me, I can say that no tooth carps have ever been in my fish house without I have spawned them.

These fishes are in the main from Africa, including the beautiful *Aphyosemion australe*, *A. calabaricus* and *A. bivittatum*. The last-named is found in small water places and in low temperatures, and for the aquarist faced with a problem of dubious temperatures, fluctuating from 60° to 80° F., they are an ideal fish. There are too, the *Panchoax* (*P. lineatus*, *P. dayii*) of the far east, also easy to keep and certain to breed.

There is also no problem in keeping these fishes together, and they will make a good community, the only exception to this being that all of them will eat any other fish small enough to be taken into their fairly enormous mouths. All of them need live food, which can be garden worms, *Daphnia*, white worms, Grindal worms and any variety of pond life. The *Aphyosemion* will enjoy freshwater shrimps, and *P. lineatus* will not fail to enjoy large water tigers, which do not worry them at all. You will find that they always take these beetle larvae in their expanded jaws, with the water-tiger's mandibles flailing hopelessly from their mouths in the vain hope of getting a hold of the enveloping fish.

Blue Gularis (*Aphyosemion coeruleum*)

These fishes are the most colourful of the whole family. The male can grow up to 5 inches long and will be bright blue, with an elongated orange tail. The female is a smaller fairly plain mate, with only a trace of the blue colouring on her sides.

Not so long ago great praise was given to the aquarist who succeeded in breeding this species, why I shall never know, for I am certain that it is not possible to keep a pair of these fish together without them spawning, provided that they are getting good food. The fish does not even require great space. It has been repeatedly bred by me in a tank 12 in. by 6 in. by 6 in. When asked about the difficulty of spawning this fish I always answer what I am certain is the truth: that all fishkeepers who have had a pair together have spawned them, but not many have had the patience to await the hatching. The reason for this is that no two of



Aphyosemion bivittatum

the accepted authorities will be sure of the amount of time needed for the fish to hatch out.

I have read many English and foreign books on this fish, and they all give various hatching times, which stretch from 2 weeks to 6 months. Each of them can be right. I have had, for no apparent reason, fish hatch out within 2 weeks, and yet the very first time that I put a pair down, I made a note that the tank was not to be dispersed until I had given the eggs 3 months at least. It was only because I am an extremely lazy aquarist that the tank stood for 6 months after the parents had been removed and that I saw newly hatched fish in it. I am convinced that in most cases the eggs or fry are thrown away by the would-be breeder who has not waited long enough. After all, 6 months is a long while to wait when you are urgently needing success and looking into the tank every day. This fish goes in and out of fashion, and is either in abundance in the shops or there are none to be found in the country, so I am sure that the aquarist who is prepared to carry on raising this variety will, if he persists, find a market for the produce.

I have already said that a small tank will suffice, and all that is then required is a base of boiled peat, a depth of 6 inches of rain water and a bunch of nylon wool to help hide the eggs. Food should be alive, and garden worms are a good breeding conditioner. The fish should be left together for 1 month. When, after the long wait, the young do hatch out, it is not necessary to introduce fine foods to get them out of the tiny stage, for after that time there is enough life in the tank to keep them going, for at a few days they will eat Grindal worm, etc.

If you ask me why there is such a disparity for the various hatching times for the eggs I would suggest that the bacteria and life content in the water probably has something to do with it, and it seems in accordance with nature, that she awaits the day when there is sufficient life in the water to support the newly hatched fry.



WYNNE RICHARDSON discusses the australe
(*Aphyosemion australe*)

THIS richly coloured species is found in the very soft waters of Africa, in practically any type of pond, trench or river. It needs a fairly cool tank and is quite happy at 65°F. The male is quite obvious as a highly coloured fish compared with its drab female. The male has a lyre-shaped tail, of bright orange and blue, and the body is rich orange-brown. The dorsal and anal fins are tipped with bright white. As soon as these fish are adult they will breed, and only one pair is needed. They should be kept in a small tank, about 12 in. by 6 in. by 6 in., with a layer of boiled peat on the bottom. They may be fed on any live food or on flakes. They will also greedily eat shrimp or meat and any other meaty food.

The tank should be filled with fairly soft water, and rain water, or a mixture of tap and rain water, will do. The hardness of this is of no concern to me, and in fact the fish will live in hard water, but appear to breed better in the rain water. I have never cleaned rain water with a filter and, as far as I can say, I have never lost a fish whilst using water

drawn directly from an old iron butt. I do not, of course, draw off the sediment from the bottom, but I think that far too much emphasis is put on the water problem. The fish, left alone and well fed, will certainly spawn, without plants, although I use a nylon-wool mop for them to lay in. Fish should be removed after 1 month and the tank left, when it will be just a matter of weeks before you will be able to collect the youngsters from the tank as they reach movable size. As soon as the first young are seen I always add a little food, such as powdered flakes, adding Grindal worm as the fish grow. I can find no evidence of cannibalism, and one may take away the young fish as they advance in size over their brothers.

The water after this time is, of course, rather acid owing to the peat base, but the absolute pH has never concerned me. The fish do not need peat in the tanks where they are kept, and will be quite happy in a well set-up show tank.



Aphyosemion australe



JACK ROBERTSON introduces *Aphyosemion bicittatum*

THIS member of the tooth-carp family has recently been prominent as a breeder's entry in many of the bigger shows. It is a beautifully coloured fish, with so many colours to be seen according to the position of the reflected light that no two descriptions will ever suffice to

identify the fish. The male should have brilliant orange fins, and at spawning time a cast of blue over the throat area.

I have caught this fish in its home waters in Africa, and I have seen it in many small rivers in the area of Lagos. Here the waters are cool, and it may successfully be kept at a temperature around 65°F. How does the fish acclimatise itself to transfer from one type of water to another? This fish appears to be extremely adaptable, and I have carried it in a bucket for days, to be thrown into London tap water, and many of my friends bred the fishes which I brought home at the first attempt.

The female, as with all the related fishes, has no great colour and sexing the pairs is very simple. They should be placed in a small tank with a peat base and allowed to spawn for 14 days. I then remove the parents and the first young fish hatch after a further 14 days. These fish will eat Grindal worms and *Daphnia*; they are not keen on any type of dry food.

Although I think that this fish will adapt itself to any hardness of water I always use rain water in the breeding tank, because it appears to give a larger production of fry. I also always boil the peat to be used in the breeding tank, for although they will breed if raw dry peat is allowed to settle in the tank, there will always be produced in that tank such a strong acid content that the fish will rarely survive a transfer to less acid water at a later date.

HENRY WHITE discusses *Panchax chaperi*

THESE little fish are among the easier-to-keep tooth carps, and have all the fine colours of their family. The male fish is a heavy barred green-silver, torpedo-shaped fish with a brilliant red jowl and throat. It will live longer and breed easier than any of the others.

The female, although showing the black vertical bars, can be easily recognised for she has none of the red, when fed properly she has a curved lower contour and is apparently able to throw eggs for the whole of her adult life.

These fish may be kept in any type of water, and the tank in which you may try to breed them can be of any size. It is not necessary to have any special number of fish in the breeding tank, and a shoal of ten will reproduce, with no losses.

The tank may or may not be planted with rooted plants, but some surface planting is desirable. *Riccia* is excellent, or floating fern, and if this is not readily obtainable a floating nylon-wool mop, suspended from a cork, will serve very well. The fish need only good live food and when they are adult will throw eggs daily. The young fish will hatch out in about 2 weeks, and will enjoy the finest live foods.

I have successfully reproduced these fishes in a community tank with mixed livebearers, and in such circumstances the nylon wool should be floated in and examined every week-end. The eggs are easily seen against daylight for they are large and transparent. They should be carefully

removed with wet fingers; care being taken not to squash them. An interesting fact is that these eggs have a reasonably hard shell, and if care is not taken the shell will be broken and removed from the egg.

The eggs should be placed in a small jar or tank of the same temperature. In the unlikely event of fungus appearing on the eggs, it will be advantageous to add a trace of



Panchax chaperi (F.B.A.S. Show Fish Guide illustration)

acriflavine to the water. The developing fish will be seen in the eggs. The young fish grow rapidly and will soon take sifted *Daphnia*, and the flake foods crumbled will suffice until they have reached that stage. When free from the egg, the young fish soon stay at the surface where they normally spend their life. It may rightly be assumed from this, and the characteristic flat back of the surface fish, that the best food for them will be surface insects and flies.

Control of Algae in the Aquarium

MOST but not all types of algae growth thrive in hard alkaline water. Aquaria containing soft peat water rarely develop a serious attack of algae. I have yet to see slimy green or blue-green algae develop in water below pH 6.5 and a hardness of 30 parts per million. I have, however, seen the short bushy hairy algae develop under such conditions. It seems to me that one of the simplest treatments one could try to kill many forms of algae is to replace some of the aquarium water with rain water or distilled water and to run a peat filter for a while. Though this is not guaranteed to kill all forms of algae, I am certain it would help to control many of the forms that flourish in hard alkaline waters. It must be pointed out that any brown-coloured specimen of water produced by passing water over peat is not necessarily soft and acid. This must be checked and controlled with the aid of kits available for the purpose. Changes in pH and hardness of water must be brought about gradually so as not to affect the fishes adversely. Soft acid water produced in this manner does not stay that way for ever. Calcium salts leaching out from the gravel, aquarium putty and glass, calcium salts added with the food and calcium salts from disintegrating snail shells all help to turn the water hard and alkaline with the passage of time.

Filtration and Control of Algae

There is little doubt that filtration can help in the control of algae. As we have already observed, particulate organic waste matter does not directly promote plant or algae growth; it is only when it is broken down into simple inorganic salts that the plant or algae can absorb and utilise this material. If most of the organic debris could be removed before it is broken down then algae trouble will have little chance of developing. An external filter can remove large quantities of particulate matter and thus help

by Dr. F. N. GHADIALLY

(A continuation of the article
published last month)

in this direction; a subsoil filter does not have this advantage. The common filter media used are too coarse to trap effectively the fine algae which turn the water green or to trap algae spores. A few spores may be trapped but this cannot be an important factor. Aeration on its own offers no advantage.

Chemical Control of Algae

There are many substances which when placed in the tank will kill algae. The snag is that anything that can seriously injure the algae will also to some extent injure aquarium plants. However, there are substances which, by adjustment of their dose, can be used to obtain a more or less specific destruction of algae with little or no damage to plants.

Salts of heavy metals such as silver, mercury and copper. These have long been employed for the destruction of algae. Of the three, copper undoubtedly is the best known and most extensively used. Copper is added to the aquarium either as a salt or metal. Aquarists have placed pennies, copper sponges, etc., in the tank as a prophylactic against algae, and others have used copper sulphate or copper chloride both as a prophylactic and as a cure for algae.

Personally, I am opposed to the addition of copper in any form to aquarium water. It is a potent lethal agent for algae, plants and fishes and one virtually impossible to

remove once it has been added to a tank. I have extensive experience with the use of this substance both in the metallic form and as a salt for treatment of velvet disease and algae trouble, and I have never been able to kill algae selectively or cure velvet disease without in the long run seriously injuring plants and impairing the health of fishes. It is not commonly appreciated that once copper salts have been added to a tank it is difficult to get rid of them.

I remember once accidentally dropping about 50 millilitres of a saturated solution of copper sulphate into a tank. Even when the tank was rinsed out dozens of times and allowed to stand in running water for many days it was still unsuitable for fish-keeping. Fishes placed in the tank died within a few hours. Further numerous changes of water carried out over a period of months gradually made the tank habitable, in the sense that the fishes survived, but it was soon apparent that they were not in the best of condition. The tank was finally restored to normal use by re-glazing.

Mercury salts and silver salts act in a manner similar to copper. Many aquarists must have noticed that when treating white spot with mercurochrome any algae present

are also killed. But the same treatment will kill *Vallisneria spiralis* var. *torta* and seriously injure the growth of many plants for months to come. The gravel is also loaded with mercury salts and if plants are ever to grow really well one must get rid of the old gravel and substitute fresh. Recently a method of adding silver ions to aquarium water has been introduced. There is little doubt that such a technique can control algae growth but it is too early to state whether it offers any advantage over the use of copper or mercury. After all, the mode of action must be essentially similar.

Potassium permanganate. This substance has attained a certain degree of popularity as an algicide and is the active constituent of a popular commercially available mixture for clearing green or cloudy aquarium and pond water. It can rapidly clear green water and it is also moderately active against slimy green and blue-green algae. The best method of using this substance is in the form of a strong solution. A few drops or a teaspoonful (depending on the amount of water to be treated) are added at a time until the algae turns brown and precipitates on the floor of the tank and the clear water shows a light pink colour. Once the pink colour disappears the protective powers of the chemical are finished and the algae may easily reappear unless the true cause, e.g. excess of light, overfeeding with dried food, etc., is detected and tackled. Moderate occasional use of permanganate seems to have no ill effect on plants or fishes.

Methylene blue. This substance is highly toxic to algae and plants but completely harmless to fishes. One could easily add enough methylene blue to kill all plants and algae in the tank without the slightest ill effect to the fishes. However, to find a dose that kills the algae but leaves the plants completely unharmed is very difficult, if not impossible. Accurate doses are difficult to state as the drug combines with the algae, plants and mulm and is rapidly removed from the water. Here again the best method is to place a few drops of a 1 per cent. solution (2 to 4 drops per gallon) in the tank until the water develops a faint-blue tint. In time, as the drug combines with the algae, the water will clear and a few days later a few more drops may be added until the algae shows signs of disintegrating. Most of the tough-leaved plants survive the treatment quite well but delicate plants like *Vallisneria* and Indian fern are almost as susceptible as the algae, and a few may be killed and others may show impaired growth later on.

Acriflavine. During the course of experiments with acriflavine, to determine the best way of tackling velvet disease, I found that algae-ridden tanks cleared up in a most miraculous fashion. Some old *Cryptocoryne* whose leaves were long obliterated from view by the growth of dirty-brown algae cleaned up beautifully and the plants appeared very bright, shining and healthy. Slimy green algae was also seen to disappear in another tank. Since that day, nearly 3 years ago, I have wanted to investigate the algicidal properties of acriflavine in greater detail. However, as luck would have it, for nearly 2 years I have failed to produce the algae-ridden tanks I needed for trying out this new remedy. But for the last year or so I have had better luck(!), and have been able to carry out many tests. All these tests now seem to indicate that in acriflavine we have a fairly potent algicidal agent which is harmless to fishes and pretty harmless to most aquatic plants in the doses stated below. Indeed, it seems to boost the growth of *Cryptocoryne* and *Sagittaria*.

The chief value of acriflavine seems to me to be its power to halt an impending attack of algae. As a cure it is also valuable but full success cannot be claimed for this treatment. Experienced aquarists can usually sense impending algae trouble. A trace of green algae on the glass or on an odd plant leaf means little, for any healthy tank is likely to show such slight growth of algae. However, when all is well this growth remains static, but if it begins to encroach further then trouble is brewing and steps should be taken

FINNY BUSINESS

by
LD



"Stop complaining—not every tank has a view like this!"

before the trouble is too far advanced and the plants are seriously damaged. Further, the rate at which the algae advances is a fair measure of the severity of the impending attack. If conservative treatment such as reduction of the amount of light, cutting off dried-food feeding, etc., fails at least to halt the march of algae within a few days then acriflavine should be added. As a rule a large dose of acriflavine is not required; a dose of 1 to 2 milligrams per gallon of water is usually quite adequate. When this is combined with other measures of treatment (i.e. reduction of light, etc.), not only does it halt the march of the algae but it more or less completely destroys it. If the desired degree of effect is not produced with the first dose then a second dose may be given in 2 or 3 days. Aquatic plants are not adversely affected until a dose of 10 mg. per gallon is reached; even then only plants like *Vallisneria*, *Myriophyllum* and *Cabomba* show some deterioration; plants with tough leaves like *Cryptocoryne* and the Amazon sword plant can tolerate a much larger dose with impunity. Fishes show no adverse effects. After the treatment there is no need to dismantle the tank or change the water. A search should be made for the cause of the trouble, for if this is not found and rectified when the acriflavine disappears the trouble may appear once more.

For the treatment of a tank heavily infested with algae acriflavine is only of limited value. On many occasions now I have purposely allowed a tank to become overgrown with algae so as to try out the effect of various doses of acriflavine. I find that a total dose of about 8 to 12 milligrams per gallon (depending upon severity of attack and type of algae) added in two or three divided doses during the period of a week kills off the majority of algae, which then peels off the glass and plants and accumulates on the bottom of the tank, from where it can be easily siphoned

off. Unfortunately, in some instances the cure is incomplete and a fair amount of viable algae is left clinging to the plants. Further additions of acriflavine will kill this algae but may also seriously damage the plants. Green water, hairy algae and green algae respond more satisfactorily than blue-green algae. For the last-named manual removal plus treatment with acriflavine is needed to bring it under control. Used in an intelligent manner, acriflavine can be of assistance in curing at least 80 per cent. of cases, if not 100 per cent. Even at the higher doses mentioned, fishes show no adverse effects whatsoever.

For administering the acriflavine treatment a 1:1,000 aqueous solution of acriflavine should be purchased from a chemist (the usual strength at which it is sold is 1:10,000), and 1 millilitre (ml.) of this solution will contain 1 milligram (mg.) of acriflavine. Therefore 1 ml. of this solution added to 1 gallon of water will give you an approximate concentration of 1 mg. of acriflavine per gallon. Thus to treat a tank containing 10 gallons of water to produce a concentration of 2 mg. per gallon you will need 20 ml. of 1:1,000 acriflavine solution.

Having described the various chemical means of controlling algae, I would like to end this article by once more stressing that any chemical means of algae control is purely symptomatic treatment; it does not go to the root of the trouble and eradicate it. The final and only satisfactory way of control lies in sensible aquarium management. Chemicals are of use to get us out of serious trouble brought on by ignorance or neglect in the first instance. Continuous addition of various chemical substances to aquaria is a practice that cannot be too strongly depreciated, for in the long run it so hopelessly upsets the biology of the aquarium as to make life difficult if not impossible for both fishes and plants.

Why be so Conservative?

by DUNCAN SCULTHORPE

THE community tank is considered by many of the 'elder brethren' of the aquarium hobby to be a beginner's concern; it is assumed that a hobbyist, as he becomes more experienced, progresses from keeping one fairly small community aquarium to keeping an infinite number of tanks and species, to many of which he is devoted as a specialist breeder.

Whatever people think of the relative merits of community tanks, and of those devoted to one, or at most two, particular species, there is no doubt that the successful maintenance of a selection of mixed plants and fishes in the close confines of one tank constitutes the toughest "examination" of the fish-keeping hobby. It involves the most careful consideration of all the operative physical conditions, the most acute analysis of fish habits and temperaments if success is desired with minimum expense through accidental loss or wastage. In spite of this, however, there is always a tendency to regard the community tank as the starting point, and to scornfully dismiss the species usually seen in such tanks as mere beginners' fishes. Whilst deploring this attitude, I admit that there is frequently an absence of inspiration in many community tanks, and the number of fish and plant species which, though well suited to such an existence, are rarely seen in such tanks is legion.

Most fishkeepers are familiar with the ideals of a community tank; ideals which combine visual pleasure, educational value and not great expense. A community tank should form not just an isolated living picture; it is within the hands of the aquarist to mould it into the general plan,

decoration and atmosphere of the room in which it is situated. Similarly the aquarist should strive to reach a high standard of artistic design within the tank with rocks, gravel and those species of plants most appealing to him, to the best aesthetic effect, while providing as natural an environment for the species as it is ever possible to provide in the artificial regions of a glass tank. The types of fishes kept in community tanks are of two groups: those chosen just for their appealing colours, and those chosen also for their biologically interesting habits. Whatever fishes are chosen it is generally agreed that the ideal collection of community fishes should be not only of blending and contrasting colours but of species of different swimming habits so that there is always activity in all levels of the water.

The names of the most common community fishes are familiar to us all: the platys, guppies, swordtails, mollies, flame fish, glowlights, neon tetras, pristellas, beacons, feather fins, serpa tetras, black widows, zebras, harlequins, small barbs, angels, catfish and one or two others; this list is not intended to be exhaustive, but just to give some idea of the narrow range. There are many other species little kept except by specialists and yet, although the text-books frequently state dogmatically that they are unsuitable, they are distinct assets to the community tank if the aquarist takes a little more care than usual. It is essential to read one or two books on fishkeeping but if the aquarist is occasionally attracted by the features of a certain species and decides to try it, though the book may warn him off, so much the better, for the aquarium hobby at the moment is



Photos:

Duncan Sculthorpe

An established tank with Japanese rush (left), water rose (in front of flat rock), hair grass (right front), water wisteria (centre) and Vallisneria (background)

so much a matter of trial and error, and one man's experiences with a fish frequently conflict with his neighbour's.

The absence of some species from community tanks may obviously be put down to their expense and rarity. Most new fishes command fantastic prices, which no sane fish-keeper should pay, until further stocks are introduced and the price falls. Of course there is always the interval during which some lucky aquarist may succeed in breeding the new species, after which he will fully recover the initial cost, but here we are digressing into the sad realms of commercialism.

Many of the tetras are examples of these expensive or rare fish. Cardinal tetras (*Cheirodon axelrodi* or *Hyphessobrycon cardinalis*) are great improvements on neons, with a proportionally greater area of red on the underside and a longer sparkling violet and blue line, and they are just as hardy community fish. The bleeding-heart tetra (*Hyphessobrycon rubrostigma*) is a local variation of the jewel or serpa tetra and is of a similar body shape to the rosy tetra, but is browner in colour and with a brilliant red spot on the side. It, and the recently introduced *Hyphessobrycon griemi* which is another deep-bodied tetra with the familiar paired shoulder marks seen on rosy, yellow, pretty and flame tetras, are both good community fishes, inhabiting mainly the middle water levels. Rarely seen in this country are the dawn tetra (*Hyphessobrycon eos*) and Loretto tetra (*H. metae*); the first has a silvery body and fins invested with a beautiful rosy-yellow glow, and the second has a brilliant blue lateral stripe and red fins.

The red-nosed tetra (*Hemigrammus rhodostomus*), with its black-and-white caudal fin and reddish nose, the silver-tips (*H. nana*), with its yellowish, white-tipped fins, the Belgian flag tetra (*Hyphessobrycon heterorhabdus*), with its brilliant red, yellowish-white and black lateral stripe and the black wedge, diamond, rasbora or pretty tetra (*Hemigrammus pulcher*), with its glowing eye, green-and-gold side spots and brassy 'garnet' set above the black mark on the caudal peduncle, are all peaceful small fishes growing to about 1½ to 1¾ inches which are not seen often enough in

community tanks. They swim mainly in the middle layers of water in the company of their own kind, but none of them keeps to the same precise depth as the Costello tetra (*Hyphessobrycon 'costello'*). This newly-introduced fish is peaceful and very attractive, with greenish-silver sides bearing a brilliant lateral stripe which may look amber or emerald according to the position of the fish in relation to the light. Its caudal fin has black, white and yellow markings and there is a brilliant yellow 'garnet' on the caudal peduncle. Not uncommon nowadays is the platinum tetra (*Gephyrocharax atracaudatus*), with its shimmering green sides; the blue tetra (*Mimigoiates microlepis*) is sometimes seen but does not seem to be as hardy as the other community fishes described.

Other species are not kept because the books frequently stress that they are very shy in the company of other fishes. The mahogany characin (*Neolebias ansorgii*) from Africa, with shining turquoise scales, a brassy lateral stripe high up on the side and black spot at the tail base, is an excellent example of such a fish. The dwarf cichlids of the genera *Pelmatochromis* and *Apistogramma* are now becoming more common community tank inhabitants because they lack the plant-destroying habits of the larger cichlids, but in spite of their delightful colours they are frequently not given the chance they deserve on account of their first shyness. All fishes which are introduced into a tank already populated by possibly larger specimens seek out the dark corners of the tank and it may be days before the aquarist succeeds in coaxing them out into the open water. A little patience is all that is required, and even if these species take some time to accustom themselves to the tank they are surely worth waiting for; we don't want all the fishes to dash about at breakneck speed, zebra fashion!

Barbs are frequently condemned for their plant-grubbing habits; many of them are bottom-feeding fishes always on the look-out for some uneaten remains. Rosy, nigger chequer and other barbs disturb plants with weak root systems, like *Eleocharis acicularis*, but this is surely no reason for the aquarist to become testy and irritated by the

species. The solution is simple: plant the species like hair grass in a finer, closer-packing medium and give the fish more vegetable material in their food, and, once again, have a little patience. Similarly some quite innocent fishes may be blamed for eating plants; some, e.g. *Barbus nigrofasciatus*, have a liking for young shoots of such as *Nitella*, while others, e.g. most of the cichlids, may suddenly take a dislike to a plant and destroy it. Generally though, no particular fish species are consistent culprits, and it is more often snails who are to blame.

There is an amazing number of fishes rarely kept in community tanks because of myths in the text-books that they are difficult to keep, requiring special water conditions. The *Aphyosemion* group are outstanding examples, and there are many more whose upkeep and breeding are plagued with fairy stories about pH and water hardness. Fortunately, these myths are steadily being exploded but this does not seem to reassure the community tank aquarist that he is likely to succeed with them. Fishes such as *Aphyosemion australe*, the lyretail, *A. bicittatum bicittatum*, *A. sjoestedti*, *A. cognatum*, etc., and *Mimigoniates*, the blue tetra, *Chanda lala*, the glass fish, and *Telmatherina ladigesi*, the neon glass fish or Celebes rainbow fish and the *Notobranchius* tooth carps, are all among the most beautiful aquarium species and their outstanding colour patterns and relatively small size make them very desirable community tank fishes. Yet they are all renowned as being difficult fishes: in fact it has been proved that they are not particular about the water conditions at all, being able to live healthily and to breed successfully in soft, acid water or hard, alkaline water. The reason that they are so superficially delicate is not that the aquarist's water is unsuitable, but that he changes them from one environment, the dealer's, to that of his own tank much too suddenly. It is the drastic change of water conditions, not the precise nature or suitability of one or the other which is so dangerous.

Aphyosemion, *Mimigoniates* and *Telmatherina* are all very susceptible to the effects of rapid changes of water, and it is essential to know and compare the nature of your own water and that from which you are buying the fishes; if they are very similar, so much the better, and the chances of success in the change are very good, but if there is a considerable difference in the pH and water hardness, then the water change must be very gradual. Indeed, there are very few fishes which will not live in different types of water, but there are also very few which will withstand rapid changes from one type to another with no after effects. Again patience is required in the slow process of acclimatisation with the more sensitive species.

There are several genera of fishes which make interesting and attractive members of the community, but they require special foods and a little individual care. Cherry barbs (*Barbus titteya*), pencil fish (*Nannostomus* and *Poecilibrycon*) and dwarf rasboras (*Rasbora maculata*) all have tiny mouths and so must be fed on food of a finer grade, or more closely chopped than is necessary for the general run of aquarium fishes. They are all very pretty species but it is preferable to have a number of them to get the best effect, as individually they are quite small. Of these the pencil fish, *Nannostomus trifasciatus*, is the least-often seen, and it has several lateral lines in gold and black and the most distinctive red fin markings of the whole group. A related species *Nannostomus unimaculatus* is an African fish of a most attractive overall coppery hue and it is an excellent community fish.

Finally there are the fish seldom seen in community tanks because of their reputation as fin-nippers and trouble-makers. The large cichlids are probably the worst offenders though young fishes of these species may be grown on in communities and never give the slightest

trouble. Angel fish (*Pterophyllum eimekei*) are now common aquarium fish and are generally well-behaved. It has been said that the strain of black lace angels is apt to be very scrappy; with this I cannot entirely agree. I have never had any trouble with young specimens introduced into and grown on in communities, and there is no more bickering between themselves than between the members of any other species. Tiger barbs (*Barbus tetrazona*) and black-line tetras (*Hyphessobrycon scholzei*), together with ticto barbs (*Barbus ticto*) and scissor-tails (*Rasbora trilineata*), have all earned names for fin-nipping; many of the *Panchax* group also indulge in sly nipping of the long fins of such as *Betta splendens*. I have always been convinced that fin-nipping and bullying in a community are entirely dependent on the individual conditions of the tank. It is impossible to maintain a small tank of fishes such as Siamese fighters, pearl and blue gouramis and guppies, neons and dwarf rasboras without some bullying and cannibalism. This is because of the confined space which causes the fishes to search more intensively for food, thus swimming in all parts of the tank and constantly mixing with widely different sizes of species.

The larger the tank and the more densely it is planted, the greater the chance of survival of minute species when large fish are already present in the tank. The longer the tank the more the fishes are able to swim in their natural depth of water, shoaling and feeding together and giving protection to each other. In such conditions each species goes about its own business.

As a result I have found it necessary to stick to fishes of similar size only in the smallest tanks: the large (24, 30, 36 inches and above) tanks when well set-up will provide suitable habitats for a wide variety of species. It is easy to feed at several places in such tanks to ensure that the slower fishes are not starved out by less-retiring inhabitants. Many of the so-called vicious species behave as perfect gentlemen if they are introduced as very young fish with the other members of the community, but disaster may occur as a result of the inhabitants' natural curiosity if a strange newcomer much smaller than them is introduced some time after the community has stabilised itself. It is undoubtedly most satisfactory to introduce the stock together as young fishes and let them grow up together.



Decorative community tank. At the right-hand end the thermostat and control panel are visible.

A Fish-House Design from France

(continued from page 80)

Apart from these aspects of heating technique, there are still further advantages worthy of mention, which one can enjoy with covered tanks. Because of the dry atmosphere in the fish house all the iron parts hardly rust at all, and all other metal parts corrode only very slightly. This is specially advantageous with the motors, pumps, stove and the installation for the supply of water. Besides this, dry food and also brine-shrimp eggs can be preserved without harm in the dry air. The aquarium water does not decrease through evaporation, which could be very great with the surface agitation caused by aeration and filtration. Since the tanks do not need to be refilled, the hardness of the water is not constantly being increased. A cover ensures that the surface of the water remains free of dust, and lastly, it prevents the fish from jumping out.

There will, of course, be protests that the tank covers will hinder work in the aquarium. To this I would like to answer that I do not cover my tanks with single whole sheets, but cover each one with several strips of glass, so that only a small piece of glass needs to be pushed back for the daily feed. Only when catching fish or giving a thorough clean-out must the entire aquarium be uncovered. But, on how many days a year does this need to be done, and for how many days on the other hand does one enjoy undisturbed the advantages of covering the tanks? Alternatively, if you think of the great advantages which you will remember that the tank covers bring, you will even gain a certain satisfaction upon their removal.

It does not matter, of course, if a corner of the aquarium is uncovered somewhere or if a crack remains open. That exposes only a very slight area in comparison with the total surface of the water in the fish house, and it has no effect on the surroundings and the cost of heating.

Like Dr. Ghadially, I also had to provide for circulation of air in the fish house. In the picture you will recognise a stouter pipe in the corner of the house. A ventilator has been built into this, and it sucks in air from the highest warmest place and directs it into two channels, upon which stands the lower row of tanks. Without air circulation the water in the lower tanks remains 9° F. colder than that in the higher ones. When the ventilator is working, however, the difference is less than 2° F.

Heat Regulation

With a continually burning stove one can hardly use automatic regulation of heating. An aquarium which is closed in on all sides with glass (all my tanks have glass bases) gives off very little of its heat. Thus its temperature follows the fluctuations of the room temperature very slowly, specially when it has a volume of over 20 gallons. In my experience the loss of heat takes place mostly through the metal frames of the aquarium. Therefore I have fitted (under all my tanks) a heat-insulating intermediate layer against the angle iron on which the tanks rest. Thus fluctuations in temperature are still further delayed.

When one goes into the fish house at least three times a day, one soon senses whether the stove needs to be closed or opened. A glance towards the room thermometer quickly confirms the position. Between the single visits to the fish house the fluctuations in temperature of the aquarium water remain far behind the fluctuations in room temperature. But in nature fluctuations in water temperature are the rule. I have, on the other hand, provided two room thermostats: one is set at 85° F and the other at 60° F, and these make a bell ring in my house when the temperature in the fish house exceeds the limits.

After 3 years of management I have had no kind of difficulty in caring for my fish and plants in the fish house in the way I have described.

(Translated from German)

HERRINGS can be kept in the Tropical Aquarium!

An unusual experiment in fish-keeping reported by JOHN DAVIS

IN May this year when the children were bathing in the sea, a large shoal of whitebait swam near the shore probably chased in by mackerel who feed on them.

There were so many that they were easily caught, and about 12 were brought home in a jar together with some more sea water in a bottle. They were about $\frac{1}{2}$ inch long. When we arrived home they were put in a small outside aquarium with freshwater added to fill it. There they still swam in a shoal together; a little extra sea water was added after a day or so, but the water soon turned green, and we had to change the water, adding only about 2 per cent. of sea water. The water soon turned cloudy again so once more it was changed, but this time only fresh water was put in, and a shrimp was added to keep them company.

They remained alive but because of the colour of the water we took them out at the beginning of July and put them indoors into a tropical tank, at 70° F, with the usual tropical plants.

There are now nine fish, as some were given away, and they have been in this tank now about 2 weeks and are quite contented. In fact they are quite tame, as they come to the side and top of the tank whenever one approaches it, and come at once to any part of the tank if a finger tip is put in the water. They always seem ravenously hungry and snatch any dry food from the surface as soon as it is put in—three or four times a day—and swim at great speed through any food that falls, eating it before it reaches the bottom. We tried white worms when they were first brought indoors, but unfortunately our supply failed so it is difficult to tell whether they liked them.

Whitebait, of course, are the fry of herrings, although young sprats who are of the same family are called whitebait and are sold as such as food. They are delightful fish to watch, being a very brilliant silver and move with remarkable activity, flashing through the water independently.

It is perhaps not remarkable that whitebait continue to thrive in fresh warm water, because the eggs of the spring herring are found near the shore attached to weeds and small stones, and those of the autumn herring in brackish water of river estuaries. Some spawning grounds are washed by waters of the gulfstream.

The herring family does, of course, exist in freshwater, as shads will spawn in the rivers and both shads and herring are found in some freshwater lakes.

Herrings live mostly on plankton, but also eat their own eggs and fry and small worms, but our whitebait seem to enjoy the commercially prepared dry food.

Some of our specimens are about $\frac{1}{2}$ inch long and two just over 1 inch, and it remains to be seen how they will progress.

It is unlikely that in a small tank (24 in. by 12 in.) they will eventually attain anything like their normal size. If so it may well be that later they will be sacrificed to provide a breakfast!

It would be interesting to try them in company with tropical fishes, and it is being seriously considered whether to introduce say a few young guppies to see how they live together.

AQUARIST'S Notebook

by

RAYMOND YATES



HEAUV-GAUGE polythene sheeting has been discussed at length in this column as a substitute for concrete, where a quickly finished job is desired. Although it has much to recommend it, the fact remains that it is easily holed, a disadvantage which from my own personal bitter experience far outweighs all its advantages combined. It was therefore with pleasure that I recently came across a substitute material which has all the advantages of heavy-duty polythene, at the same time being exceptionally tough and very hard to damage. This is a new plastic material called Plastoglass, which consists of flexible, laminated sheets of P.V.C. with fibre glass reinforcement. It is unaffected by sunlight, water, frost or most chemicals and is absolutely waterproof. The creamy-white colour is not opaque and is permanent, although underwater growths would soon change this to darker shades. It is light in weight, a square foot weighing about one ounce. My attention was drawn to this material by H. Dales and Partners, of New Cubbington, Leamington Spa, an engineering firm who, as a sideline, manufacture ready-made pools of formal design from this substance. These pools are simplicity itself to make; installation could not be easier.

The position is marked with a template, the soil is excavated to the dimensions given, then the plastic pool, whose flexible contours fill the excavation, is placed in position. The edges of the pool are lined with crazy paving, walling or concrete blocks as required. I tested this material at home and only wish I had been using it instead of polythene when my pond was damaged. Large pointed 3-lb. stones dropped from 6 feet on to it made no impression at all and this seems to be the main hazard, namely stones thrown in or being dislodged and falling in, a risk which will not worry Plastoglass users. The material can be cut in the normal way with any really sharp instrument like a knife or scissors. Unlike polythene it is inflammable. Where repairs are necessary at any time, normal patching (both sides) with an adhesive such as Evo-stik does the trick. I feel we are yet on the threshold of plastic ponds. There seems to be quite a future for them, more particularly when the time and trouble involved is so small, and the fact that when one removes there is nothing to stop one taking the pond along too.

Early in the summer I had a fortnight's holiday and travelled about quite a bit. I did not see anything of real and major interest for aquarists but one or two points are worth mentioning. At Hereford I was surprised to see so many notices saying "No Fishing Allowed", when many very casual and most unofficial anglers were in evidence everywhere. Surely it was the River Wye which was recently in the news, where salmon-fishing rights had been sold at £1,000 a yard of river bank? Who said tropicals were expensive? The pond in the cathedral precincts was wired off at one end, obviously to discourage youthful fanciers. At Llangollen I walked along the canal for a mile or two and was astonished to find no plants in this water. There must be some explanation, but it escapes me; it is most unusual to find a length of water in such rural surroundings without any aquatic vegetation. Some pleasure craft use the canal, but it is hard to lay the blame on these.

The ancient ruin of Valle Crucis Abbey still has its fish-pond in the rear, but the entire surface was covered with duckweed and algae and one got the impression that the fish had long gone. Of course, the Dee at Llangollen makes

up these deficiencies—what a wonderful vista it is. In Dovedale the settings are delightful, the fishes grand and the water life, in general, magnificent. I never tire of this valley, which so few visit because it has to be done on foot. Aquarists who have never visited Dovedale have quite a treat in store. The fishes at near-by Lathkill Dale and at Bakewell have a contempt for mere man which is most refreshing.

I took a small party from Rudyard Lake along the feeder to the trout ladders on the Dane in Staffordshire and told them to keep their eyes open for pike and perch. Everyone laughed at the idea of fishes in such a shallow, narrow ditch. However, three minutes later they had all seen three 18-inch pike and several dozen perch, and I gained quite a moment of triumph. I was reminded of an outing long ago where I produced a can and answered the inevitable question with "To put the fish in which we catch, of course". There was tremendous hilarity when I commenced hunting under stones in a small stream for bullheads, but three catches in as many minutes had everybody else feverishly joining in the hunt. On another occasion I remember similar surprise when a hunt in a brook produced several loach. Whilst on holiday I heard a B.B.C. talk on proposed changes to maximum penalties for certain crimes and mention was made of the fact that the penalty for damaging fish ponds still remains at 7 years. First catch your culprits!

I have been reading some interesting points in a wonderful book about nature's power called *The Elements Rage* by Frank Lane. We refer to "raining cats and dogs", but it seems that it sometimes rains frogs, jelly-fish, crabs, tadpoles, rats, snails and worms when nature is in the mood. It is stated that an army officer in India rode across the parade ground after a cloudburst and found approximately four acres of the area covered with fish resembling small sardines. Rhode Island once had a rain of perch and bullheads, some 5 inches long, covering a quarter of an acre; barbel were dropped at Uganda in a place some 30 miles from the nearest water. Reference is made to a lake being struck by lightning and subsequently 18 cartloads of dead fishes were removed. Subterranean earthquakes are described as being responsible for fish migration to other feeding grounds. Terrestrial earthquakes, if severe, are often fatal to fishes, who receive the blow, like a dynamite shock, over the whole surface of their bodies at once. For some days after the Assam earthquake of 1897 the rivers of the Garo Hills were choked with thousands of dead fishes brought down from the upper reaches.

It is reported in the press that the latest fashion in ladies' handbags is an iridescent leather made by a Littleborough firm. These Glowcalfs have an effect like shot-silk, as for example, a steel-blue with mauve cast or a golden beige with pink hue. It appears that the glint is done with a process which involves powdered fish scales. Imported from the Mediterranean, these are quite expensive, roughly £2 an ounce.

It is always a source of wonder to me the way so many aquarists fuss and fad over many unusual foods and quite ignore the common earthworm. It has been truly said that the best food for fish is fish, but this being so surely the next on the list must be the earthworm. There are very few fishes which will not eat worms, whole or shredded according to their size, and there are no ill effects. Trout, salmon and trout grow faster on other foods, but as an all-round standby the earthworm has no equal. It is found in almost any soil where damp conditions obtain, and if one has a garden one need never be without.

Worms grow very slowly in winter but much faster in the more suitable conditions of spring and summer. Most worms breed when they are about 110 days old or thereabouts, and the egg capsules are quite small (about a hundred would go on a teaspoon). Each capsule is white in colour and holds up to 20 eggs, which hatch out in about 2½ weeks. The age worms can attain is not known but specimens have survived in laboratories for 10 years; those found by hobbyists, of course, have a very short life! A compost heap in the garden can provide a constant supply of worms if it is kept primed with dead leaves, decayed fruit and peelings, old vegetables, meal of any sort, tea leaves and coffee dregs, wet sand, stale bread, sour milk, old newspaper and eggshells. Worms as a rule do not like light but although they can and will disappear like lightning when you shine a torch on them they seem unworried by red light and are easily captured, although such worms are usually of a size more useful to anglers than aquarists. A strong solution of potassium permanganate poured on the ground quickly brings any worms in that vicinity to the surface. Charles Darwin believed that something like 50,000 worms could survive per acre, but the modern view is that the figure of a million worms would not be an over-estimate.

As few tropicals can manage whole worms they have to be chopped up or shredded, a messy business which probably puts many off. In addition, aquarists feed too much worm at one time. Masticating worms is quite a job, so it is wiser to feed little and often than to have decaying segments littering the tank floor. Worms can be kept in ventilated tins indoors for weeks, provided that they are not dried out. Moss is quite unnecessary. I usually have a good hunt and then make my supply last a fortnight or 3 weeks.

The other day I took the opportunity to collect a considerable quantity of willow moss and *Heteranthera* from a wild source to use in my pond. Not being prepared I was forced to dump the lot into a large bag and hope for the best. The numerous water shrimps trapped in the weed, which survived the journey, surprised me. However, I washed some of the plants for use in a tank and was somewhat shaken by the enormous number of planarians which showed up. In a pond they are no trouble, and consume waste matter, but in a tank they are unsightly. Readers cannot be warned enough not to use plants from wild sources for indoor aquaria unless they are sure they are free from such pests.

1958 saw a fall in the number of visitors to the London Zoo of roughly 86,000 over the previous year, due in the main to the London bus strike and the poor weather. The fall in the number of those visiting the Aquarium was about 6,000, which was rather gratifying to aquarists, bearing in mind the fact that the proportion of visitors who visit the Aquarium is rather less than one in every five. Considerable improvements have been made in the lighting of certain tanks, whose appearance has been enhanced. Tropical marine enthusiasts will have noticed that coral fishes, a group of fishes not previously shown with much

success, can now be kept in good condition. The sea anemone collection has been improved, eight species now being on view as against the single species formerly kept. A special tank in the temperate sea-water section shows the colour changes of flatfishes according to background.

Some 42 new species of fishes have been added to the collection, including blind cave fish, cardinals, Pulcher tetra, Buenos Aires tetra, lemon tetra, black-lined tetra, *Neolebias ansorgei*, *Pyrrhulina vittata*, dark-banded piranha, scissor-tail, upside-down catfish, butter catfish, half-beak, lyretail, golden sea horse, spotted rockling, vagabond coral fish, translucent cardinal fish, keyhole and firemouth cichlid, ringtail pike cichlid, anemone fish, rock cook, giant goby, chocolate gourami and striped climbing perch, among others. Approximately one hundred fishes were donated to the zoo, including 43 marine fishes, 32 tropicals and over 20 coldwater specimens.

There must be some interesting stories behind some of these gifts, such as a single miller's thumb or the mirror carp (25½ lb.), which we shall probably never know. Of the 60 or so books presented to the library only two were of major interest to aquarists: *Tropical Aquarium Fishes in Colour* by H. Gwynne Vevers and *Of Fish and Men* by J. G. Miller. Admission receipts to the Aquarium fell by £116 over 1957, but the expenditure on salaries, wages, exhibits, provisions, fuel, light and general maintenance for this section fell by £415. Under the heading of "New Buildings" the reconstruction of the Aquarium roof cost £3,172 as against £778 the previous year. It is worth mentioning that the Society has now obtained a Grant of Arms; these briefly are a shield with a lion thereon holding a torch, supported by zebras at each side and a crest of an osprey grasping a fish in its talons. The motto can be translated as "Every kind of living thing is our concern." Fishes are rarely seen in armorial bearings although they appear in those of some coast towns and of the chief scout, Lord Rowellan.

The insulated can or jar of the Thermos type is far and away the best means of carrying tropicals in all conditions, and most aquarists use these convenient containers sooner or later. My old one having broken after many years of service I was delighted to obtain a replacement in the form of a quart-jar Thermos for the low price of 12s. 6d. I found these bargains on sale at a store which has about 40 branches in Britain. The jars proved to be ex-Government stock and are coloured black with a large printed instruction panel on the side. In all other respects they seem to be the same as similar-sized jars which sell for twice the price elsewhere. I picked mine up in Leeds.

Standards for Transport of Animals by Air

RECOMMENDATIONS for the carriage of live animals by air are being worked out by a number of expert committees of the British Standards Institution and will cover the design of suitable containers, ventilation, feeding and watering.

A committee dealing with fishes, amphibia and invertebrates has decided upon the chief features it will be necessary to investigate for the transport by air of tropical fishes and information is now being collected on these issues.

Represented on the B.S.I. committees are representatives of major airlines and air-transport firms, the Zoological Society of London, Universities Federation for Animal Welfare, Medical Research Council, Poultry Association of Great Britain and the Ministry of Agriculture, Department of Agriculture for Scotland, R.S.P.C.A., Pet Trades Association and other organisations.

Breeding the Siamese Fighting Fish

by E. WALLWORK

A WEALTH of literature is available on this attractive tropical fish and its fighting propensities, some of which is true and quite a lot more is fictitious.

Its colours, especially in the male, have been responsible for more converts to the aquarium-keeping hobby than almost any other fish, and it remains permanently popular. Colours generally available are blue (in several shades), red and green. In addition there is an albino variety and a so-called black type, and a cream-coloured variety with coloured fins (*Betta cambodia*). My experiences are confined to the blue or red type, which usually breed true. The green variety, though most attractive, does not often maintain its colour in its offspring and the result is a batch of nondescript colours.

Whatever colour is available, it is recommended that six small fish are purchased from a reliable source of good-quality stock and, if possible, it is a help to see the fully coloured adults too. Not all of these fish develop good finnage unless it is inherent in their parents. Good-quality stock is a little more expensive but it pays off in the long run.

Sex is readily distinguished in the adults by the increased finnage in the male, but in young stock it is not so obvious until they are about 1 inch long. A good guide to early sexing of these small fish is to watch the anal fin, and although we are told that those of the males tend to lengthen and point towards the tail fin, this is partly true of the female too. However, the difference is seen in the lower border of the anal fin, which, in the male, inclines obliquely downwards quite early after 1 inch body length is attained. In the female, the lower border of the anal fin is approximately parallel to the central axis of the body at maturity.

Few people can resist the appeal of a beautifully coloured fighter in an aquarium exhibition, but these large fish are not usually suitable breeding stock, for although they will often spawn readily, they will often either eat the eggs or will fail to give the proper parental care to their offspring, which is fatal. A body length of about 2 inches, excluding the tail fin, is ideal. New stock should, of course, be segregated as soon as their sex is apparent and raised on good-quality food to sexual maturity.

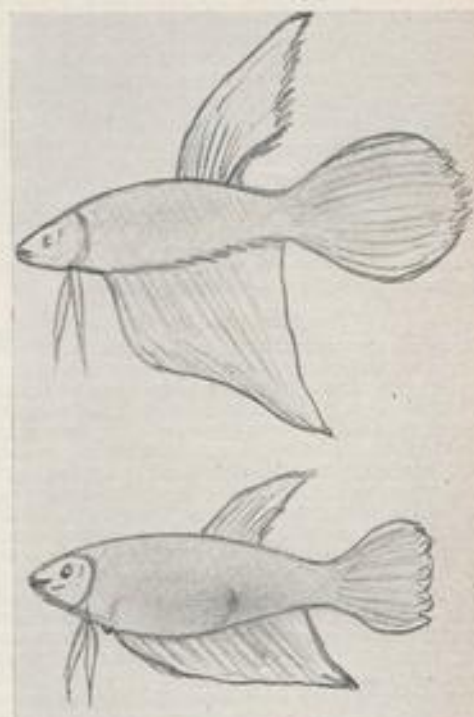
Food given can include almost anything of an animal nature, but preferably fresh and not dried. Floating foods are acceptable, but to produce sound growth I use a combination of *Tubifex*, white worms, mussel, tuna fish, pilchard, *Daphnia* and glassworms.

Visible Oviduct

Sexual maturity in the male is apparent in his finnage. In the female, it is seen in the sides of her body, which bulge with spawn. At this time it will be seen that there is a little white pimple present just in front of her anal fin, often described as "the first egg." This is actually the distended oviduct which is projected outwards. Assuming that the male is of comparable size, this is the right time to introduce the pair to the breeding tank.

The breeding tank may be as small as 12 in. by 8 in. by 8 in. but it facilitates the raising of a good batch if the surface area is around 24 in. by 12 in. with a water depth of 6 to 8 in. and a temperature of 82°F. Only floating plants are required and *Riccia*, water lettuce or floating ferns are satisfactory if allowed to cover about one-quarter of the water surface.

On introduction of the breeding pair to the tank, both



Siamese fighting fish (*Betta splendens*): male (upper fish); female (lower fish)

fish show their finest colours and then the male is seen at his best. He shows his finnage fully extended and his gill plates stand out at right angles to his head, whilst he stays close to the female with his body inclined obliquely towards her. After a few minutes he will butt her in the middle, nosing her around the tank, the female with her fins extended showing no fear. After about 2 hours of this courting display, the male starts to blow a bubble nest, usually under a large leaf or clump of floating plants, taking time off to chase the female around the tank in a more aggressive manner. At this time the fins of the female become torn as a rule, as he often bites her. She will often find a hiding place, which is usually behind the heater or thermostat.

More than once I have seen the female lying full length on the top of the large leaf under which the male is blowing his bubble nest, whilst he (and often the aquarist, too) has been searching the tank for her. Sometimes the female adopts a vertical position behind the angle-iron vertical faces. For the benefit of the female, rooted plants are often placed in the tank initially, to provide a refuge, but these, if too numerous, can be a means of introducing unwanted snail spawn into the tank. Generally, however, within 24 hours the breeding pair have settled their differences and then the female approaches the male without fear, and under the bubble nest. By this time the nest is often 2 inches in

diameter. The male approaches the female with his fins fully extended and in a motion resembling the side-slipping action of an aircraft.

Both fish then seem to be under tension and the male swims parallel to the female and quickly arches his body over her middle like an inverted letter U at first, and then completely around her, exerting a steady pressure. The locked pair roll over till the female is upside down and then the eggs can be seen leaving her body, 10 to 20 at a time at each embrace. After each embrace the female is quite immobile for a minute or so, like a stunned fish, but she soon recovers. The male, in the meantime, has collected the eggs in his mouth, and, appearing to chew them, he coats them with a saliva bubble and spits them up into the nest together with other bubbles for reinforcement. This spawning action is repeated over a period of 2 hours, after which time the nest is 2 inches or so in diameter and perhaps $\frac{1}{2}$ inch deep. Then the male may become aggressive towards the female again, who should be removed as soon as possible, leaving the male below the nest to carry out repairs as the bubbles burst or evaporate.

After the Eggs Hatch

The eggs as seen in the bubble nest are opalescent white, around $\frac{1}{2}$ mm. in diameter, and may number 150 to 200 and are largely concentrated in a mass in the centre of the nest.

Incubation takes 48 to 60 hours, and to the aquarist it seems that all is lost as the eggs are no longer seen in contrast to the fine bubbles of the nest. On closer inspection, after 72 hours or so, the minute tails of the fry can be seen hanging downwards underneath the nest; they are more difficult to see if duckweed rootlets are present. Within another day the young fry are making little excursions 3 to 4 inches below the nest, each of short duration as they still have a white yolk sac of fair size and the young fry must wriggle in a tadpole-like motion, finishing back in the centre of the nest. The attendant male will often catch them in his mouth, as well as any which fall to the bottom. Coating them with a saliva film and with extra bubbles for good measure, he spits them back into the nest. By the fifth day, the young fry have assumed a vertical position below the nest and, as this is the time when the male parent often eats them, he is best removed from the tank. The

young soon scatter at the end of another day, the bubble nest disintegrates and the aquarist cannot decide whether all is lost or not—there seems to be so little to see. A good artificial top light at one corner will soon attract the minute youngsters, especially at night, and others can be seen if a medium-power lens is used.

Patience and the right sizes of food, however, soon show results. Fine pond Infusoria, *Euglena* or Infusoria substitute are the best at this stage. *Paramecium* is much too large for the fry until at least one week later. The batch can then be progressively reared on micro worm, brine shrimp, small *Daphnia*, white worm and *Tubifex*.

As this small area of water soon develops a surface film of oil or light scum, it is important to draw the edge of a sheet of newspaper lightly over the surface from time to time. This is especially so at the end of the second week when the young are developing their labyrinth organs and using air at the surface, and at this time too, draughts of cold air should be prevented from reaching the surface. Small tanks are easily contaminated by over-feeding in these early stages. The emphasis is now on the right size of foods for these young fry and even in the best batch, some fish will develop faster than their brothers, so a little latitude in the sizes of foods offered is helpful.

Growth is dependent not only on the food used, but on the available swimming area. Initial provision of a reasonably large tank will now show better results than with the smaller one. With the smaller tank, my method is to transfer the whole of the batch to a larger tank when the fry are $\frac{1}{2}$ to $\frac{1}{4}$ inch long, and this change of environment certainly produces good results.

Usually the youngsters are left together until they are all 1 inch in body length and then they are segregated and the males spread about (one per tank), or placed in floating glass jars in the larger tanks or individually in a divided tank. This is necessary to produce good finnage in the males, which would otherwise fight and tear their fins. Females sometimes fight each other but do not seem to do much real damage if kept in community together.

Personally, I would consider that to raise a batch of a 100 good fish would be a satisfactory achievement, especially if the fish are of comparable size at 2 to 2 $\frac{1}{2}$ inch body length.

FRIENDS & FOES No. 77 *Bitynia* Snails



Bitynia tentaculata (left) and *B. leachii* (right)

Mollusca (continued)

GENUS: *Bitynia*, from Greek *bythios*—of the deep.
SPECIES: *B. tentaculata*, from Latin *tentaculum*—a feeler; *leachii*—after Leach.

B *tentaculata* and *leachii* are the only two known species of this genus of molluscs. They inhabit both ponds and rivers in which there is a small amount of movement. If search is made for them by actually entering the water and wading about, it is an obvious precaution (still overlooked by some

aquarists) to move upstream against whatever current there may be. By so doing any mud or dirt stirred up by moving feet is washed away from the field of search and does not obscure one's vision.

The snails reach a maximum size, in *tentaculata*, of almost two-thirds of an inch, and *leachii* is smaller, not exceeding one-quarter of an inch. Both snails are operculate—possessing a hard "trap door" to close their shells once their bodies are safely inside. Eggs are laid in capsules and attached to plants or stones.

The new-hatched snails are quite small enough for most fishes to swallow, and where present in quantity could be used to supplement any other live or dry fish food. If an attempt to breed them is made in an aquarium at home, due regard to their natural habitat should be paid. Their presence in moving water argues a need for fairly well-oxygenated conditions, so a moderate degree of aeration should be provided.

C. E. C. Cole

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

Museum Aquaria

IN view of the comments on museum aquaria in your June issue (*Aquarist's Notebook*) I feel your readers might like to know of the coldwater aquaria which have been maintained for many years in the City of Leicester Museum, New Walk, Leicester. We have at present on display 19 species of British freshwater fishes, as well as the common British amphibia and reptiles. Many of the fishes have been caught locally. I should personally be very glad to hear from local coldwater aquarists and to receive any comments or criticisms they may have concerning our display.

I. M. EVANS,
Keeper of Biology,
City of Leicester Museums and Art Gallery

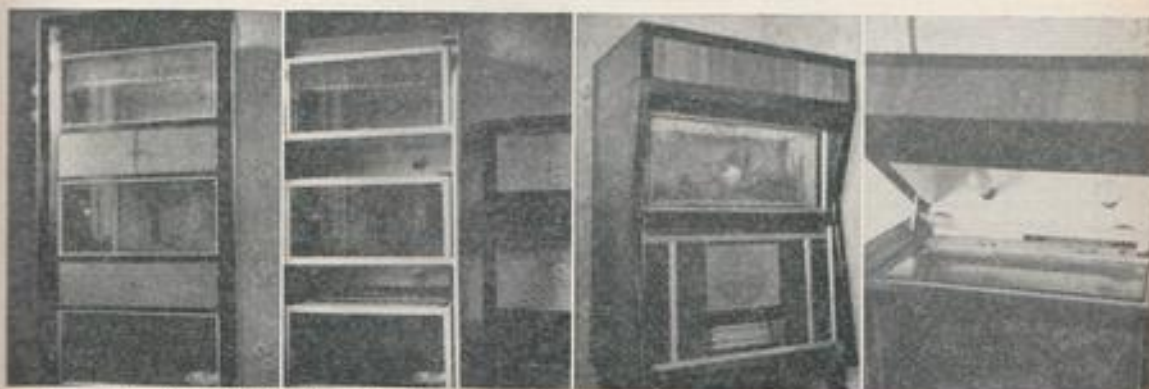
Cabinet Aquaria

THE accompanying photographs show two cabinets for aquaria that I have built, and which may be of interest to readers. The single-aquarium cabinet was designed around a radio set as this occupied the only corner of the room with a power point. Its frame is pitch pine obtained from the sides of an old bedstead. This timber is hard and strong. The aquarium (24 in. by 12 in. by 12 in.) rests on a bed of 1 in. blockboard (two people, each of 10 stones, stood on this to ensure that the frame was strong

enough!). Sides and lid (shown raised in one photograph) are of $\frac{1}{2}$ in. walnut-veneered plywood, and this, together with the blockboard base and a small amount of moulding, was the only wood purchased, and the cost of it all, excluding tank and electrical equipment, did not exceed five pounds. Parts of the frame which show are finished in black with the moulding in gold.

The three-tiered breeding cabinet is of similar construction to that described in the letter from Mr. B. Barrow in the February issue of *The Aquarist*. Hardboard panels were screwed to the frame and the back is tea-chest plywood. The hardboard is covered with the adhesive wood-grained sheeting. The front, made from obeche and painted black, is attached to the frame by four hooked clips so that it can be removed as shown in one photograph to allow the tanks to be taken out. Two sets of small doors between the bottom and middle tanks and the middle and top tank are used for ordinary maintenance and feeding; the top tank has a hardboard lid. No heaters are required in the two upper tanks during the summer as the overhead lamps of the aquaria beneath them provide base heating. Last winter the lowest temperature recorded, without heaters, was 65°F. Cost of this breeding unit including the stand and aquarium equipment was two pounds seven shillings.

J. HAYES,
Havercroft, nr. Wakefield, Yorks.



Three-tier breeding-tank unit shown with and without the front panel (left and left centre) and radio and aquarium combined cabinet (right-hand pictures). See letter "Cabinet Aquaria"

Good Idea

DURING a recent national exhibition, this Society was commissioned to instal several furnished aquaria of various sizes in a feature entitled "Life in the Living Room". Our members were able to take names and addresses of many people who were interested in the hobby of fish-keeping, and were prepared to join a Society. These people came from all parts of the country, and their addresses have been sent to secretaries of Societies in their area and we hope that we have been of some assistance to these societies in improving their membership.

May I suggest that this idea be taken up by all Societies who take part in public shows?

New membership is at a very high premium these days—surely this method of helping one another could be one way of paying it.

F. C. TOMKINS, *Chairman*,
The Independent Aquarist's Society

Modification to Aerator

I AM writing to you in the hope that what I have done may be of interest, and perhaps of use, to other readers. Recently I bought and installed a piston aerator. Although perfect in operation and comparatively silent, it was, nevertheless, a trifle too noisy for my lounge. I was reminded of some asthmatic cat eternally struggling for breath in the corner!

I traced the major cause of this bronchial wheezing—it was from the inlet spout. My cure was simple and served a dual purpose. Simply by attaching an ordinary diffuser stone to a small piece of air tubing and, in turn, connecting this to the inlet spout I have an effective silencer—and air filter.

Possibly the diffuser stone restricts slightly the air intake, but since the output is adequate for my needs, I am quite satisfied with my modification.

PL. LT. M. S. WATSON, R.A.F.,
London, S.E.9.

Offer of Speakers

MAY I point out through the courtesy of your journal that the Hendon Aquatic Society are prepared to talk on a variety of subjects to any society in London.

Furthermore we are also prepared to go farther afield if we can make arrangements. Any society interested should contact the Hendon Secretary, Mrs. B. Robertshaw, Buck Cottage, Buck Lane, Colindale, London, N.W.

BOB CALROW,
Chairman, Hendon Aquatic Society

Speakers Wanted

I WOULD be very grateful if you could insert an appeal in *The Aquarist*, for speakers who are prepared to travel, as it is most difficult to get anyone in this area.

D. JOLLIFFE, *Secretary*,
The Bexhill and District Aquarium Society

The Editor will be glad to receive names and addresses of lecturers who wish to make their availability known to aquarium societies farther removed from big towns and cities.

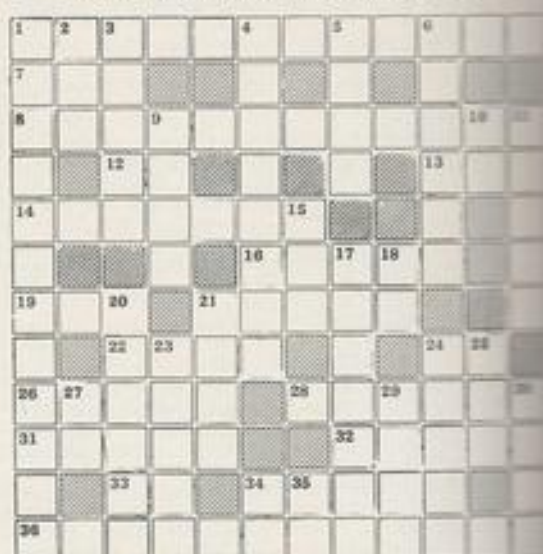
Not the First

THE statement that Mr. Rhyner's "white python is the first white snake ever known in zoology" (*Most Valuable Snake in the World? The Aquarist*, April) is more interesting for its inaccuracy than for its information. A white prairie rattlesnake, a white king snake and a white cobra are on record.

JOHN BOURSOT,
El Salvador, C.A.

The AQUARIST Crossword

Compiled by J. LAUGHLAND



CLUES ACROSS

1. *Myriophyllum* (5, 7)
7. We and fishes breathe this (3)
8. I crisp to half for the heated tank (8, 4)
12. -- of the Chaldees but not from trout (2)
13. Sounds a bright sort of sea fish (3)
14. Rot rife produces live food for fry (7)
16. Sorest in another way smell sweeter (5)
19. Bird in the fish bowl (3)
21. You might well call it a sucker (5)
22. A variety of goldfish you can adore (4)
24. Chair returns with no seat (2)
26. Half strinned (5)
28. Pa club is ornamental but upset over the boss (3, 3)
31. 22 Across in a way (3)
32. Nothing changes the meaning (4)
33. Gunners, briefly (1, 1)
34. Weapon for catching bass (5)
36. Bloody weapon and its ending (3, 7)

CLUES DOWN

1. Aquatic plant or Royal Marine (5, 7)
2. Atmosphere (3)
3. This fish portrays defeat to a T (5)
4. Cram look for sea fish (8)
5. Flowering plant of which lotus is one of the aquatic kind (4)
6. Oursize waterside plant for ancient Egyptian god (6)
9. Strait-laced (4)
10. Part of a sardine is part of an Empire (1, 1)
11. Octopus of the small aquarium (5)
15. Fish spawn (3)
17. Scrubbed (7)
18. What, perhaps (2)
20. Reptile (6)
21. Open ditch (4)
23. Sage rises to a penny for the artist (5)
24. Vehicle in A.A. for motor fish (5)
25. Military body claiming to be oldest British unit (1, 1, 2)
27. Morn (1, 1)
29. Ship (4)
30. Young Phillip (4)
34. Thus (2)
35. Could be a small breeding pair (2)

(Solution on page 96)

SUBSCRIPTIONS

Owing to the recent dispute in the printing industry our numbers for July, August and September were issued as a combined number last month. Two extra issues will therefore be sent to direct subscribers to *The Aquarist* in order to complete their current subscriptions.

News from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 12th of the month preceding the month of publication.

A MOST interesting talk, illustrated with numerous slides on Aquarium Plants was given by Mr. C. D. Roe of Shirley Aquatics at the Bristol Aquarists Society meeting. The speaker dealt with a variety of plants which must now equal in numbers and range of tropical fish which are available and there is certainly no excuse to-day for any monotony in set up aquaria. A happy feature of the meeting was the presence of several visitors from the Midland Society who are also members of Bristol.

The Bristol Society gained a "Gold" for their exhibit at the Civic Horticultural Show. Their well arranged Stand drew many questioners and also showed a wide variety of both coldwater and tropical fish.

THE Coventry Pool and Aquarium Society's sixth Show and Exhibition was held this year at yet another venue, this being the third move in six years. The entries had to be restricted because of the lack of space, but the quality of single entries was good, although the furnished aquaria were rather below standard.

The following were the first prizewinners in the various classes:—A.V. Guppy (Clarke plaque), Mr. C. Scott; A.S. Livebearer, Mr. Bagnall of Atherton Society; A.S. Characins, Mr. C. Scott; A.S. Barbs, Mr. Bagnall (Atherstone); Niggar barb, best fish in show; A.O.S., Mr. C. Scott, Pike cichlid; Breeders class, livebearer, Miss N. Barnett; Egglayers, Mr. F. Randall; Coldwater, Mr. L. C. H. Smith, wins the Diamond Cup for best coldwater fish in show; Tropical furnished aquaria—1, Mr. G. Stock (Stone Cup); 2, Mr. J. Grant; 3, Miss N. Barnett. Coldwater furnished aquaria—1, Mr. Shoeter; 2, Mr. G. Glover; 3, Mr. P. O. Smith. Society Junior Cup for best fish entered by juvenile, Master R. Wallace. This year's competition for Home Aquaria and Garden Pools resulted as follows:—1, Mr. Shoeter, 76 points; 2, Mr. F. Prescott, 75 points; 3, Mr. R. Hunt, 73 points. Garden Pools—1, Mr. P. O. Smith; 2, Mr. H. Stanton; 3, Mr. F. Randall.

THERE has been an amalgamation between the Irish Aquarium Society, and the Leinster Pond and Aquarium Club. The name of the new society is The Tropical Fish Society.

A TEN aside friendly challenge match was held at the St. Peter's Church Hall, headquarters of the Clapham Aquarist Society against Independent Aquarist Society. Though Independent took the first two places, with Clapham third, the overall score was Clapham Aquarist Society 725, Independent 638. Placings—1, Mrs. J. Joyce (Characin); 2, Mr. F. Tomkins (Barbus Leporus); 3, Mr. E. Evans (Leeri Gouramies).

The show was judged by Mr. Hunt, an A.S.L.A.S. Judge, and the evening ended with a general discussion on fish keeping.

THE Democratic Federation of German Aquarists are holding their Annual Congress on 17th and 18th October at Leipzig Zoological Gardens.

MR. R. O. B. List, F.B.A.S. Vice-President, has been invited by Dr. Hans Lange, to attend the Congress and address the delegates with a lecture. Professor Dr. Sterba will also address

the delegates and several prominent aquarists from Holland, Russia, Federal Germany and France have already notified their proposal to attend.

AT one of the recent Wirral Aquarists Association meetings, Mr. J. C. Faulkner spoke on the different types of live food locally available to aquarists, and exhibited specimens. During the talk other members were invited to give their own particular method of rearing types of live food and some quite useful information was received.

Mr. M. Pugh-Thomas (Manchester University), lectured with slides on "Fresh Water Biology" at the second meeting, showing how life in rivers survives, feeds and breeds.

An excellent question time followed this most interesting lecture.

FEDERATION OF SCOTTISH AQUARIST SOCIETIES

THE third meeting of the Federation was held in Inverness and was attended by 73 aquarists and friends who were welcomed by the Provost of Inverness in the traditional Gaelic salutation Ceud Mìle Fàilte—one hundred thousand welcomes!

After an excellent lunch accompanied by souvenir menu cards provided by the Inverness A.S., the company saw the Hans Hass film "Under the Red Sea."

The table show results were:—Mollies (nine



The Aquarist's Badge

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

To obtain your badge send a postal order for 2s. 6d. together with the Aquarist's Badge Token cut from page xiv, to Aquarist's Badge, *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.



Fishes do not form the only subject-matter at meetings of The Aquarium Circle. At a recent meeting members discussed photography, and a group seen here comparing notes on equipment, were themselves photographed

entries)—1, Albert R. Bell, Dundee A.S. (*Mollisetta velifera*, green); 2, Angus Jeffrey, Kirkcaldy A.S. (*Mollisetta velifera*, green); 3, Alex. Chisholm, Inverness A.S. (*Mollisetta velifera*, black); 4, Alex. Robertson, Dundee A.S. (*Mollisetta velifera*, green). Rasboras, Danios and W.C.M.M. (23 entries)—1, G. L. Thomson, Inverness A.S. (*Rasbora heteromorphus*); 2, H. Bottom, Inverness A.S. (*Rasbora trilineata*); 3, George Reid, Alloa A.S. (*Brachydanio albivittatus*); 4, J. G. Main, Inverness A.S. (*Rasbora trilineata*). Catfish (13 entries)—1, P. C. Watson, Inverness A.S. (*Corydoras paleatus*); 2, Albert R. Bell, Dundee A.S. (*Corydoras paleatus*); 3, J. McLean, East of Fife A.S. (*Corydoras aeneus*); 4, Alex. Cross, Dundee A.S. (*Corydoras aeneus*). Large Cichlids (12 entries)—1, G. Wardrope, Glenrothes A.S. (*Aequidens pulcher*); 2, Ian Young, Inverness A.S. (*Cichlasoma nigrofasciatum*); 3, Robert Cathcart, Inverness A.S. (*Aequidens portalgromis*); 4, John Low, Alloa A.S. (*Cichlasoma nigrofasciatum*). Best fish on show (57 entries)—G. L. Thomson, Inverness A.S. (*Rasbora heteromorphus*).

At the Council Meeting the Society Delegates ironed out some of the early problems of the Federation and made plans for its future development.

There was a full attendance at the A.G.M. when the secretary and treasurer submitted their reports. The financial statement showed a small profit on the year. The following office bearers were appointed for the season 1959-60: President, Peter N. Greening (Dundee A.S.); vice-president, M. Kerr (Edinburgh A.S.); hon. secretary, Alexander Cross (Dundee A.S.); hon. treasurer, Gordon B. Kirkland (Dundee A.S.). The meetings during 1960 will be held at Kirkcaldy (6th March) and Alloa (4th September). Fuller details will be announced later.

THE Hartlepool Aquarist Society have drawn up the programme for the autumn and winter period. This programme includes a series of table shows to be held in the club room of the Zetland Hotel, West Hartlepool, and these shows will be open to non-members of the



Group of prizewinners photographed at this year's Catford A.S. show

society who wish to exhibit their fish and are perhaps rather diffident about entering the more formal type of open show.

The committee and members of the society extend a cordial invitation to any interested person to attend any of their meetings, which are held on alternate Monday evenings in the Zealand Hotel.

The show secretary is Mr. J. Carter, 7, Clifford Close, West View, Hartlepool.

AT a meeting of Barton and District A.S. a speaker from the Midland Association of Aquarists' Societies gave a talk on the increasingly popular landscape aquaria.

Recently, members of the Society visited Chester Zoo, where they were shown behind the scenes at the aquarium.

RECENT activities of the Ilford and District A.S. have included table shows and a quiz. Members enjoyed a pleasant evening with representatives of the Romford A.S., who sent a team to compete in an inter-club quiz.

There was a table show for any variety of Barbs or Characins. The winners were: Barbs—1 and 2, Mr. Postlewaite (Tiger Barbs). Characins—1, Mr. Hunter (Neon Tetra); 2, Mr. Price (Cardinal Tetra).

An "All classes table show" was also arranged and an extensive variety of tropical and cold-water fish were on view.

THE next meeting of the Association of Yorkshire Aquarists Societies will be held on Saturday the 11th October at the Co-operative Institute, Oddfellows Court, Thimpton Road, Bradford.

THE September meeting of the Bradford and District Aquarists' Society was in the form of an Inter-Society table show with Dewsbury Aquarists' Society. A visit to Chester Zoo also took place.

ON the 14th October meeting of the Guildford and District Aquarists' Club a talk will be given by Mr. W. E. Coveney on Electricity in relation to fishkeeping. During September there was a visit to McLynn's Aquarium, a table show and an inter-club table show with North Hailes.

AT a recent meeting of the Alloa and District A.S. the 20 members present unanimously accepted the new constitution.

The lecturer for the evening was Mr. George Reid, who spoke on the Barbus Conchomus. The table show was of Livebearers and the results were:—1, P. J. Dalton (*Mollivnia colifera*); 2, P. J. Dalton (*Albino Xiphophorus helleri*); 3, A. Pollock (*Red Xiphophorus helleri*).

The secretary is Mr. P. Dalton, 21, Rose Street, Alloa.

SECRETARY CHANGE

A CHANGE of secretary has been reported from Cambridge and District Fishkeepers Club (Mrs. A. Pelling, 1, Geldart Street, Cambridge).

SHOW REPORT

A FULL report of the Midland open show will appear in the next issue.

AQUARIST'S CALENDAR

4th-10th October: Leeds and District Aquarists Society annual show at Leeds.

10th-11th October: British Aquarists Festival at Belle Vue, Manchester.

14th-17th October: Bradford and District A.S. annual show at Mechanics Institute, Bradford.

21st-24th October: Scottish Aquarium Society annual show at McLellan Galleries, Sauchiehall Street, Glasgow.

30th-31st October: Bristol Aquarists' Society annual open show at the Bishopston Parish Hall, Bristol.

6th-8th November: Blackpool and Fylde Aquatic Society annual show.

Crossword Solution

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



BRITISH AQUARISTS' FESTIVAL 1959

OCTOBER 10th and 11th

BELLE VUE ZOOLOGICAL GARDENS, MANCHESTER

26 Classes covering Tropical, Coldwater and Aquascapes

In addition there will be an outstanding Guppy exhibit of some 150-200 tanks by the Lancashire and Yorkshire branches of the Federation of Guppy Breeders' Societies

SHOW OPENS 10 a.m. to 8 p.m. (7 p.m. Sunday) Admission to the Festival including also Belle Vue Zoo and Amusement Park 2/- (children half price)

A WORTHWHILE VISIT

For years, like the majority of tropical fishkeepers, I had been intrigued by the wonderful colours of certain fish of the Egg-laying Tooth Carp family that I had seen in book illustrations. I could never, with all my searching, find a shop which stocked them and I had come to believe that they were just figments of the imagination.

While discussing this with a chum at the local Society a new member came over and suggested that we should pay a visit to Johnson's Aquarium in Tooting. He told us that Mr. Johnson always had a good selection of these beauties in stock and was certainly an expert on this family. So, off we went armed with a list of these exotic fish which we had read about, but never seen.

We waltzed in gaily and had a good look round the tanks in the shop—peering into each. But not a sight of the fish we were after. Tanks with 300 Neons, 60 or 70 Cardinals, Ram-creezi, Reitzigi, Kribensis, Talking Catfish, and six or seven other Catfish varieties. Jack Dempseys, Severum, Firemouths, Jewel Fish and other cichlids, including four variations of the good old Angel Fish. Dotted about were jars housing practically every colour male fighter you could think of—including a new strain showing a shot-silk body with changing colours of green, blue and violet and having red fins. Very handsome fellows indeed, and all beginning bubble nests in their jars. They were only 15s. each. Younger males were from 6s. 6d. upwards. All the commoner fish were on view—prices in most cases 7s. 6d. or less.

We explained to Mrs. Johnson that we didn't see what we wanted, and were there by any chance any Tooth Carps? We were told that there were a few but not as many as the usual 40 varieties that Mr. Johnson played with. A call brought him down from a pair of steps in the back shop, used as a stock room, containing over 80 tanks.

Yes, he had some Tooth Carps and asked which ones we were after. We gave him our list and then the show began. *Cynolebias Nigripinnis*—all full of eggs and rearing to go, 21s. per pair, and real beauties they were, too. *Cynolebias Splendens*, young pairs with females beginning to fatten up. Two colour varieties of *Lyretails*—a deep chocolate brown at 15s. pair, and the normal colour at 12s. 6d. pair. Then came the *Aphyo*, *Hærrerensii*—similar in shape to the *Lyretail* but the body glow with a fluorescent orange coloration. The females also show a peach colour—as against the drab grey of the *Australis*. These fish cost 21s. per breeding size pair. A very new arrival was *Aphyo Callisurium*—and a beautiful new fish, somewhat similar, having a pale blue-green body spotted with scarlet. The fins being most attractive—bright orange with a crimson band. Adults were 2½ in. long, but only young pairs were available at 30s. a pair. I fell for those and the young *Golden Pheasants*. These were young *Blue Gularis* at 10s. 6d. each, *Bivittatum* at 13s. 6d. a pair; *Arnoldi*, a vivid blue with red and orange coloration in the fins, and *Blue Fins*—the American top minnow, both at 21s. per pair, breeding size.

There were also the little *Indigo Blue* and *Silver Spotted Aphanis Sophiae*, the *Persian beauties*, youngsters at 7s. 6d. each. And then, to almost take your breath away, the most—it's impossible to describe this gem of a fish—*Nothobranchius Rachovi*—with its vivid blue, scarlet, green and glowing salmon pink colours. The pair we saw were adults, in a large plastic box, the female plump with eggs, and when Mr. Johnson told us to look through the bottom of the box a dozen or so eggs could be clearly seen, absolutely transparent like miniature glass marbles, pinhead size. Once the fish commence to spawn they are placed in small tanks with a fine peat bottom where the eggs are laid and later collected for hatching. Similar pairs were available at 25s. per pair, but more youngsters are expected soon at a reduced price. After seeing these—the previous beauty of the group, *N. Guentheri* seems to have lost its shine, although it was the best until *Rachovi* became available again. *Guentheri* were bred here by Mr. Johnson some two years ago—then the price was 45s. a pair—now, through his efforts, the price is a more popular one of 25s. a pair.

We left the shop with a fine collection of fish—all packed in polythene bags filled with oxygen, for which service we were charged 3d. per bag and assured that the fish would be quite safe for a 24 hour journey. Having had opened to me a new world of fish keeping and breeding I would sincerely suggest that you should visit Mr. Johnson as soon as you can and see, in many cases for the first time, these rare beauties.

The easiest way to get there is by Underground to Tooting Broadway and then a 3d. ride on a 630 trolleybus or 44 bus from outside Woodworth's Street to Tooting Junction. The Aquarium is on the corner at 223, Longley Road, facing the Southern Railway Station.

A word of warning—don't call before 10.30 a.m. Both Mr. and Mrs. Johnson are often packing trade orders until well past midnight. They like the fish to catch the early morning main-line trains, and so ensure quick and Guaranteed live delivery. They keep many traders throughout the British Isles stocked with first-class fish. For this reason the shop is never open Wednesday. Normal shop hours are 10.30-1, 2.15 to 6 p.m.; 6.30 p.m. Friday. Open all day Saturday. The address—JOHNSON'S AQUARIUM, 223, LONGLEY ROAD, TOOTING, S.W.17. Phone: Balham 6742.—Good hunting.

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