

# The AQUARIST AND PONDKEEPER

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## Editorial

THE hatching of eggs of the octopus at the London Zoo Aquarium is something of an event, and one of which its curator and staff can feel justly proud. Few instances of successful hatchings of octopuses in aquaria have been reported and probably none has taken place before in an exhibition tank of a public Aquarium so far removed from the sea. The London Zoo's achievement means that conditions maintained in the marine tanks are every bit as good as can be expected, for it is well known that the octopus is a particularly difficult subject to keep alive, without considering breeding, in water maintained under artificial conditions.

These are the practical considerations of the event. There remain the exciting possibilities for zoologists that observation of the mother and young will disclose some new facts about this animal and, in particular, about the behaviour of the incubating female. Certainly it is something of a surprise to find that the mother octopus guards her thousands of eggs most carefully and keeps water circulating through them with jets delivered from her body. Especially is this surprising when it is considered that the London specimen has done this almost continuously for about 50 days, much longer than in previously recorded instances. Such parental care is unusual in organisms so low in the animal kingdom.

Although the curator, Dr. Gwynne Vevers, is not hopeful about keeping the young octopuses alive for very long, for it seems impossible to supply the correct diet for them, opportunity has been provided for further study of the early developmental stages of the animal. In the aquarium the young look at first sight like nothing so much to the aquarist as large *Daphnia*, for their swimming movements, reddish brown colour and habit of aggregating in a great cloud close to the light above the water are so similar. They do not crawl about the sea bottom, as do the adults, until some months have been spent drifting at the sea's surface as part of its plankton. So that, even if she were interested, the mother octopus has little chance to coddle her numerous offspring once they have hatched.

# Economise in your use of Electricity!

by ERIC R. JONES

WITH the increase in the cost of electricity it is high time we considered the heating of the aquarium and the fish house. We cannot afford to neglect such an important factor as this, for haphazard carelessness with heating can only lead to ridiculously high electricity bills which put us off fishkeeping altogether. How often do we just put any heater in the aquarium and hope that the overloaded thermostat will look after the heater or, with space heating, try to maintain a temperature of 75° F. air temperature throughout the fish house with a greedy greenhouse heater bought for a couple of quid from the chap next door (and he nearly gave it to the rag-man).

To get down to hard facts. Any place won't do as a fish house, any space heater won't serve to heat the fish house and any old heater and thermostat won't serve to heat the aquarium.

To start our calculations let me get one thing straight: thermal conductivity is not used in these heat calculations, but a unit known as the "temperature coefficient," which is in British Thermal Units (B.Th.U.). It is the amount of heat lost to the outside atmosphere per square foot per degree Fahrenheit difference between the inside and outside, according to the materials serving as walls, roof and floor. Below I give the temperature coefficients of some materials used in building construction which will help you to design your fish house accordingly.

Table 1. Table of heat-loss coefficients

Nature of material of construction	Values of heat loss in B.Th.U./hr./sq. ft./°F. difference in temp.
<b>Glass</b>	
Single windows .. .. .	1.03
Double windows .. .. .	0.48
Plate glass .. .. .	0.74
<b>Doors</b>	
Half-glass .. .. .	0.75
All-wood .. .. .	0.45
<b>Walls</b>	
Brick (unplastered) 4½ in. .. .. .	0.50
Brick " 9 in. .. .. .	0.35
Brick (plastered) 4½ in. .. .. .	0.44
Brick " 9 in. .. .. .	0.33
Concrete wall 2 in. .. .. .	0.70
Concrete wall 4 in. .. .. .	0.57
<b>Roofs and ceilings</b>	
Tiles on boards .. .. .	0.35
Tiles on boards and plaster ceiling .. .. .	0.24
Wood insulating material and wood ½ in. .. .. .	0.27
Wood insulating material and wood 1½ in. .. .. .	0.22
Wood insulating material and wood 2½ in. .. .. .	0.18
<b>Floors</b>	
Boards on joists .. .. .	0.30
Dry earth .. .. .	0.21
Cement or concrete .. .. .	0.31

Let us first consider space heating of a fish house. If you have not already got a fish house and want to build one,

consider firstly the position you are to put it. Remember, the most sheltered place is the best place to keep down heat losses from a building. Note that the higher the speed of the wind the more heat is lost. Next decide on the measurements of the building—you can get a lot of tanks into a space 7 ft. by 10 ft. If building with brick, it is better to have a 9 in. wall rather than a 4½ in. wall as the heat coefficient is almost halved. Double-glazed windows have half the heat coefficient of single windows. The application of plaster also cuts down heat losses.

For simplicity the roof should be a flat wooden roof with an insulating compound between its upper and lower layers. A well-fitting door of any type can be used, as the actual heat loss from the door is very small, but cracks allowing air in can create an air change of as much as three air changes an hour, thereby losing a lot of heat. The cost of such a building would be nearing £150 to £200. This then is only for the rich keen hobbyist.

To calculate the heat loss of any place:—(1) take the overall measurements of the room; (2) measure the area of the walls, including windows and doors, and note the thickness and type of material of which the walls are made; (3) note the area and types of windows; (4) note the area of the doors.

To make your heat-loss calculations make a table of facts as shown in Table 2, and find from Table 1 what the heat coefficient is for what you are dealing with. Assume that there will be one air change per hour owing to the cracks in the doors and windows and for opening the door.

Table 2. Data needed to calculate heat losses of a space-heated fish room or house

Factor	Area (sq. ft.)	Heat coefficient	B.Th.U.
Air change	(Take cu. ft. of the room)	(Always 0.02 × no. of air changes)	
Area of windows			
Area of doors			
Area of walls	(Total area of wall minus area of windows and doors)		
Area of roof or ceiling			
Area of floor			
Total B.Th.U. ....			

The total B.Th.U. is for 1° F. difference between the outside and the inside temperatures. Say the minimum outside temperature is 30° F. and we want the heat loss for an inside temperature of 75° F., the temperature difference will be

$$75^{\circ} - 30^{\circ} = 45^{\circ} \text{ F.}$$

Now multiply the total of the heat losses (which are in B.Th.U.) by the temperature difference. This will give the total heat loss in B.Th.U. per hour for the fish house.

When you have decided where to have the fish house and have found the heat loss in B.Th.U. per hour, plan your heating arrangements accordingly. Note that these calculations are made assuming the outside temperature is 30° F., but the mean temperature for the whole year is about 48° F. With the use of a suitable thermostat the heater would be

(Please turn to page 178)

# Toads in Captivity

by JOHN WALKER

**I**N this article it is proposed to discuss the requirements in captivity of some of the more easily obtainable toads.

In general toads are one of the easiest vivarium inmates to cater for, as they need little attention and are easy to feed. A very good type of vivarium is a converted aquarium tank, with a wire-gauze ventilator fitted over the top.

Assuming that a vivarium is to be started, and an aquarium tank being used for this, about 1½ in. of gravel or grit should be put on the bottom of the tank first, as this helps the soil to drain. On top of this should be put 2-3 in. of soil. Sand should not be used, as it sticks to the food and causes discomfort. The earth should be kept friable, as toads like to bury themselves from time to time. A bowl or some other utensil should be sunk into the soil, up to the rim, and filled with water. The bowl should not be too deep, as sometimes toads find difficulty in getting out of deep containers and will drown.

For the furnishings, some pieces of curved bark or stones can be placed on the soil. These are for little shelters, as a toad will like to hide itself after meals, and sometimes during the day. A flower pot makes a very good hide-out, as when laid on its side it looks natural and I have found my toads to be very fond of one to sit in.

Planting is optional. Personally, I have found it to be a waste of time, as the toads will either knock the plants down when walking about, or uproot them when burying themselves in the earth. However, if mossy pieces of bark or stones are included in the set-up, a very pleasing effect can be obtained.

Some of the best inmates for a toad vivarium are: the common toad (*Bufo bufo*), 10 cm., which is too well known to need a detailed description, save to say that it can be found in almost any shade of red, brown or yellow.

The natterjack (*B. calamita*), 6-7 cm., which on top is greenish grey, with a bright-yellow dorsal stripe, and red on the warts; underneath it is off-white speckled with green.

The green toad (*B. viridis*), 7-8 cm., is similar to the



Common toad (*Bufo bufo*)



Photo: W. S. Pitt

Male midwife toad (*Alytes obstetricans*)  
carrying eggs

natterjack in colour, being putty-coloured marbled with green, but without the dorsal stripe. It has red on some of the warts. Underneath it is grey white.

The first two toads named are native to Britain, but the green toad is not. It is distributed across Europe, Asia and North Africa. These three species are the only European members of the large and typical family Bufonidae.

All three will, if kept at room temperature, remain active throughout the winter, but if the temperature falls too low they will want to hibernate. If it is wished to hibernate them, they should be placed in a box full of dry leaves and moss, and put in a shed where it is cold, but where no frost can get at them, as frost can be fatal.

For food, toads will take almost anything that moves: ants, beetles, flies and worms. Different specimens have particular likings, but these will be found by experimenting.

Toads are fascinating to watch feeding, as they will stalk their prey, and then snap it up with their tongues. One gulp and it is gone, unless it is something like a worm. In this case, it is swallowed in a series of gulps, being helped down by the backs of the eyes, which are pulled into their sockets for this purpose. In the meantime the toad runs the worm through its fingers to clean it.

Food should be given once every 2 or 3 days, and should be placed where the toads can see it moving. In a very short time, and with patience, toads will tame easily and feed from one's fingers.

Another toad which is often seen in dealers' lists is *B. marinus* from South America, being sometimes known as the giant South American toad. This toad is a monster, and will grow to 5-6 in. long. In colour it is a variable shade of brown or yellow on top, speckled with red, yellow or black. It has very large parotid glands, which are sometimes marked with red lines. This toad can be treated in a similar fashion to the previous ones, but of course can be offered much larger food. Even mice will be taken. These can be killed and then placed in front of the toads, and agitated with a stick. Some toads, however, will not eat dead food, but most of mine will, provided it is moved about. *B. marinus* likes a warm temperature, 65-70° F., but this can be allowed to fall to 45-50° F. at night.

Most toads will live quite happily together, but it must be remembered to keep only those of a similar size in one cage. If this is not done, trouble is certain, as a large toad will often eat a smaller one.

# Fancy Goldfish Breeding—10

by A. BOARDER

**T**HIS fancy fish is one which should be bred only by the experienced aquarist and one who has plenty of patience. It is a fine handsome fish but the hood which characterises this variety often takes a year or two to develop, and so it is rarely possible to be able to sort out the good from the bad under at least 2 whole years. Therefore those aquarists who like quick results would be well advised to stick to breeding guppies and similar species.

The shortest description of an oranda is that it is a fish resembling the veiltail with the addition of a large hood or raspberry-like growth which covers the head and gill plates. In detail, the fish should have a twin tail, that is its tail should be completely divided. It should be as straight as possible at the base and hang in graceful folds. There should be no signs of forking at the tail end. It should be as broad as it is long and at least as long as the body of the fish. The dorsal fin should be erect with a height of about that of the depth of the body. It should have a slight curve in front and the rear should be slightly concave at first, dropping to convex towards its end. The pelvic and pectoral fins should be long and distinctly pointed. The anal fins should be completely divided and be well developed.

The body should be deep and round, approaching a sphere. There should be no signs of snoutiness and the upper curve should be in one clean sweep. The head should be completely covered by a rough wart-like growth and this should extend over the gill plates as well. If the growth is well developed it should be almost round, standing up well above the line of the head but finishing off sharply at the back. The colour of the "self" should be a rich red. The "variegated" should have two or more colours in a pleasing pattern. What a pleasing pattern is has not been explained in the Federation Standards, but



Photo:

Young oranda

Laurence E. Perkins

## 10. The Oranda

I imagine that with red and silver in almost equal proportions and disposed in fairly equal markings on each side would be considered pleasing. The "nacreous" and "matt" fishes should have no scales visible and should be blue, violet, red, yellow and brown, overlaid with black dots or splashes. For exhibition purposes the minimum body length is 2 in.

Having studied all the above descriptions the breeder should be in a position to sort out his fry. The nacreous and matt ones will have changed colour very early in life and so these can be sorted more easily than the scaled types. Most of the orandas seen in this country since the war have been of the scaled types and have been red and silver in colour. Very few selfs are seen and also very few nacreous. The first sorting should be as for the veiltail: to get rid of those fish which have not the divided tail. The same rules apply here as with the veils; do not be too eager to cast out any fish which have well-developed tails just because they do not appear to be divided. Often they open up later on or they may have been held very closely together when examined. Do not expect that the tail or caudal fin will have its ultimate development at an early age of the fish. This fin will grow on for some time, and with some fish never seems to stop; often a fish which was a winner at 3 years of age has a flowing pointed tail at 7 years of age, which would prevent it from getting in the cards at a show.

Make sure that your fry which you are intending to keep have no sign of forking, as this fault tends to become exaggerated as the fish grows. Once the sorting for tails

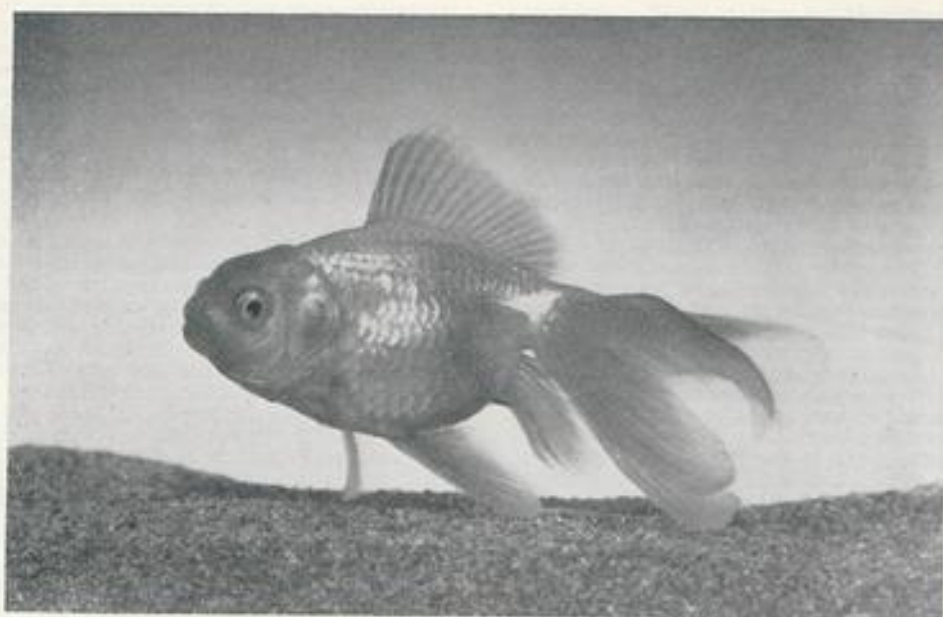
has been completed the dorsals must be examined. A clear-sided tank must be used for this. See that no fish is kept which has a badly formed dorsal, as the shape of this fin is never likely to change much from the time the fish is 3 months old to the end of its days. As with most other fancy fish with double tails it will be found that the pectoral and pelvic fins are not likely to vary much unless the fish is an actual runt. The anal fins will give the most trouble and again the fin which should be double might be single, badly shaped or missing altogether. The oranda with a single anal fin should be disqualified at a show.

Unfortunately the only feature which distinguishes the oranda from the veiltail is the hood and this does not develop until the fish is almost mature. The formation may take 1 year or even 3 years. It will therefore be necessary to keep all fish which resemble a veiltail, and this is where the patience of the aquarist will be well tested, as it may be several years before he knows for sure whether a certain fish will form the hood or not. In fact some fishes in a spawning will never do so. The difficulties to be met with by the intending purchaser of young orandas can well be imagined.

The scaled types will take some time to change colour from the bronze to the red or red and silver, and there is no doubt at all that the warmth of the water will make a great deal of difference to the time taken by individual fish to change colour. A temperature of 70°F. for the youngsters is very good and at this warmth growth should be rapid as long as sufficient food is given and enough space is provided. For these fish a tank at least 12 in. deep should be provided once the fry are over 3 months old, and later on, when they are almost fully developed, the 15 in. deep tank will be preferable.

### Meaty Diet is Necessary

See that a certain amount of meaty foods is included in the diet, but one with a basis of Bemax and dried shrimp will make a good stand-by. Garden worms, white worms, *Twix* and gentles will be acceptable and once a day will be quite enough for such foods. The meaty types of food can be given at the last feed of the day and the starchy types for earlier. Three feeds at least will be necessary unless enough live foods can be given to last a long time.



Scaled oranda

Such foods as *Daphnia* can live for days, *Tubifex* until it hides in the mulm and white worms can live in water for about 24 hours. The trouble is that if one tries to give too large feeds with live foods at a time the fish get satiated quickly and then instead of eating the *Daphnia*, etc., they catch it, kill it and spit it out again. Such over-feeding can soon upset the balance of the tank, and so I consider that it is still the best plan to see that no more food should be given at a time than can be eaten in 5 minutes. Another feed can then be given in 2 hours or less if the water is warm and the fish are very active. Obviously, as long as you can get the fish to eat well their rate of growth will be all that can be desired.

It must not be thought that it is necessary to keep the young orandas at a temperature of 70°F. after they are about 3 months old. If they have grown properly they should have a body length of at least an inch. From then on the water can be allowed to drop to the lower sixties without the fish coming to any harm. The oranda should not be left in a small out-door pond for the winter. The flowing finnage would be very prone to develop fungus and fin congestion. Once the fish has a body length of 1½ in. it needs plenty of space, and no more than two such fish, or three at the outside, should be housed in a 24 in. by 12 in. by 15 in. tank.

The hood of the oranda appears to be formed by a group of malformed cells and has been thought by some people to be a type of cancerous growth. Very often an adult oranda will show fungus-like substance on the hood. It is not necessarily fungus at all, and so do not give treatment as soon as such a condition is seen. The cells which contain the mucus are often deranged by the formation and this condition allows a surplus of the mucus to escape. Perfectly healthy orandas may therefore show this tendency for fungus on the hood.

When preparing the oranda for a show it is well to train the fish in a smallish tank for some days before the actual show. See that as soon as the fish is placed in the show tank for training it is given a small feed of *Daphnia*. The fish will soon look for this treat and the search for such food in the exhibition tank will tend to keep the fish active and so

gain it many points for department. Not that this is the only reason, for any fish which has a good department can show off all its other points far better than the fish which continually sits on the bottom of the tank.

Always test the temperature of the water in the show tank as sometimes it can be as low as 45°F., whereas your carrying can can be as high as 70°F. Although most fishes can stand a certain amount of variation in the temperature of the water in a tank it is dangerous to take a fish from a warm tank and place it directly into water many degrees lower.

#### CHYDORUS OVALIS

*Chydorus ovalis*  
(magnified × 5)



I seeded a pond in my neighbourhood with a mixture of *Daphnia* and *Cyclops* about 2 months ago. Now I find that it contains an abundance of the small creatures I am sending to you for identification. Are they young *Daphnia*, and if so how long will they take to reach maturity?

THE creatures forwarded for identification are not, as you thought, young *Daphnia*, but a related crustacean, of equal value as fish food, but by no means so prolific. There were young and mature specimens in the sample forwarded. The maximum size of *Chydorus ovalis* is just over 0.5 mm. and so they often escape notice by the unobservant. Young *Daphnia* mature more rapidly in warm than in cool water—from 8 to 14 days as a rule. Mature in this case means sexually mature. They are by no means fully grown when they commence to produce offspring and ephippia.

C. E. C. Cole

# AQUARIST'S Notebook

by

RAYMOND YATES



ONCE again the British Aquarists' Festival at Belle Vue has been and gone and we are left with only the memories of a grand show. Manchester weather is supposed to be a music-hall joke, but year in, year out the B.A.F. has perfect weather and this year was no exception. Although now accepted as an annual event at the same venue, the public continues to roll along, and an obvious feature of the 1957 attendance was the high proportion of relative newcomers to the hobby.

Every hobby needs new blood and it was very comforting to see such an influx of keen and interested "freshmen," not to mention their equally keen wives and families. I asked a great many visitors at *The Aquarist* stand where they had come from, and many had travelled considerable distances. One and all were delighted with the show and said it had given their interest in the hobby a decided fillip. Many shows suffer insofar as they have no dealers present with fish stocks and equipment on sale. On this occasion there were nine trade exhibits and the various dealers reaped the reward of their enterprise, there being hardly a fish left for sale when the show closed. This is what the public wants, the opportunity to see fish set up in ideal surroundings, prize fishes and attractive layouts coupled with the chance to browse through the large stocks of a number of dealers. Almost everybody arrived with a jar or two and few, if any, went away without a fresh addition to his or her collection.

There were many varieties on sale, upwards of a hundred, and some were in the very rare class indeed. There was something for everyone from black angels to guppies, blue gularis to mudskippers, *Leporinus* to sucker-mouthed catfish; not to mention birds, hamsters, alligators, monkeys and the like. One dealer sold a variety of reptiles to Dudley Zoo including an anaconda, iguanas, a tegu and a python. Young slowworms were on view which were born at the show, also a tortoise which had hatched out there. The public enjoyed guessing at the number of zebra danios swimming in a large tank set up by the curator of the Belle Vue Aquarium, Mr. Brian Cheshire. This actually held 242 but the enormous tank misled some people into imagining it held more, one guess being 1,000!

Not the least interesting part of the B.A.F. is the certainty of running into old friends. I was particularly delighted to meet Mr. and Mrs. Michaels, who used to be such well-known aquarists in Halifax until they sold their business 2 or 3 years ago. Mr. Michaels then removed to Selby, where he engaged very successfully in the motor trade and also found time to found the Selby Club and keep a few fishes to remind him of old times. When he left Halifax we thought it was farewell, but it was only "au revoir." Now it really is farewell as he is emigrating to Australia shortly. His many friends in Britain will wish him success in his new venture and I hope to let readers have further news of him once he is "down under."

Mr. C. Blake of Rochdale was once a name in the hobby as a breeder and exhibitor, but it seems he decided to have a rest and gave up fish-keeping for a time. Now the old urge has returned and he has started up again and set himself two targets, bigger and better *Apistogramma ramirezi* (and those who knew his previous prize winners of this strain know his already high standard) and the breeding of the chocolate gourami. He has a dozen of the latter from which he hopes to get some results. Another aquarist was telling me at the show of his own failure with these fish, which had died on him soon after purchase. They certainly

are a problem fish. Mr. Blake is using tubular heaters (60 watts/foot) and asbestos matting for base heating.

One of last year's highlights were the grand leeri gouramies shown by Mr. G. Williamson of Salford. He was showing again and told me of his success with neons. Although only 5 years in the hobby he has four successes with breeding neons; the first attempt produced one single fish, the second effort six fish, the third saw 50 neons grow on to maturity and the fourth and last ended in disaster through his own "carelessness." I asked him what his secret was but he feels he is still too raw at the game to hazard any opinion on that score. He will think about it when he has had six or seven successful rearings! It is interesting to mention that this "raw beginner" has already spawned and raised 35 different varieties, all in about ten tanks inside the house. Readers will agree it is about time he threw away his "L" plates with experience such as this!

After the resignation of Mr. Gerald Iles, who is leaving to take up an appointment in Canada, the Belle Vue club has appointed Mr. Ken Owen as secretary. This appointment should prove very popular as Mr. Owen is a well-liked and respected aquarist whose modest manner will endear him to all, particularly to the ordinary club members which he represents so well. Although the Belle Vue Club has now reached its majority, it is not one of those which have seen many changes, an experience quite the reverse to most present-day aquarium clubs.

Mr. A. Engelke of Manchester tells me that the yellow leeri to which I referred last year is still going strong. He has now bred from this fish to three generations (say 1,000 fish in all) but all the young have proved quite normal and the yellow coloration is absent. This fish is blind, as a matter of interest.

The most fascinating feature of the huge birthday cake showpiece in the centre of the show was the wonderful paper-decoration to represent icing. This really marvellous paper-sculpture work was all done by Mr. George Donaldson (and his wife), who knew nothing of this art but got books out of the library from which they got the "know how," as the Americans say. Over 600 separate pieces were made and stuck on with white Bostic. The material was green-and-pink index card, partly scored and backed, and the time taken on this undoubted labour of love was in the vicinity of 250 hours. Financially the cost amounted to a mere 14s. 4d. Mr. Donaldson received numerous pats on the back from show visitors for his splendid work on this particular set.

I had a yarn with the Merseyside visitors, because I have felt for a long time that Merseyside has become rather a backwater of the hobby and that if anything does happen there in the fish line it is rarely reported. Off-hand the last things I can remember hearing was something about natterjack toads at Bootle and lizards on Formby sandhills, or vice versa . . . whatever it was it was not heart-warming stuff for fish fanciers. It was therefore with pleasure that I talked over the hobby with members of the Merseyside Aquarists' Society. Their club has now been reorganised and meets twice monthly on Thursdays at the Grenville Cafe, opposite Exchange Station. With a membership of

about 40 they now have some very keen young enthusiasts and take part in table shows with other clubs to about 30 miles distance, run inter-club contests, debates, issue a news letter and make their own colour slides. They have their own show tanks, and judge to F.B.A.S. standards with three entries per class. They prefer to have lectures from their own members, as these prove more alive and vital than some of the booky "fuddy-duddy" stuff they have had to endure in the past. The secretary is Mr. B. T. Roe (9, West Way, Liverpool 15), if any aquarists in the area wish to get in touch.

Blackburn club finds difficulty in getting lecturers (who doesn't?) and it does seem as if more and more club members will have to learn to stand on their feet and talk instead of putting on the dreary clam act seen so often at clubs, apart from annual general meetings. Anybody who would like to give a chat to the club should contact the secretary, Mr. J. Haworth (38, Avondale Road, Darwen).

As he missed the last B.A.F. through illness it was a treat to welcome back Mr. Boarder to his customary place on *The Aquarist* stand. He is now quite himself again, putting on weight and quite equal to all the queries about sick and ailing goldfish or pond troubles which came his way, and plenty did. Asian 'flu did not seem to have hit the show at all, although perhaps one or two missing faces were due to its ravages. Mr. and Mrs. Hammond of Doncaster were both down with it a week earlier but managed to get along. I had a long yarn with Dr. F. N. Ghadially, who came over from Sheffield for the day on the Sunday. What a lot he does for the hobby, rushing here and there and wearing himself out. Of course, he enjoys it, and he once told me he was always happy driving his car through the night. He has recently written a small book entitled *Fish Foods and Feeding* (reviewed in detail elsewhere), which is jolly good and written in down-to-earth, straightforward language and accompanied by numerous photographs.

I saw a lot of Mr. Chapman of Sheffield also; I like his infectious humour, although this time he was worried with the similarities of neons and cardinal tetras. I did find time to have a look round the displays and the fish and the dealers. The keynote was enthusiasm, even to the people who were selling cacti. When the societies and the dealers are all pleased one feels that the show has been a success. The time and trouble given by so many has been rewarded and the future of the hobby secure. My own view is that we are now experiencing a large influx of newcomers to the fancy, they may not have reached the clubs yet in worthwhile numbers but they are there. Club membership is no yardstick to go by; it has always been reckoned that for every club member there are 10 to 20 aquarists who are unattached.

Finally, my regrets to the lady from Birmingham who called at the stand and asked for me in my absence and said she was "one of my fans." Thanks also to the young enthusiasts from Rotherham who called and said "I always read your stuff first!" Like broadcasting, writing is very impersonal and one has little idea how it is received by the great mass of readers. Incidents like these are therefore appreciated. If you missed this B.A.F. don't miss the next!

Colour, like beauty, is often in the eye of the beholder as far as fishes are concerned. Tastes vary considerably and no two aquarists see fishes in quite the same light. The selling unpopularity of *Barbus schuberti* is surprising, as this fish is a delightful yellow or orange but the fact remains that it just does not sell well, although similarly coloured goldfish and golden orfe and tench are ever-popular. Bright reds and blues in fighters and real colour in livebearers put them

in demand but silver or silver and black have not the same pull except in angels. The coloration of angels varies but it is always policy to buy one which is very well coloured because then you know what it can be like. Frightened fishes at the dealers lose their colour (cichlids in particular) and fishes exhibited under strip lights rarely look their real selves. In breeding condition, colours are at their best but colour is inherited and all the attention and feeding in the world won't put colour there which isn't inherent. There are one or two tricks which will put an artificial coloration on the fish for a time, but this is not natural coloration. Fighters are variable, brilliant and intense colour can fade away to a washed-out drabness which makes the fish very ordinary, and this change can last weeks or months before a return to its previous hues. Colour fades with age, cold, where disease or parasitic attack is present, with fear and unsuitable backgrounds and becomes more intense with heat, spawning approach and anger. Some fishes also put on their best colours when they are about to die (as angels) but not many.

I am always disappointed when I visit places which have opportunities for showing fishes and fail to take them. A case in point is Southport, which boasts several ornamental ponds in the famous Lord Street boulevard and in the gardens on the front. These, however, contain no fishes or water plants and are an eyesore to aquarists, who recognise a lost opportunity. Although there seems a lack of municipal interest in Southport there are plenty of aquarists in the town and these have assisted in the staging of an aquarium section at the Children's Zoo at the Pleasure Beach. Goldfish are also on view at the Water Caves. The famous fish pond at Matlock Bath has been a "must" for all visitors for many years but the privately owned pleasure garden "Aquarium" there is disappointing insofar as the numerous tanks contain only goldfish, and perhaps more than their share of mulm and detritus. Chester Zoo is another case where more could be made of the Aquarium. The Zoo itself is delightful and well worth a visit, but the large Aquarium (for which an extra charge is made) seems underpopulated and bare. Some years ago this Aquarium maintained a very high standard indeed.

Jugoslavia has issued some very interesting zoological stamps in the past and a recent issue keeps up the high standard. In values of 10, 15 and 20 we have a sea-horse in yellow and green, *Argonauta argo* in blue and white and a lobster in red, yellow and blue. These three large stamps sell at 6d. the set, mint. British Honduras also feature a lobster on a 10 cent red stamp. The mudskipper makes its bow on the 50 cent brown-and-black stamp of Liberia. We are still waiting for a real set of tropicals to be issued. Some years ago a "fake" set for an imaginary country did appear bearing excellent reproductions of some of the colour photographs from W. T. Innes' well-known book *Exotic Aquarium Fishes*.

Those aquarists who like (or require) to use an inside filter permanently in their aquaria are often upset by the fact that the constant sight of the filter detracts from the appearance of the tank. Building up a facade of rockery is not easy, adds to the weight and usually fails to disguise the filter adequately. Recently I saw a splendid effort at getting over this difficulty in a public aquarium. In this instance the filter was completely hidden behind a single piece of rough cork which, in the water, could almost have passed for a rough rockface. The effect was splendid. Cork must be seasoned for some time before use in the tank, however, well boiled and weighted down. Aquarists may find that it colours the water slightly in the same way as peat and lowers the pH (i.e., increases the acidity).

# In the Water Garden in November *by* ASTILBES

**I**T is a good policy to clean out the pond each year, but a lot will depend on its size. The smaller the pond the easier and quicker it is to clean.

Where small concrete ponds have been made and the water plants have been set in pots or removable containers, the task will not be at all difficult. On the other hand, any large pond especially one with a natural base will present too many difficulties for the average pondkeeper. In a large pond, too, the action of the water plants will to a large extent do the work of cleaning without outside aid. The only likely trouble with a large natural type pond is that each year a certain amount of mulm will surely form at the bottom and what was once a fairly deep pond can soon become very shallow. Many ponds could gain an inch in depth each year from decaying leaves and mulm.

Choose a fine day, if possible, for pond cleaning, one of the few fine mild days we generally get at this time of the year. A pair of gum boots will make the task quite a happy one as it is always fascinating to empty a pond and wonder how many youngsters have been reared or how much some of the fishes have grown. If the pond is small it can be emptied with a bucket. Where a drainage pipe was incorporated when the pond was first made it is an easy matter to remove the bung and allow the water to drain away. If the pond is on raised ground it may be possible to siphon the water out with a hose, but place a net over the end of the hose in the water to prevent any small fishes from being sucked up and also to stop water plants from blocking up the hose.

## Pond Emptying with a Pump

The method I use is to start up a small electric pump first thing in the morning. This takes about 3 hours to almost empty my pond. The type of pump usually supplied for this purpose has to be primed before it can work, as it does not work by suction but by a propeller forcing the water forward; unless water is in contact with the propeller no continuous action can be obtained. The priming can be done by filling the small chamber with water before the pump is switched on, but I find an easier method is to start the pump running and then give a good quick suck at the outlet end of the discharge hose. This draws the water up to the propeller and the water continues to run without further trouble.

Do not start to try and catch the fishes until most of the water has been removed, as it will then be a much easier task. A large bath or similar container should be handy in a shady place to receive the fishes. They can be examined when caught to make sure that they are in good health and that there are no water lice or leeches on them. Look at the fishes occasionally whilst the cleaning operation continues to make sure that the fishes are not in trouble because of lack of oxygen.

When all is clear the pond can be well scrubbed round with a stiff broom and well washed by the hose. It will be surprising how much waste matter will have to be removed from a pond, and although a pond may be cleaned out once a year the amount of black smelly mulm which will have collected will be astonishing. The pond can then be refilled and whilst this is happening some attention can be paid to the water plants. Where some have grown too large, pieces can be removed and if more are needed the young off-shoots of many of the plants can be removed with a few roots for setting in a separate pot. Water lilies almost always send out fresh root stocks which can be removed quite easily and they will be found to have enough roots to ensure that they grow. Although such plants are

not likely to make fresh growth at this time of the year they can remain alive all through the winter and be able to start into active growth once the spring weather arrives.

The water plants should be returned to the pond as soon as possible and once the water has settled down the fishes can be replaced. If any British coldwater fishes have been kept in the pond it is not difficult to weigh and measure them to see how much they have grown. A small notebook can hold such information and may come in very useful one day. The best way to weigh a fish is to have a piece of wet cloth to wrap round it to keep it quiet whilst it is on the scales. The wet cloth should be weighed separately so that the exact weight of the fish can be determined. Fishes can be kept for some time in wet cloths and come to no harm. Handling of fishes must always be done with care. Many experienced aquarists can handle fishes and cause them much less harm than might be done with a net. The chief point to remember is that the hands should be wet. If fishes are handled carelessly with dry hands much of their protective mucous covering can be removed. If this happens the fishes may be prone to attack by fungus and pests.

## Treatment for Large Ponds

The treatment of a fairly large pond is, of course, much more difficult and it is best to deal with small sections of the pond at a time. If the under-water oxygenating plants have become too dense many can be removed by making a small grapnel to tie on the end of a long cord. Three butcher's hooks can be used for the purpose, and if they are straightened at one end and bound together securely with fine wire they will make an excellent grapnel. This is then thrown into the thick bunch of weeds and in a short time whole masses of weed can be removed. The weed should be carefully examined to make sure that there are no small fishes entangled therein. Where the pond is being cleaned in sections it is a good plan to deal with a section one day and then allow the water to settle before doing any more, or 3 or 4 hours is usually a sufficient interval to allow the mulm to settle down, and in this manner the fishes are less likely to be disturbed than if too great an area was treated at a time.

The removal of surplus water plants such as irises, pickerel weed and various rushes will be much more difficult. It may be necessary to wade into the pond in gum boots, armed with a sharp spade. The root-stocks can then be cut through and the surplus plant removed. Again when doing this it is well to wait a while for the mulm to settle before attempting to work on another bunch of plants. Should it be necessary to remove some of the mulm from the bottom this can be done by fixing a large strong tin to a long pole and dragging this at the bottom. A great deal of sediment can be removed in this way but again it will be easier if small sections are dealt with at a time to save undue pollution of the water.

When the pond has been partially emptied the task will generally prove easier but when it is refilled great care must be taken to ensure that the water is not allowed to run on to the mulm with too much force and so disturb the bottom too much. If a bucket is placed in the water and the hose end placed in this it will be found that the water will be less disturbed.

Once the pond has been cleaned out it will look much better and greater satisfaction for the pondkeeper is certain. As with most unusual tasks it is the thinking about them that is far worse than the actual job, and once it is over, one can say "It wasn't so bad after all."



*Mollienisia sphenops*

ORDER : Microcyprini, from Greek *mikros*—small, and *kyprinos*—a kind of carp.

FAMILY : Poeciliidae, from Greek *poikilo*—many (coloured).

SPECIES : *Mollienisia*, after M. Mollen, and *sphenops*, from Greek *sphenos*—a wedge, and Greek *ops*—face.

THERE are two varieties of *M. sphenops*, both known to older aquarists but only one to newcomers to the hobby, if my experience is general. Indeed, this article might well be considered "in memoriam" as far as the "liberty" molly is concerned, for I have seen no specimens of this handsome fish since 1946.

Its steel-grey body, and the striking red, yellow and black dorsal and caudal fins of the males have disappeared from our aquaria, in deference to a popular craze for speckled and jet-black specimens.

However, *sphenops* (as *sphenops*) is still with us, and maybe someone will acquire "libertys" and once more start the strain going in this country.

Care of both varieties is the same. Mollies prefer somewhat high temperatures, a good proportion of vegetable

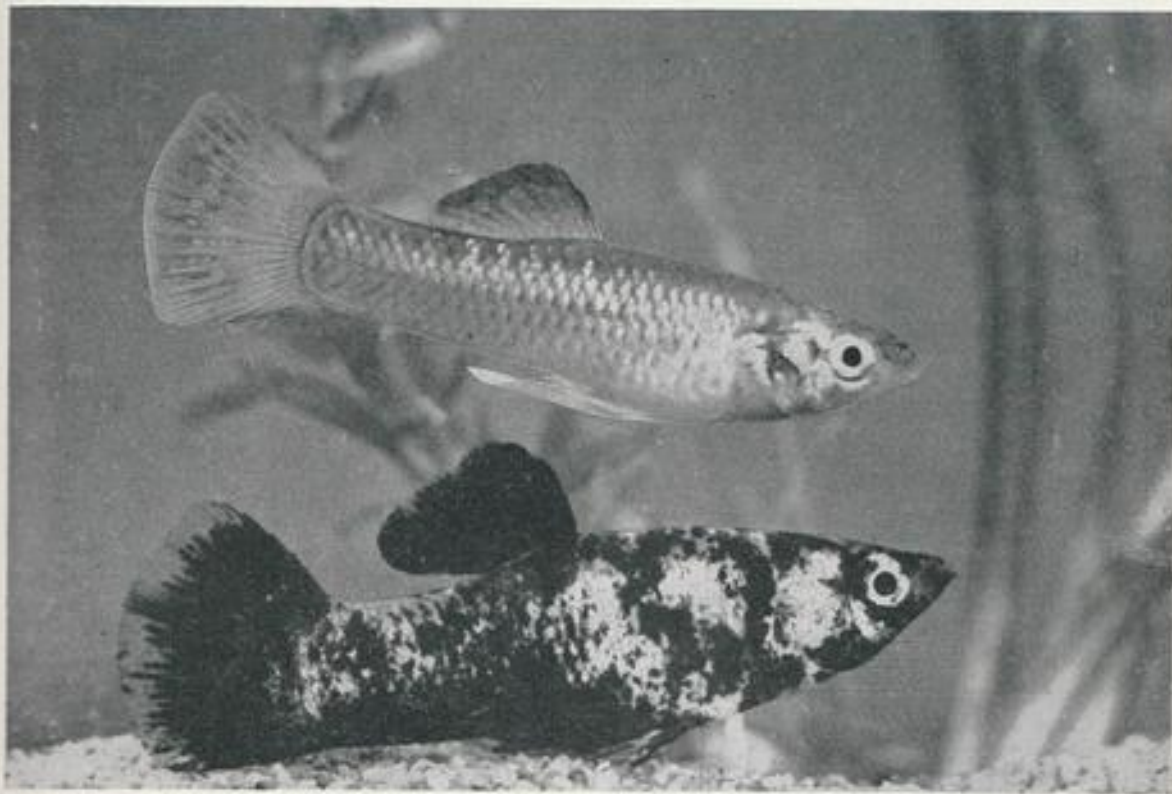


"Liberty" molly

food and a certain amount of peace and quiet. Given these, females will regularly produce batches of youngsters born alive and able to fend for themselves as far as food and shelter go.

Living space should be ample : a 36 in. by 12 in. by 12 in. tank is suitable for six or seven fishes, only one of which need be a male. Even he may be dispensed with after he has lived with his harem only a week or two, and the aquarium then becomes a maternity ward.

Plenty of feathery plants should be growing in the tank, together with a thick layer of floating weeds like *Riccia*, *Salvinia* or the common *Lemna minor*. An intense light will encourage rapid plant growth and stimulate the production of algae, upon which the fish will constantly be picking. In an average temperature of 76 to 80°F., the female fish will give birth every 4 to 5 weeks to small broods of young, which may be born entirely black, or all grey, or speckled.

*Mollienisia sphenops* (male above)

There just isn't any certainty about proportions, colour or anything else as far as the young are concerned. When born the fry will seek instant shelter among clumps of plants or in the mat of floating leaves. This protects them from the open-mouthed attentions of their mothers or aunts, who are temperamental in this as in other matters—they may gobble or not gobble; again, there is no fixed pattern of behaviour.

Maybe some of you who read this and who haven't kept mollies will think the answer is obvious—the provision of live-bearing traps to allow the babies to escape into the aquarium while mother remains a prisoner.

Mollies do not take kindly to this sort of treatment. The catching and confinement of the female near to her delivering a brood might well result in her death or that of her offspring. No—the answer is as outlined above, plenty of shelter in the form of plants.

Pulped lettuce or spinach mixed with a cereal-based dry food is greatly relished by the young, who should be fed little and often. Lettuce in water at 76°F. will start decaying in a very short time, and regular siphoning of uneaten portions out of the tank is wise. This feeding of spinach and lettuce always reminds me of the time fishes were very scarce and very expensive. There came an urgent knocking on my door one evening as I was preparing for bed—someone from 3 miles away had arrived and begged me to return home with him at once, as all his valuable specimens were dying one after another for no apparent reason. I couldn't get to the root of the trouble by normal questioning about temperature, etc., and so I went back with him.

Sure enough, his fish were dying. There was a most revolting smell in his fish house which he had failed to notice owing to a bad nasal cold. Floating about in his aquarium were bits of horrible half-rotten lettuce—not a little bit here and there, but great blobs of it.

He had assured me he was giving them the right food. Now he told me that as he had had to go away for a couple of days, he had suspended a whole lettuce in the tank to be sure the fishes had enough green food to last them. He hasn't done it since, and nor, I hope, will you!

#### CICHLIDS



Photo:

Laurence E. Perkins

## FRIENDS & FOES

No. 61

### Water Beetles (*continued*)



*Donacia simplex*, a member of the *Chrysomelidae* (magnified)

#### COLEOPTERA

FAMILY: Chrysomelidae, from Greek *chryso*—gold, and Greek *melos*—limb.

**I**N this family the adults are terrestrial—only the larvae and pupae live in water. The female beetles visit the floating leaves of water plants—lilies, arrowheads, etc., for the sole purpose of laying eggs.

Round holes are bitten through the leaves, the female passes the tip of her abdomen into the hole and presses her eggs evenly round the edges, and then leaves them to hatch. The larvae are more like maggots than the more familiar beetle larvae, and sink to the bottom of the pond. Yet they are dependent upon a supply of free oxygen for existence, and this they obtain in a remarkable manner. Instinctively they make for their food, the roots of aquatic plants, and attach themselves to them. Then into the tissues of the plant they insert hollow spines, probing until they break through into air spaces in the plant, whereupon they, literally, are able to breathe again.

Safe from molestation they feed and grow until ready to pupate. A cocoon is woven in such a way that it covers the outside of the larvae while leaving them in contact with the root air spaces.

In the spring the cocoon is ruptured and the beetle, encased in an air bubble, floats perfectly dry to the surface of the water, breaks the surface and is air-borne immediately.

The beetles are variable in size, according to species, ranging from  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch. Because of their habits the larvae are seldom found, and many aquarists of quite a long experience have never seen them.

C. E. C. Cole

*It is a pity that the large size to which the cichlid fishes grow renders them unsuitable specimens for aquarists other than those with plenty of tank space. The marbled cichlid (Astronotus ocellatus) pictured here is a beautiful member of the family and shows all the interesting behaviour associated with them. It is less ready to breed in aquaria than most other cichlids, but as mature specimens are frequently over 9 in. in length it certainly requires a lot of space before it feels "at home." The eye-spot on the root of the tail fin is a conspicuous feature of the specimen depicted but the photograph does not reveal the bright-red spots that are seen over the head and body*

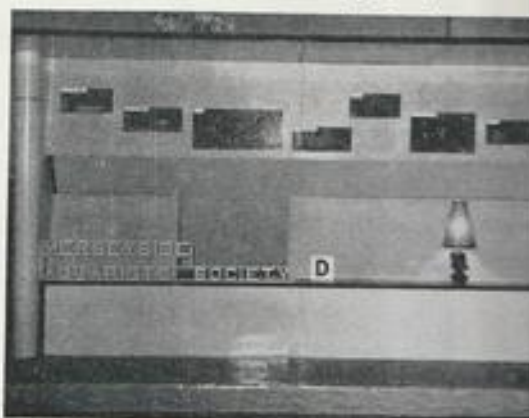
## British Aquarists' Festival, 1957

THE seventh British Aquarists' Festival was held in the Exhibition Hall, Belle Vue, Manchester, last month. The style of the show followed the general idea of the past 2 years and the various clubs set up their own displays and included in these were the pairs of fishes for competition. Fourteen clubs entered and some interesting displays were on view.

Belle Vue Aquarists' Society was awarded first place by public vote and there could be little disagreement with this verdict. Their display took the form of a twenty-first birthday cake to celebrate the anniversary of the Society. The large "cake," on a stand, was very well decorated and appeared to be all pink-and-white icing. It was all very real and the 21 candles around it made a fine finish. In the centre top were the figures 21 in shining silver-like material, slowly revolving. The tanks were inset round the sides of the "cake."

Second prize went to Burnley Aquarists' Society with an old iron-bound sea chest, filled with jewels, pieces of eight and valuable treasure. The padlocked chest was partly broken open to disclose the treasure, and some had spilled out on to the rocks and sand on which the chest rested. Very well-executed rotted holes in the front and ends disclosed the tanks of fishes. This was a popular second.

Third prize was won by Merseyside Aquarists' Society



**3RD** Third prize for artistic display was awarded to entry by Merseyside A.S.

with a very neat display, which looked like a form of shelter, but a table lamp on it dispelled this idea and the visitor wondering.



**1ST** Commemorative of the twenty-first anniversary of the Belle Vue (Manchester) Aquarium Society, this "birthday cake" with its inset aquaria won first prize for the Society



**2<sup>ND</sup>** A derelict "treasure chest" was the setting chosen by Burnley Aquarists' Society for their aquaria entries and was judged second in favour

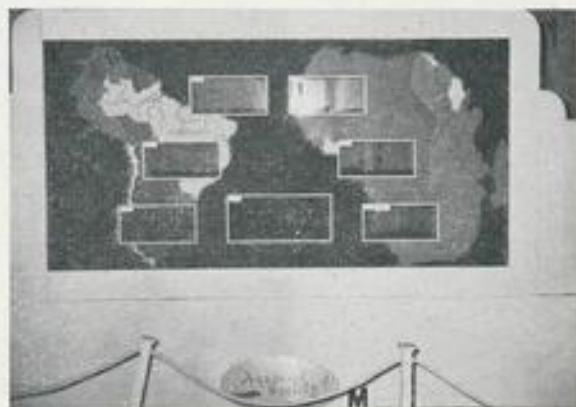
Other scenes were quite interesting and one or two looked very attractive. That of Stretford A.S. was in the form of a train on a viaduct. That of Bury was shaped like a grotto, and a very good effort it was too. Macclesfield A.S. had a large mermaid on rocks with tanks on either side. City of Salford A.S. had a section of a room with a flower bed in front planted with a very healthy lot of cacti and other succulents. Rochdale A.S. displayed their tanks in a very neat and attractive setting, rather formally but nicely done; this was well favoured by many visitors. Birstall and District Breeders' Group showed a very formal display, with tanks inset in a black-covered stand.

Leeds A.S. came up once again with their sunken galleon, but it begins to show signs of wear and is not nearly as attractive as when first shown 3 years ago. Accrington A.S. had a semi-circular stand with a pond in the foreground and a small fountain playing; this was quite a good effort. Ashton-under-Lyne A.S. had a large screen showing maps of South America and South Africa, with the tanks inset; very neat. Bradford A.S. showed their tanks in a rather formal design.

A great deal of work must have gone into the making of these displays and all the clubs entering are to be congratulated on a fine show, which was much appreciated by the many visitors. It must have taken a great deal of time and expense to put on such fine displays and the Federation of Northern Aquarium Societies can be very proud that its members are so keen as to give such an exhibition. Nothing like it has ever been seen in the south and it is

a pity that more aquarists from there did not attend to get ideas for future shows.

There were two novel entries in the Aquascope Section. The winner had a water mill working, rather too fast, and a pretty country scene. The water in front, the mill pool,



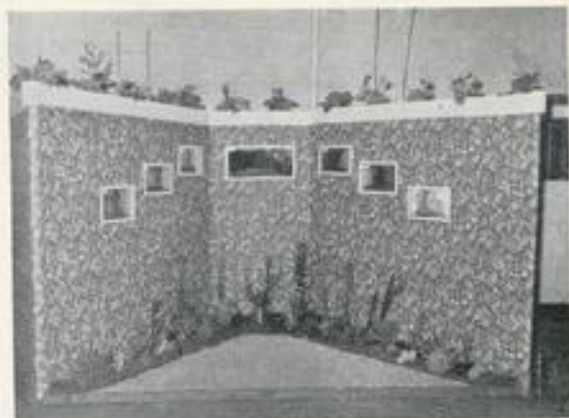
Entry by Ashton-under-Lyne A.S.

held a few small goldfish. A very pretty display, but perhaps the butterflies were out of proportion to the rest of the scene. The other was a model of a water-side scene with a lovely inn, complete with sign. Very nice dwarf trees and plants were included, with a lawn which ran down to the water's edge. More goldfish inhabited the river in front. This was all very attractive and pleased the visitors immensely. The four window boxes at the sides appeared out of keeping with the rest of the display.

The coldwater section of the exhibits was as usual not well supported, but among the veiltails was one small one which was very nice indeed. It had a grand colour which is not often seen in veils these days. It was a pity the other fish of the pair was not up to the same standard, which meant that the pair took second to a better-matched pair, although one of these sadly lacked colour. The pair which took third appeared unable to make up their minds whether they wanted to be fantails or veiltails!

The tropical section held some very good specimens and the red fighter awarded the best fish in the show was a little beauty.

Many dealers had attractive stands, displaying a wonderful assortment of fishes, birds, reptiles and even a coati-mundi. The dealers all reported very good business done,



*Entry by City of Salford A.S.*



*Entry by Rochdale A.S.*



*Entry by Bradford A.S.*



*Entry by Leeds A.S.*



*Entry by Stretford A.S.*

and this is something exceptional, as they rarely "let on."

Judging the scenic displays was done by the visiting public's votes, and this method has its objections. If all the visitors had been allowed one vote each on their admission ticket it would have been better. As it was, anyone could buy as many tickets as he wished for threepence each. They then voted to place the first three clubs in order. The first and second winners stood out plainly and one had only to pick from about three other good entries to be able to forecast the result correctly, for which a prize of £5 was offered. There was nothing to stop any club from buying a large number of tickets and voting for themselves for first prize! As it turned out there were about 30 who forecast the right results and names went into the hat for the winner. The competition was a good idea but the actual judging should have been done as suggested.

The *Aquarist* had a stand on which the 20 prize trophies were displayed, and Mr. A. Boarder and Mr. Raymond Yates were present to give advice to enquirers.



Entry by Macclesfield A.S.

## BRITISH AQUARISTS' FESTIVAL RESULTS

**Best Fish of the Show** (*Daily Dispatch* Challenge Trophy) male *Betta splendens* (92 pts.), Mr. and Mrs. A. Wardle (Bury and District A.S.).

**Class 1A and 1B** (Cassens' Silver Challenge Trophy). Best Society furnished aquarium.  
1. Belle Vue (77 points).  
2. Rochdale (74).  
3. Macclesfield (72).

**Class 2**. Best six pairs of fish (St. Martin's Aquaria Challenge Trophy).  
1. Burnley (503).  
2. Bradford (489).  
3. Merseyside (487).

**Class 3**. Artistic display only (Hammond Trophy).  
1. Belle Vue (904).  
2. Burnley (83).  
3. Merseyside (45).

**Class 4**. Complete display (Walter Smith Coronation Shield).  
1. Belle Vue (650).  
2. Burnley (642).  
3. Merseyside (604).

The following Classes were included in the Society entry in Class 2 (Six Pairs of Fish). Awards have been made to the owner of the fish who is a member of the Society which exhibited the fish.

**Class 5**. One pair of livebearers: any variety

(Fraser-Brunner Trophy).  
1. Mr. D. Jones, Merseyside (85).  
2. Mr. E. Silson, Bradford (82).  
3. Mr. F. Taylor, Accrington (81).

**Class 6**. One pair of coldwater fish: any variety (Belle Vue Silver Challenge Cup).  
1. Mr. J. Annal, Bradford (85).  
2. Mr. J. W. Coupe, Belle Vue (84).  
3. Mr. F. Smith, Accrington (82).

**Class 7**. One pair of cichlids: any variety (National Aquarists' Society Challenge Trophy).  
1. Mr. L. Connel, Merseyside (83).  
2. Mrs. J. Barnister, Burnley (81).  
3. Mrs. A. Ledger, Streetford (80).

**Class 8**. One pair of labyrinths: any variety excluding *Betta splendens* (F.N.A.S. Challenge Trophy).  
1. Mr. D. Chapman, Burnley (84).  
2. Mrs. M. Matthews, Streetford (83).  
3. Mr. D. Hughes, Merseyside (81).

**Class 9**. One pair of barb: any variety (Bland Challenge Trophy).  
1. Mr. and Mrs. A. Wardle, Bury (92).  
2. Mr. J. Whettam, Burnley (86).  
3. Mr. N. Boardman, Belle Vue (83).

**Class 10**. One pair of barbs: any variety (*The Aquarist & Pondkeeper* Silver Challenge Cup).  
1. Mr. J. Hodgetts, Burnley (85).  
2. Mr. K. Denham, Birstall (79).  
3. Mr. J. Annal, Bradford (79).

**Class 11**. One pair of characins: any variety (East Lancashire Challenge Trophy).  
1. Mrs. Horrocks, Bradford (85).  
2. Mr. J. Hodgetts, Burnley (84).  
3. Mr. D. Hughes, Merseyside (82).

**Class 12**. One pair of tropical fish in any other variety than those specified above (Leeds Rose Bowl).  
1. Mr. F. Bewick, Ashton-under-Lyne (82).  
2. Mr. J. Hodgetts, Burnley (82).  
3. Mr. R. Dobson, Macclesfield (81).

**Class 14**. Individual furnished aquaria (Harrrogate Trophy).  
1. Mr. A. Wardle (73).  
2. Mr. J. Annal (61).  
3. No award.

**Class 15**. Individual ornamental aquaria (*The Aquarist & Pondkeeper* Trophy).  
1. Mr. V. Stephenson.  
2. Mr. J. Pettifer.  
3. No award.

**Class 16**. Individual breeders: egglayers (F.N.A.S. Challenge Trophy).  
1. Mr. J. P. Williamson, Salford (82).  
2. Mr. Z. Fic, Accrington (81).  
3. Mr. A. Moss, Accrington (80).

**Class 17**. Individual breeders: livebearers (F.N.A.S. Challenge Trophy).  
1. Mr. W. Leigh, Belle Vue (79).  
2. Mr. E. Whittam, Burnley (77).  
3. Mr. E. Whittam, Burnley (75).

## Economise in your use of Electricity

(continued from page 166)

used only when required. If you are using electricity for space heating, 3,415 B.Th.U. equal 1 kilowatt per hour, so that if the heat loss was 10,000 B.Th.U. per hour then a 3 kilowatt heater would be suitable.

### Aquarium Heat Losses

To calculate the heat loss of an aquarium, make a heat-loss calculation in the same way as for a room, taking the measurements inside the aquarium and not outside. The fact that gravel and rocks are inside the aquarium will not affect the heat-loss calculations as any heat given to a rock is by the water, so therefore the heat will be given back to the water and no difference made. If no overhead heating is used in the form of lights, take the heat coefficient of the surface of the water as 1.5.

To calculate the heat loss and to calculate the minimum wattage of heater needed to heat a 12 gallons aquarium, maintained at 75° F. while the minimum room temperature is 50° F. Assume for convenience that the inside measurements of the aquarium are 1 ft. by 1 ft. by 2 ft. Therefore the area of the sides and the bottom is 8 sq. ft. and the area of the surface is 2 sq. ft.

Then, the heat loss for 1° F. difference =  $8 \times 1 + 2 \times 1.5 = 8 + 3 = 11$  B.Th.U./hr.

But the temperature difference will be  $75^\circ - 50^\circ = 25^\circ$  F. So now the heat loss will be  $25 \times 11$  B.Th.U./hr. = 275 B.Th.U./hr. Remembering that 1 kilowatt = 3,415 B.Th.U./hr., then 1 watt = 3.415 B.Th.U./hr. The minimum wattage of the heater must then be, at least  $275/3.415 =$  about 80 watts.

To sum up, waste not want not should be our motto in all aquarium heating. Use should be made of whatever insulating material we can lay our hands on. The time and what bit of money we spend in conserving heat is never wasted.

## “This Aquatic plant has become Established Here”

by WILLIAM HOWES

RECENTLY, whilst exploring some local waterways I came across a stretch of canal that had its surface completely covered with a floating plant. Like a green mantle, this reached from bank to bank and for as far as I could see. At first, I took it to be duckweed, but after looking a little more intently I decided to go down from the bridge from which I was looking and make a closer observation.

I'm very pleased that I did investigate further, for this abundant surface foliage proved to be fairy moss (*Azolla caroliniana*). Fairy moss is really a native of Northern, Central and Southern America, and I do remember reading somewhere that it has become firmly established in some of our inland waterways.

Obviously, then, this dainty floating aquatic plant is



A stretch of canal completely covered with fairy moss. In this section of the canal the water is still



Photos:

William Howes

The moss-like tracery of the leaves of fairy moss (*Azolla caroliniana*) can be seen in this top view of the plant on the water's surface

quite hardy, and if kept successfully in the aquarium or garden pool a close watch should be kept or its prolific growth will quickly cover the surface like a green blanket. (Hardy it may be, but the small portion that I brought away from the canal, and placed in my pool, soon disappeared !)

However, the fronds or leaves of this plant are quite distinctive, and have a very pleasing effect because of their delicacy and light-green moss-like tracery.

In the autumn the foliage of the plant takes on a russet tint before it dies back until the following spring, when its decorative fronds once more develop and growth again becomes rampant. Although suitable for both tropical and coldwater aquaria, I believe the Federation of British Aquatic Societies recognises it for use only in the competitive coldwater-aquaria class.

Like most floating plants fairy moss makes a useful as well as decorative surface cover for both aquarium and pond, for it provides protective covering for the young fry away from any predatory larger fishes. But once *Azolla caroliniana* becomes established, strict control is necessary or the whole surface will be more than just covered—it will be completely choked !

### Cacti in the Fish House

DO not repot any cactus at this time of the year unless it is obvious that something is wrong with the soil. If this keeps wet long after watering, or much longer than the soil in other pots, it is a sure indication that the plant needs repotting. Although general repotting should not be done at this time of the year, unless the wet pot is dealt with at once it is probable that the plant may die. If too wet the plant should be removed from the pot and it will be found that the drainage has become clogged. This may be through the growth of many roots, which have impacted the soil, or some of the soil may have blocked the drainage hole. When the plant is repotted into fresh soil it may not need watering for some time.

# Making a Garden Pond

by AQUARIUS

**L**AST month the siting and design of the pond were discussed and quantities of the materials (cement, sand and aggregate) needed for the concrete were indicated.

When the materials are being mixed, all the aggregate must receive a coating of cement; if too many gaps are left between the larger stones it will mean that more cement will be needed to fill those gaps. When mixing in the sand it is essential that care is taken to see that no lumps of soft sand are included, as this could cause a pocket without cement and promote a leak later on.

The cement should be fresh and free from lumps; if it is sifted it will be safer. The mixture should be measured and a bucket will do for this. To each bucket of cement use two of sand and three of aggregate. Turn this over about three times so that every stone has a covering of cement. Now add the water gradually from the rose of a water can. Be careful not to wash off most of the cement from the stones but add it carefully until all is of a stodgy consistency. The mixture can now be placed in position.

Cover the base of the pond to a depth of about 5 in. A small pond can be made safely with 3 in. but any fair-sized pond will be better for the extra thickness. It is imperative that after the water is added to the mixture the concrete is laid in position as soon as possible. Concrete commences to set, or "go off," in about 20 minutes unless it is kept moving. This is the reason why it was recommended last month that to have a friend to help at this stage would be a great advantage. The quicker the mixture can be placed in position the better will the finished job be. Pat the mixture down well and smooth off with the back of the shovel. There is no need to use a trowel to make a very smooth surface. If the sides of the pond are to be perpendicular the shuttering must now be placed in position. This is not easy for the amateur, and it will be far simpler

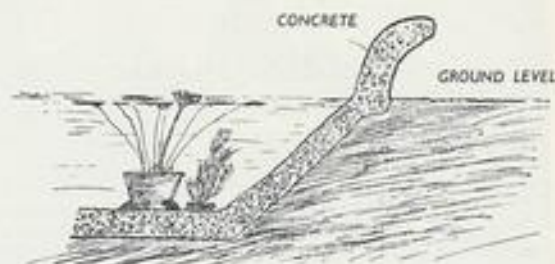
By setting a plant pot in a concrete base it can be made into a stable container for water lilies, etc., in the pond



to dispense with any form of shuttering and make the sides sloping. There is no advantage to be had by making perpendicular sides and sloping ones will be more natural and far less trouble.

Place the concrete for the sides in position as soon as possible and if the pond is fairly large it will be an advantage to incorporate some reinforcement rods, especially at the corners. Old pieces of iron railings or old bed laths will do. Even some strong wire netting makes a good job. This should be worked well into the concrete so that all is covered. When near the top take great care to test with a spirit level to ensure that the finished top will be quite level. When the laying is finished do not allow the concrete to dry out too quickly. Some damp sacks can be used to prevent too rapid a set or a fine mist spray of water can be given occasionally.

If shuttering has to be used see that the parts to come in contact with the concrete are well greased to prevent sticking; some discarded car-engine oil will do well for this job. The shuttering should not be removed before



Sectional view of a fish pond made with a raised edge to keep amphibians and grass snakes away from the water

at least 3 days have elapsed, to make sure that a good set has been obtained. It is possible to lay the concrete in two parts, by using a very coarse mixture first and then floating over with a strong finer mixture on top. This is a good plan when the pond is large and one has to work alone. It is then possible to get the top layer in position quickly. It must be remembered that if any concrete is left for half an hour or more it will start to set, and then the next application will not adhere properly, cracks appearing later on. The top layer can consist of a good mixture of sand (some very coarse sharp, and some finer but not too soft), 3 parts to 1 part of cement. The type of cement known as "Ciment Fondu" is rapid hardening and does not give off as much free lime to the water as other kinds. However, it is quite possible to make a mixture as described with ordinary cement which will hold water if only half an inch in thickness.

Failures with concreting may be due to dirty material, lumps of soft sand or earth in the mixture, stale cement, too much water, insufficient mixing and too long intervals between the addition of a further amount. If one portion of the mixture has been laid and left, even whilst you have a meal, when the next part is added it may never make a good seal. Although it may appear good for some time it will invariably form a crack in the future.

If any pockets for plants are needed these can be built onto the sides before the concrete has set too hard, and if a little of it is cut away to make a better hold it will be an advantage. These pockets are useful but can be dispensed with and all plants set in separate containers to facilitate their removal at any time for pond cleaning or for dividing the plants.

Instead of making concrete pockets on the sides of the pond some large flower pots can have a base of concrete made to them so that they are not likely to tip over when



A raised pond made with walling stone and floated over inside with concrete



in the water. If a shovelful of concrete is placed on a few sheets of newspaper and the pot is pressed into it, after a couple of days to set it will be found that a broad base has been formed which will keep the pot steady and yet allow it to be slid out of the pond for cleaning or other treatment.

If it is intended to make a concrete path around the pond be careful not to make this as an integral part of the pond proper. That is, the concrete path must not actually join the pond concrete or else when a severe and prolonged frost occurs the earth will freeze to a good depth, which will cause it to expand and lift the path. If this is joined to the pond it will probably crack this near the top and a bad leak will occur. It is far better to allow the pond concrete to set and then to lay a path afterwards. If flag stones are made in separate moulds they can be laid at leisure on a base of sand or cinders. If a long concrete path is made there will always be cracks form, after some months, where each mix was joined to the previous one. If no cracks are needed between the flag stones it is possible to lay them in position and, after they

have been well settled in position with a wooden pummer, the cracks can be filled in with a strong mixture of cement and sharp sand; the whole operation can be done in one stage to ensure a good continuous finish.

Once the concrete has set it can have a good wash round and scrubbing with a stiff broom. Water can be allowed to remain in the pond for about a week and then another scrubbing can be given. Another treatment after a week's soaking will make the pond safe. There is usually some free lime from the freshly laid concrete which could harm fishes, but if a couple of good scrubbing are given there should be little danger. The shallow pond is more likely to be harmed by lime as the amount of water in relation to the concrete surface will be much greater than in a deep pond. Once the pond has been well scrubbed and refilled some water fleas and snails can be placed in the water. If these show no signs of dying then the water should be quite safe for fishes. The washing round with an acid of any kind would help to kill the lime, but care must be taken that this is well washed off before the pond is refilled and fishes are placed therein.

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## Gambusia affinis

by ROBERT A. HELLMAN

TO my mind, one of the handsomest of livebearers is the common mosquito fish, *Gambusia affinis*. This fish deserves the attention of aquarists interested in colour variation in fishes, as males in nature frequently display a "marbled" melanistic pattern similar to the one so well known in *Mollisnina sphenops*. Peculiarly, however, this pattern rarely occurs in females. The mode of inheritance of this type is not yet understood.

While I was observing a ditch in Florida recently, not far from Lake Okeechobee, I collected a few of these fish and, after some trouble, managed to bring successfully to New York a single pair, the male a "marble." Though *Gambusia affinis* is a hardy and adaptable species, I was told by a prominent fish geneticist that they are difficult to raise, as livebearers go, because of their aggressive and carnivorous nature. They breed readily, but the females avidly gobble up the babies as soon as they are born. I was, however, able to obtain a large brood of young, and these are now growing rapidly on a diet of meat scraps supplemented with white worms and *Daphnia*. None, so far, has shown any sign of the male's melanistic pattern.

The aggressive nature of these fish makes them untrustworthy citizens for a community tank. My male persistently sneaks up behind other fish and nips their tails. He even makes the stalwart swordtails nervous, though he judiciously avoids contact with my golden top-minnow, *Fundulus chrysotus*.

One feature of the mosquito fish that I like is their manner of fin carriage. They seem to carry their fins more widely spread than most fishes. This is partly an illusion caused by the shape of the tail, which is rather short relative to its vertical height. At any rate, the general bearing of the fish is one of stateliness.

The tolerance of mosquito fish for widely varying conditions makes them good beginners' fish. They can be seen in large numbers in the soft swamp water of the Okefenokee Swamp in Georgia, where the water is tea-red with tannic compounds from oak leaves. On the other hand, they swim happily about residual pools in dried-up

ditches in Florida, where mineral salts must surely be concentrated. The ditches in which these fish are found in Florida are slow-moving and subject to wide fluctuations in temperature, since the sun beats down directly from overhead in the daytime, and the sandy soil quickly gives up its heat in the evening. There is undoubtedly as much as 10° F. difference between afternoon and post-midnight temperatures, though I did not measure this to be sure.

In nature *Gambusia* subsists largely on mosquito larvae (hence the common name "mosquito fish") and other aquatic insects which frequent the swamps and ditches of southern United States. I feed mine on after-meal meat scraps from the dinner table, with white worms, *Daphnia* and mosquito larvae as occasional supplements. They are avid feeders and do not hesitate to drive off other fishes if necessary to obtain food.

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## Deep-Water Haul

MORE than 30 deep-water fishes, many of them thought to be the first of their type caught in New Zealand, were recently brought up from 600 fathoms in Cook Strait. Working from a drifter type launch, members of the Victoria University College team on deep-water research made the catch. "The fishes included numerous specimens of types caught first time in New Zealand," said Mr. J. A. Garrick, one of the team leaders. "There were also two new species of eel which, as far as we know, have not been previously found in New Zealand. Further checking will be done to find out if they have been caught previously elsewhere in the world," he said.

The fishes were caught on a deep-water set line with 75 huge hooks which had been laid on a slope of the under-water canyon which enters Cook Strait from the Pacific. The haul included five Plunket sharks, dark-brown, spiny-skinned creatures with green eyes, some more than 5 ft. long. New to New Zealand were two species of shark (among nine caught), jet-black and of varying length, with phosphorescent patches along their undersides. No-one yet knows the real use of this submarine light, said Mr. Garrick, who is a zoology lecturer at the College, under the leader of the team Professor L. R. Richardson. Study was continuing into the uses the fish make of their lighting powers, he said. Included in the haul were 17 different species of the unlovely parasitic eels, attenuated sucking-mouthed creatures which live by eating the living flesh of other fishes.

# White Spot in Goldfish Pools

by N. E. PERKINS

**A**LTHOUGH coldwater fishes do not seem to be so subject to white spot (ichthyophthiriasis) as tropicals this is not really quite true. What actually occurs in most instances is that, owing to the lower temperatures at which the coldwater fishes are maintained for the major part of the year, the life cycle of the parasite is greatly slowed down, whilst the fairly constant replenishment of water which occurs with coldwater fishes (owing to their larger bulk with consequent larger appetites and heavier excretion) tends to remove the parasite before harm is done.

Fishes may frequently be seen carrying the odd white spot or two and this requires only a rise in temperature in the confined space of an aquarium for the fish and any others present to become smothered in under a week. It must be clearly understood that the following remarks apply only to coldwater fishes, since with many tropicals their small bulk renders them liable to toxæmia if, when heavily infested, they are not dealt with quickly and thoroughly. Whilst the same methods as are about to be outlined could be applied, they would prove troublesome owing to the necessity of maintaining fairly constant temperatures in odd-sized vessels, the raising of the temperature to 85° F. being required to speed the life-cycle of the parasite.

Over the years various remedies for white spot have appeared and have been hailed as wonder-cures; in most cases, however, the control chemical requires very careful usage whilst, without doubt (with the possible exception of methylene blue) all have a weakening effect upon the fishes. Before attempting any cure a reasonable knowledge of the disease is required so that we may know precisely what we are up against. Whilst white spot cannot occur without the presence of the causative protozoan, it is known that although the parasite be present, all fishes will not necessarily contract the complaint, showing that a natural resistance by the fish is possible and that a fall in resistance is necessary to allow the inroad of the parasite. From this it would seem evident that any additional weakening of the fish such as is caused by chemicals is to be avoided, for the pattern of disease is such that loss of resistance is the first requisite. It is of little satisfaction to be rid of one complaint only to be afflicted by another which may possibly be more serious. *Ichthyophthirius multifiliis* may be introduced into ponds and aquaria by many means, such as the introduction of plants, the use of live foods from waters inhabited by fishes, from cans and fish containers borrowed from other aquarists and, in fact, by any action which entails wet material from a strange source coming into contact with water of the aquaria or pool.

It is commonly, but erroneously, imagined that British freshwater fishes do not naturally suffer from white spot. The truth of the matter is that under natural conditions this parasite barely holds its own owing to the larger quantities of water, the higher resistance of the inmates and the unfavourable temperature for rapid increase. Freshwater fishes may quite frequently be found carrying a few typical white spots and, if these are confined to an



Photo:

Laurence E. Perkins

Uncoloured metallic veiltail goldfish  
infested with white spot

aquarium or small pond, they will in a short time exhibit the characteristic infestation which aquarists know so well.

The life cycle of the parasite consists of a feeding stage in the skin of the fish and a multiplicative stage which occurs on the bottom of the aquarium or in attachment to the plants (after the shedding of the mature feeding stage by the rupture of the white spot). The new free-swimming forms number many hundreds, produced from one mature specimen by rapid division of the cells. Although it is commonly believed that this free-swimming form must find a fish as host or perish, there is also reason to conclude that an encysted resistant form is produced under certain conditions to enable the parasite to bridge difficult periods. The point of this article is to show that it is not only possible to eradicate this menace without the use of chemicals, but that it is beneficial in the long run so to do.

I have a pair of ornamental pools, connected by a waterfall, which had been thoroughly infested with this parasite during the very warm weather; moreover, on investigation it was found that all aquaria had become likewise infested. Normally a fish breeder would not allow the complaint to reach these dimensions, but in this instance, owing to the fact that the ponds had only recently been completed and to the general chaos caused by moving to a new house scarcely overcome, the fish had been rather neglected. It might be as well to point out that new ponds, with the subsequent greenness of the water, can cause gaseous embolism which, while not fatal, does lower the health of the fish—in some cases causing severe damage to the fins. This, I imagine, was primarily responsible for the rapid development of the disease, for I had experienced a troublesome time during the early warm spells, fish frequently being found with their caudal fins blown up with gas bubbles and floating head downwards at the surface. This trouble was overcome by the introduction of sufficient aquatic plants and lilies to prevent the rapid development of the algae responsible. However, the method of cure for the white spot was as follows.

All fish were removed from the pond and housed in aquaria, the water in these being completely changed daily. Commencing with the most valuable specimens, the fish

(Please turn to page 188)

## COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I am having great difficulty in trying to re-glaze a tank, 24 in. by 18 in. by 12 in., and would be glad of some advice: (1) How soon should the tank be filled? (2) How soon can fishes be introduced? (3) How do I stop putty being forced from between the glass and frame?

When to fill the tank with water will depend on the type of glazing material used. If it is putty or similar material the tank can be filled as soon as the glazing is done. If some form of bitumastic glazing compound is used it will probably be better if 2 or 3 days are allowed to elapse before filling. The point is that this latter takes longer to set and in fact keeps somewhat pliable for long periods. If putty has been made up too soft the same would apply. Fishes should not be introduced into a freshly glazed tank until it has been standing with water for a week and has then had a good clean out. Also it is far better if you can control your enthusiasm and refrain from putting fishes in the tank until the water plants have had a chance to get settled. I expect my advice will not be taken, as I know only too well from experience that as soon as a tank is glazed and filled with water the owner wants to set it up and get fishes into it in 5 minutes! Then when the fishes die or do not look comfortable the owner wonders why it is. To stop the putty from being forced from behind the glass use putty of the right consistency. If it is too soft most of it will be squeezed out when pressure is applied to the glass. There should always be a certain amount of putty between the glass and the frame, and to try to force out most of the putty is a great mistake. A full eighth of an inch layer should always be left, and a little more than this will prove safer.

I am moving to a new house and propose to make a garden pond there. The back garden has too many fruit trees in it and so I shall have to make it in the front garden. It will be exposed to all the sun. Will this make the water too hot to be safe for fishes?

The pond will be better in the sunny position than under or near trees. It is always better to place the pond where it can get plenty of sunshine. You can easily provide some shade, if you think it is getting too much sun, with surface plants. If a water lily or two can be planted the leaves will give all the shade necessary by the time the sun gains enough power in the year to warm the water too much. You cannot increase the amount of sun a pond receives if placed in an unsuitable position but you can provide shade.

Is it possible to use bricks for building a pond?

Bricks can be used for building a pond, especially where it is to have part of the structure above ground level. The bricks will have to be floated over with a strong cement-and-sand mixture, and this can be a more difficult task than making an ordinary concrete pond where the sides have a slope. It is when you try to get the mixture to adhere to a perpendicular surface that snags may arise; the important procedure when brick-laying is to rake out the joints as much as possible so that a good key is provided for the cement mixture. All bricks must be well covered or there will be the danger from crumbling after severe frosts.

I would be grateful for some information on paradise fish: Can they live in cold water all the year round; what is the lowest temperature they can withstand; what is the smallest size of tank they can live in and at what time of the year would they breed?

Paradise fish can live in cold water all the year round. I have kept them when there has been ice on the water. When the temperature dropped to below 38° F. the fish laid on the bottom on their sides but soon recovered when the temperature was raised slightly. Mine thrived in an unheated tank in a living room and bred there with no trouble.

These fish can live in a smaller tank than many kinds as they are able to take in oxygen from the atmosphere if the oxygen content of the tank is insufficient for their needs. In warm weather the fish will come to the surface for a gulp of air far more frequently than they would in colder weather, owing to the difference in the oxygen content. On the other hand I do not think it fair to try to keep fishes as large as these in tanks smaller than, say, 12 in. by 10 in. by 10 in. The fish would breed when the temperature of the water rose to the seventies, which it is bound to do in a room where there is some sun in summer. There seems to be a lack of coldwater paradise fish about these days, but if tropically bred fish are obtained in the warmer parts of the year they could soon become accustomed to unheated water.

I have a chance to buy a pond and a disused wharf. Would it be a good proposition to buy the water for the purpose of breeding fishes and growing water plants for sale, and should I be able to get a good return for my money?

The amount you mention for the purchase price would not be all that you would have to find to make a start with your project. You would have to make quite a sizeable outlay on a good stock of water and marginal plants to be able to issue a list for sale. The fishes might not cost so much as there is the possibility of breeding many from a few. However, there are other snags. Unless you have had plenty of experience at breeding and rearing fishes you may not get any returns from your venture for a long time. Then there will be the difficulty of catching and sorting fishes. Unless you have the means of emptying the ponds each year it may be very difficult to catch the fishes. Some divisions would be necessary to enable you to keep the various varieties and species apart. It is also almost impossible to be able to grow water plants unless you have parts of the pond fairly shallow and where you are able to wade in to divide and replant. Rather narrow ponds which can be easily worked are the best, so that the plants are never out of reach. To breed any variety of goldfish in an open pond is not a very good proposition in this country. We do not get enough sunshine to encourage the quick change of colour, and therefore you would not be able to compete with continental suppliers. If you can afford the outlay to purchase do so by all means and make the project a hobby, then when you retire you may be able to supplement your pension with some sales of fishes and plants.

Do you think that there is any danger from infection of polio to children from a garden pond?

Certainly not. There is less danger from polio virus in your garden pond than there would be in any crowded building. You have no need to worry on that score.

I have a tank 6 ft. by 18 in. by 12 in. glazed with  $\frac{1}{4}$  in. plate glass. I would like to make a coldwater tank 6 ft. by 2 ft. by 15 in. wide. Would I require  $\frac{1}{2}$  in. glass?

The glass for your tank should be  $\frac{3}{4}$  in. thick, especially for the base and sides. The ends could be  $\frac{1}{2}$  in. plate as the area is much less. The larger the unsupported area of glass the stouter must the glass be. You will have to have a couple of cross pieces of metal across the frame to prevent bending or whip. A piece down the centre of each side would tend to make for greater strength and give support to the glass. When the glass of a tank is insufficiently supported and the tank is filled with water there is always the danger that a crack will occur if a jar is given to the tank.

I have been losing some of my fish lately. They seem to waste away and have difficulty in swimming. They appear to eat a little but it does not make them get any stronger. What is the reason for their deaths?

The cause of death of a fish is always difficult to determine without detailed information. If a post mortem could have

been given to the fish it would have been far easier. In the first place the wasting of a fish is not often due to under-feeding. Fishes can go long periods without artificial feeding in an ordinary set-up tank with water plants therein. If left for weeks on end you would not be able to notice any wastage in their bodies. Any wasting of your fish is probably due to disease or pests. The fish may have some form of tuberculosis or they may have some internal parasite. Surface attacks on the body, by such pests as flukes, could cause the trouble. Some of these parasitic pests are invisible to the naked eye. It would be a good plan to give the fishes a bath in a Dettol solution and to sterilise the tank thoroughly. A strong solution of the Dettol could be used for the tank when it is emptied of fish, but the wash for the fish must not be very strong. Various mixtures are used, from a teaspoonful to a quarter-teaspoonful of Dettol to a gallon of water. I have known a teaspoonful to be used in a quart of water, but the weaker solution is the safer for anyone not used to treating fishes; the whole operation depends on the length of time the fish is immersed. In the stronger solution only 15 seconds should be given, whereas in the weaker solution 15 minutes may be given. Watch the fish in the solution and remove it as soon as it turns over. When first immersed the fish may dash about and breathe far more quickly, then it will remain almost motionless but still breathe quickly. If it turns over then it must be removed to fresh water, when it will soon recover. This treatment will cure a fish from fluke troubles but make sure that once the fishes are treated they are not returned to an infested tank. Once the fishes have had the treatment they can be offered live foods soon after they have settled down. They will soon get back to normal once they start feeding again.

Some rust is forming on one of my tanks and is falling into the water. Will this harm the fishes?

A little rust in the water is not likely to harm them. It should not have been allowed to form, however. If you have a cover glass this should be supported in some manner so that the glass is not in actual contact with the metal frame. If it is so placed and supported by a hook at the back of the tank the condensation water will drip back into the tank and allow the top of the frame to remain dry. Scrape off all the rust down to clean metal and paint with one of the galvanising paints first, and finish with ordinary hard-gloss paint.

Would it be possible to obtain a piece of raw meat and place it in the air to get maggots to form there for feeding to my fishes? If this is possible and safe it would be a great help to aquarists like myself who live in towns without a dealer to supply live foods.

It is quite possible to breed maggots for fish food in either meat or fish. The maggots make a good food but it is better to break the larger ones before feeding to small fishes. The reason why more aquarists do not use these methods is that it is practically impossible to breed maggots without the medium smelling badly, and unless you were able to keep the box well away from the house there may be cause for complaints. I consider that it is far easier to breed white worms, in or near the house, for this method is without any annoying smell. Some damp peat in a strong box, concrete is the best, will hold a quantity of worms which can be fed on damp brown bread. Several boxes of the same size can stand one on the other and take up little room.

I have been feeding my fishes on chopped garden worms and find that after feeding there is an oily film on the top of the water. Will this stop the air from passing through and oxygenating the water?

The film on the surface is not likely to interfere to any great extent on the aeration of the water. The film can

easily be removed by drawing a sheet of newspaper quickly along the surface of the water.

I have a coldwater catfish which prefers live foods and does not appear to touch dried foods. I have never kept catfish before. Is this fish normal and what kinds of water plants do these fish prefer?

I think the catfish would eat dried foods if it was not fed on live foods. After all, most aquarists keep catfish as scavengers and if you have to feed yours on live foods it is not likely to be able to do its main task of helping to clear up uneaten food. I do not think that the catfish would care two hoots what kinds of plants were in the tank, so you can please yourself about them.

I have a small out-door pond which contains a mixed lot of fishes (goldfish, tench, rudd and orfe). There is plenty of room for them and they appear healthy. Lately I have noticed on two or three a whitish hue round the mouth: in fact it seems almost luminous. This appears to be the only part affected. Can you please say if it is a disease and if so how can it be treated?

I cannot recognise this as a disease unless it is fungus. Some fish develop fungus round the mouth and if you can catch an affected fish and place it in a clear-sided tank it may be possible to examine it more closely to determine whether it is actually fungus or not. If you catch the fish and examine it out of water the fungus, if such it is, would not perhaps show up at all. If the whiteness appears to be a kind of film then suspect a form of fungus. A salt bath would not do any harm and might do much good. Many species and varieties of fish get rather white round the mouth as they age, and so there may not be anything actually wrong with your fishes at all. If they eat well and appear otherwise healthy there is little to worry about.

I have just completed a garden pond and would like to know if I can keep frogs and lizards in with fish, and if so should I provide them with a place to bask out of the water?

You cannot very well keep lizards and frogs in your pond. Lizards live only on land; the newts you may be mistaking for lizards belong to the Amphibia (living on land and in water), whereas lizards belong to the Reptilia (crawling on land). The newts enter and remain in water only long enough to breed, and once their egg-laying has ceased they leave the water until the following spring. Frogs and toads also come to the water to breed and leave afterwards. Many frogs like to stay in or near a pond during the summer and if you can provide a place for them to rest out of the water it will be appreciated. The newts will not come out of the water whilst breeding and when they do eventually leave it they are not likely to return until the following year.

Can I obtain a paint harmless to fishes with which to cover the inside of my new pond?

I am often asked such questions and cannot understand why anyone should want to paint the inside of a garden pond. If made with concrete it will soon mature and take on a brownish-green appearance. Certain algae will form and no matter what paint was used on the concrete this would soon be hidden by the algal growth. I know that plain concrete may not look right at first, but it is quite impossible to construct a pond and set it up and have it looking mature and natural in 5 minutes. All newly made ponds will take some time, generally a few months, to become really established and natural in appearance. This is not so unusual, after all, as one would hardly expect to make a large herbaceous border in the garden and get it looking well in a day or two. There are, of course, paints which can be used for the insides of ponds, especially the bituminous types. These are black as a rule and are for water-proofing. However, a black pond does not look too nice and if a concrete pond is correctly made it should not need any water-proofing agent added to the surface.

# our readers

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.

## Proud Society

IN an endeavour to arouse interest in our hobby and increase the membership, the above Society held an Exhibition of tropical and coldwater fish at The Royal Albert Memorial Museum, Exeter, this year.

Along both sides of the hall 70 tanks displayed 2,000 fishes, consisting of 35 species of tropical fishes and 15 varieties of coldwater fishes and goldfish. On the stage a furnished room was set up to show the position of a community aquarium in the home. The centre piece was a flower garden surrounding a pond, complete with fountain; at strategic positions equipment, foods, lectures, etc., were placed.

It was originally intended that the show should be held from 20th to 24th August, but owing to the interest shown, and by the request of the public, it was extended until 31st August.

As you are aware, to organise such an Exhibition involves much hard work and concentrated effort and the members concerned are well pleased with the results obtained. They consider that their efforts have been well rewarded by the following points: (a) 6,422 people attended the show; (b) 39 new members joined the Society (more than doubling the existing membership); (c) £7 6s. 9d. was donated by the public towards the purchase and installation of a furnished tropical aquarium in one of the local hospitals; (d) the number of queries asked by the public on many aspects of fish keeping and breeding; (e) congratulations from many people regarding the show in general.

In conclusion, I can say that all concerned are very pleased that their first effort was very successful, and it is intended to make this show an annual one in future.

F. PRESTON, *Show manager, Exeter and District Aquarists' & Pondkeepers' Society*

## Young Cuttlefish

I REGRET that I have to add a postscript to the story of the cuttlefish that hatched in my marine aquaria (*The Aquarist*, September), as they have now all died.

All went well with the 25 I kept, until they were about 4 weeks old, but in the fifth week they started dying at the rate of five or six a day, despite a complete change of water, and at the end of the fifth week there was only one left. I do not know the cause of this sudden decline, but round every dead or dying cuttlefish was a swarm of some species of copepod, which I half suspect were of parasitic nature, although they could have just been feeding on the dead cuttlefish.

The sole survivor, moved to a smaller tank, settled down and looked like it had escaped whatever had happened to



# write

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

its fellows, until last week when it decided to explore the circulation system of my tank and was caught in the inlet, where I found it dead. The last cuttlefish measured about 18mm. when it died, having grown from 6 mm. in about 7 weeks. So, I am sorry to say, ends the tale of the cuttlefish in my tanks, at least for this year!

J. P. BROWN, St. Leonards-on-Sea, Sussex

## Tea for One

IN *The Aquarist* (March-April, 1956) one of your correspondents suggested the use of tea as a water conditioner. I wonder if any of your readers have had any experience with tea for this purpose, and how does it compare with peat?

N. MACLEOD, Hereford

## Tropical and Coldwater Groups

I THINK that many readers would agree with the view that there is growing up within clubs a wave of discord and apathy, which in my opinion is inevitable due to the turn the hobby has taken during the last few years. I refer, of course, to the division of interest between the tropical and coldwater enthusiasts. Any club official will admit the immensity of the task to hand of catering for a number of individuals, who for the most part are divided into two sections. This is only made more difficult if the club, as so many are, are trying to exist on a subscription rate formulated ten years ago. The latter, of course, enforces the club to attempt to increase its income by other means, and the result is a rather poor replica of that admirable institution, the "Working Men's Club."

This sort of thing does not attract the genuine lover of fishes. He expects to be able to hear, and talk, about fishes, and not to be harried from all sides by officials with raffle tickets and the like. But again, what if the speaker is an ardent devotee of *Betta splendens*, and the listener is a breeder of the goldfish? That is the problem. The only solution that I can see is the formation of specialist groups within the club, each with its secretary to look after the interests of each one. This would satisfy the desires of the coldwater devotees at least, who, in my opinion, have had a raw deal in the past. However, the idea would only be practical, if, at the meeting, club business was kept to a minimum, to enable the groups to go into session.

EDWARD KNIGHT, Southsea, Hants.

## South Africa Calling

MY wife and I are both very taken up with *The Aquarist* badges, and are most eager to have them. We are keen fish breeders, specialising in lyretails (*A. australe*) and

quite a few of the *Rashora* varieties. We are also rather lucky in being able to have access to a great variety of plants, except the new water wistaria that you have in England. Madagascar lace leaf is obtainable in abundance over here.

As we find keeping fishes a rather fascinating hobby, we are wondering whether you would be able to put us in touch with other fish fanatics, with a view to exchanging hints and comparing notes.

We find *The Aquarist* most helpful and always look forward to obtaining it from our one and only local aquarium which has recently closed so that we have now to place a subscription order to ensure getting it regularly.

F. R. BULLARD,

Glenville, Drogheda Road, Wynberg, C.P., S. Africa

### New F.N.A.S. Secretary

AT the last Council meeting of the Federation of Northern Aquarium Societies Mr. T. R. Lee was appointed secretary to replace Mr. G. T. Iles, who as announced earlier has resigned to take up an appointment in Canada. Mr. Lee was a founder member of the Belle Vue Aquarium Society in 1936, has served on the committee for many years and is in his fifth year as chairman of that Society. He has also been actively connected with each British Aquarists' Festival that has been held as committee member, as chief steward and, this year, as organiser.

### Retirement of F.B.A.S. Secretary

AFTER 11 years' hard work for the Federation of British Aquatic Societies, as its secretary, Mr. R. O. B. List has decided to retire. Anyone who has had any connection with the F.B.A.S. of any kind will have been impressed with the efficiency with which Mr. List has discharged his numerous duties as secretary, and in fact it is hard to think of the Federation without him.

### Cacti in the Fish House

THE cactus known as the Christmas cactus (*Zygocactus truncatum*) must have some water now, and it should be kept in an even temperature out of draughts or the flower buds will drop off. Any *Lithops* or *Couophyton* should still receive a little water, but once any seed pods on *Lithops* have completed their growth water should be withheld and not started again until the old skin of the plant has almost dried up.

### PICK YOUR ANSWER

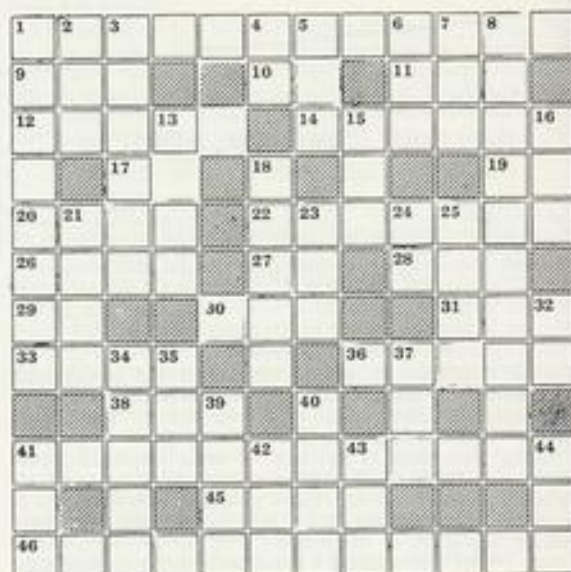
- Anabas testudineus* (the climbing perch) was originally referred to the genus: (a) *Belontia*; (b) *Channa*; (c) *Ctenopoma*; (d) *Percia*.
- Sphaerichthys ophrymionoides* (the chocolate gourami) reaches a length of about: (a) 1½ in.; (b) 2½ in.; (c) 3½ in.; (d) 4½ in.
- Hyphessobrycon alvarezi* is native to: (a) Bolivia; (b) Chile; (c) Columbia; (d) Paraguay.
- Tetragonopterus chalcus* was named by: (a) Agassiz; (b) Bloch; (c) Linnaeus; (d) Pallas.
- The genus *Pihlalaria* (pillwort) is represented by: (a) three species; (b) six species; (c) nine species; (d) 12 species.
- Which is the smallest of the following species of ramshorn snails? (a) *Pilatorbia carinatus*; (b) *P. contorta*; (c) *P. nautibus*; (d) *P. spirorbis*.

G. F. H.

(Solutions on page 188)

## The AQUARIST Crossword

Compiled by J. LAUGHLAND



### CLUES ACROSS

- Small and beautiful "bubble nester," great favourite (5, 7)
- Tree for the English bow (3)
- Golden (2)
- Eggs (3)
- "The doctor fish" (5)
- Encourages (6)
- It included the Khyber Rifles, begad! (1, 1)
- Depart (2)
- Don't depress, an old one makes a useful tank (4)
- One of the tougher members; maybe Jack Dempsey (7)
- Perhaps a tank could be so-called, yet one thinks of bars rather than windows (4)
- This sea (1, 1)
- Place where food is stored (5)
- and the result of too frequent visits to it (2)
- A drink costs Alec a hundred (3)
- Sire (3)
- Fish only, you see (4)
- Young river salmon when blue-backed and silver (5)
- Organ of balance in fishes (3)
- lithonastic fan (4, 8)
- It comes back to this in a nutshell, this monarch of marine game fishes (4)
- This leeri is the mosaic gourami (12)

### CLUES DOWN

- The most rapacious of the British aquatic beetles (8)
- Small naturally for a Scot; perhaps rather arch from the English (3)
- Useful sort of shade for tank subject to strong light (6)
- See 19 Across (2)
- Whale (3)
- Fish eggs (3)
- Roman salute (3)
- A grim snail (anagram) (10)
- Cherry, cattle or even fish (4)
- A small ad. with this for this legally (2, 3)
- Clump of grass (3)
- Armour plate for a fish (5)
- "Ah, —, the pity of it" (*Orhells*) (4)
- Another name for orfe (3)
- Pencil grade (1, 1)
- Place for upset idol? (4)
- Just a small debt (2)
- 46 Across and this for mosaic gourami (5)
- Bring forth young (3)
- Male sheep returns to spoil (3)
- Early, soon. Rather less (4)
- The thing that prevents the water from running out of the bung-hole (4)
- Equipment (3)
- The status this is the state in which (3)
- Body governing British athletics (1, 1, 1)
- Rot may return to a height (3)



## from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 5th of the month preceding the month of publication.

### AUTUMN NATURE EXHIBITION

**T**HE Royal Photographic Society's Annual Autumn Exhibition of Nature Photography will be opened at 16, Princes Gate, London, S.W.7, at 4 p.m. on Thursday, 25th November, 1957, by Mr. David Attenborough, after which it will be open to the public until Friday, 20th December, from 10 a.m. to 7 p.m. each weekday, Saturdays to 5 p.m., but closed on Sundays. The exhibition will consist of prints, transparencies and stereoscopic work, in monochrome and colour. A special feature of this year's exhibition will be a panel of prints by Mr. Oliver Pike, an honorary Fellow of the Society, who this year has reached his eightieth year and his fiftieth year of membership of the Society. Mr. Pike is generally acclaimed as the doyen of nature photographers. After the London showing, the whole exhibition is to go to Exeter, where it will be shown from 6th January to 1st February, 1958, in the Royal Albert Memorial Museum, Exeter.

### BRITISH AQUARISTS' STUDY SOCIETY

**T**HE first annual conference of the British Aquarists' Study Society, held at the London Zoo last month, was said by the secretary Mr. J. R. Edwards to be to some extent a "coming of age" for the "baby" he had fostered. In speaking of the past, present and future of the Society Mr. Edwards said that the fact that the conference was taking place in such respectable surroundings was an indication that the Society had been accepted as a serious organisation devoted to the study of aquarium-keeping. Members and guests enjoyed films shown by Mr. Lynn (Nottingham) and Dr. F. N. Ghadially (Sheffield) and, after a meal, spent the evening in the Zoo's Aquarium. Dr. Gwynne Vevers, its curator, described the exhibits and the work of the Aquarium, and members were particularly fortunate in seeing the recently hatched octopus and their mother closely attending the remaining eggs. During the conference Mr. R. G. Mealand, well known as a judge and supporter of the hobby for over 20 years, accepted the presidency of the Society for one year. Dr. A. Pearlman (Folkestone) was chairman at the conference.

**B**OTH the secretary and treasurer spoke of the progress of the **Yeovil and District Aquarists** during the past year when the fourth annual meeting of the local Aquarist Society was held. It was stressed, however, that there was need for increased efforts in the coming year to offset the rise in costs of running the society.

Mr. N. C. Stainer was elected president for the fourth successive year, and other appointments were: Chairman, Mr. R. Stone; vice-chairman, Mr. A. Dominy; secretary, Mr. M. Elliott; treasurer, Mr. S. Langdon; show manager, Mr. B. Stidson; committee, Mr. V. Collins, Mr. D. Wood, Mrs. Duff and Mr. D. Yates.

**T**HE annual general meeting of **Kirkcaldy and District Aquarist Society** was held in the club rooms at Bethelfield Place. New officials were elected and a working committee was formed. The society are looking forward to a good season when it is hoped to have talks by prominent speakers on all aquarium matters (both coldwater and tropical). The membership list has been reduced to 10s. a year and an appeal is made to old members in particular, to

attend any Wednesday night. The shields for most points in table shows and in breeders class (egg-layers), were won by Mr. Heddiey and Mr. W. Henderson respectively.

**E**NTERING a competition for the first time in their two years' existence, **Selby Aquarist Club** members with a furnished tank of tropical fish gained second place in the Leeds fish show, open to clubs throughout Yorkshire. They were beaten for first prize by half a point.

**W**ITH both societies well represented, **Forest Hill Aquaria Society** won their inter-club table show return match with **Cardford A.S.** at The Men's Institute, Holbeck Road. Both teams displayed some successful entries—each determined to widen the margin of points gained at the first contest, when **Cardford A.S.** won 28-26.

There were five classes on the programme including Barbs, Danios, Rasboras, Labyrinth/Livebearers and A.O.V. tropical fish.

**W**HEN Dr. F. N. Ghadially gave his talk at Hornimans Museum, Forest Hill, at the beginning of October he pointed out that it was difficult to speak before an audience of both aquarists and general public. He solved the problem quite effectively by summing up the various types of breeding methods adopted by the main species of fish and in particular drew attention to the very interesting habits of the cichlids.

He showed his well-known film "Breeding the Brown Acara," and followed by screening a

film showing the spawning of Angels and Tiger Barbs. The Angels were clearly shown depositing and fertilising the eggs. Other scenes illustrated various types of fish foods—one episode must have shaken some of the audience, for close-ups included the beholding and "squeezing" of a grub.

Aquarists asked a few questions at the end of the talk, one point of interest being the suitability of "Sheffield water" in the breeding of tropicals.

**R**EALISING that interested fishkeepers not already members of societies might well be present at this public lecture, members of the **Brockley Breeders Circle** sought and obtained permission to issue handbills at the door—offering another free talk to the audience, to be held in a local L.C.C. school. A number of people took advantage of the offer, mainly to the advantage of the sponsoring circle in the end for six new members were eventually gained.

Owing to recent trends and enquiries, the circle have added "and District" to their title and have extended their activities to the encouragement of fishkeeping in local schools and hospitals.

Secretary H. J. Vosper (after almost 12 months disability due to the fairly fashionable "slipped disc") has recommenced the policy of providing speakers for local organisations. The most recent effort was to four classes of a day-school in Camberwell, when live crabs, etc., illustrated a talk on rockpool creatures. A return booking on the subject of tropicals was made. The group also hopes to gain the help and co-operation of local councils in order to run a short series of public lectures and demonstrations.

**A**T the last meeting of **Northampton and District Aquarist Society** members were entertained by Mr. F. C. Karitzky, who gave a talk on "Aquarium Plants" followed by over 90 slides on plants which he explained in detail. Prizewinners in the table show for annabandids were: 1 and 2, Mr. J. Dakin; 3, Mr. J. A. Catterall; Mr. G. Pulley was judge.

Home aquaria competition winners were: Tropical, 1 and 2, Mr. N. E. Lyon; 3, Mr. J. A. Catterall; Coldwater, 1, Mr. W. H. Snedker; 2, Mr. T. Dascombe; 3, Mr. J. A. Catterall; Mr. S. Simons of Kettering Society was judge.

**A**T the October meeting of the **Dundee Aquarium Society** in addition to the breeders table show talks on breeding were given by Mr. P. Greening and Mr. F. Ripley.

**R**ECENT activities of **Glenrothes and District Aquarist Society** have included a quiz and a talk by Mrs. McPherson, who's one of the members. A teacher of biology, Mrs. McPherson spoke about "Ph and Infusoria," a talk which was enlightening to the members on these debatable subjects.

**A**T the annual general meeting of the **Medway Aquarists Society** a building fund was started for the erection of a club house, and the committee also reported an increase of the balance in hand. A breeders class table show was also held. Among other recent events have been an illustrated lecture by Mr. Edwards on "Foods and Feeding" and an aquarium gadget display where members displayed gadgets of their own making.

**A** NEW society has been formed in Workshop called the **Workshop Aquarist and Zoological Society**, and the hon. secretary is Mr. Albert M. Deakin, 14, Canal Road, Workshop, Notts. Meetings are held alternate Sundays at 7.30 p.m. at the "Newcastle Arms," Carlton Road, Workshop, and new members will be welcome.

**A** R.B.C. television film unit has been working at Paignton Marine Aquarium recently filming shots of underwater life. Among the forms of marine life recorded were sea anemones, hermit crabs, crawfish and octopus.

**A**MONG the forthcoming events in the **Nottingham and District Aquarists' Society** programme is a film show on the 26th November. This is being presented by Mr. H. P.



## The Aquarist's Badge

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

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

Lynn and Mr. B. Inman, and the following Australian firms have been obtained for this show: "Arnhem Land," "Croc. Hunter," "Fine Feathers," "Fighting Fishes," and "Birds and Billabongs."

TWO features made this year's annual show of the **Federation of Guppy Breeders Societies** very satisfactory indeed: firstly, representation at the show by all the 16 member sections and secondly, a total of 152 entries from overseas exhibitors, which amply returns support given to the D.G.G. (German Guppy Group) at their International Show at Frankfurt last month.

Very popular winner of the Open Challenge Cup for the best fish in the show was Mrs. I. D. Smith of Colindale (North London Section) with her very fine cofertal male. This is the first time that the premier award has gone to a lady member of the Federation, and adds yet another to Mrs. Smith's long list of successes—she recently became the first lady to win a gold pin.

Best female was a fine coloured female shown by Portsmouth show secretary George Elverson, while the Brossian Cup for the best breeders exhibit went to Mr. G. Russell of Dagenham (Eastern Counties Section). Mr. A. Abrahams of Bedford, crowned an extremely successful season by winning the Pavitt Shield for the best exhibit by a provincial member with his class-winning doublewood.

Eastern Counties Section had the highest aggregate of points with 107, North and South London Sections sharing second place with 42 each. The 28 points gained by Mr. R. Forest-Jones of Basingstoke made him the most successful exhibitor and gave his section an average of 1.25 points per entry to place them first in this classification.

The International Class as arranged this year attracted 152 entries, and best fish in this section of the show was a cofertal shown by Karl Fels of Duisberg. The entries were sub-divided into type classes and in one of these the first-ever silver pin to be won by an overseas member went to Kurt Koesch of Berlin.

Highlight of the event, held at the Regents Park Zoological Gardens, was a conference of most of the Federation's judges. This was attended by Mr. Gloyd of the F.B.A.S. Judges Committee and a number of most interesting points were discussed.

Full results of the classes, involving a total of 614 entries, were as follows:—

Cofertals (41 entries): 1, Mrs. I. D. Smith (NLS); 2, H. Wignall (ECS); 3, G. Tansley (ECS); 4, R. Alley (ECS); 5, P. Redvall (Spelthorne); 6, Mrs. Smith. Robson Males: 1,

F. B. Cox (Cheltenham). Roundtails (9 entries):

1, A. Littlewood (SLS); 2, F. W. Humpidge (Cheltenham); 3, W. G. Phillips (NLS); 4, R. Forest-Jones (Basingstoke). Speartails (16 entries): 1, E. Wignall (ECS); 2, and 4, R. E. Hesterbrook (EMS); 3, Dr. G. Meyer (Overseas); 5, A. Littlewood (SLS). Pintails (14 entries): 1, R. Foster (Spelthorne); 2, J. C. Wilson (SLS); 3 and 4, H. S. White (ECS). Scarftails (21 entries): 1, P. Jenkinson (ECS); 2, Mrs. D. Nichols (Portsmouth); 3, P. Pavitt (Spel); 4, G. Elverson (Ports); 5, D. Nichols (Ports); 6, W. Howe (SLS). Coloured Veiltails (42 entries): 1, G. Tansley (ECS); 2, Dr. O. M. Stoersbach (Overseas); 3 and 6, R. A. Keeping (Basingstoke); 4, H. Smith (WMS); 5, C. H. Sanderson (Liverpool). Black Veiltails (13 entries): 1, H. Smith (WMS); 2, G. Elverson (Ports); 3, H. Smith (WMS); 4, B. Ashman (ECS). Doublewoods (51 entries): 1 and 3, B. A. Abrahams (Provincials); 2, W. G. Phillips (NLS); 4, T. H. Thomas (ECS); 5, A. Littlewood (SLS); 6, P. Pavitt (Spel).

Lyretails (18 entries): 1, A. Littlewood (SLS); 2, B. A. Abrahams (Prov); 3, L. E. J. Challenger (Bath); 4, P. Jenkinson (ECS); 5, E. L. Matthews (EMS). Topwords (6 entries): 1, E. L. Matthews (EMS); 2, D. Sumner (Chelt); 3, E. L. Matthews (EMS). Bottomwords (59 entries): 1 and 3, T. H. Thomas (ECS); 2 and 6, R. E. Hughes (Ports); 4, P. Jenkinson (ECS); 5, J. Martin (SWS). Goldlaced Males (10 entries): 1, Mrs. I. D. Smith (NLS); 2, T. H. Thomas (ECS); 3, C. W. Macrae (NLS).

Gold Males (34 entries): 1 and 2, H. S. White (ECS); 3, T. H. Thomas (ECS); 4, A. V. Taylor (Ports); 5, M. Welch (Prov); 6, W. G. Phillips (NLS). Grey Females: 1 and 4, R. Forest-Jones (Bas); 2, G. Russell (ECS); 3, L. Stevens (SLS); 5, R. P. Bryant (Bath); 6, A. Littlewood (SLS). Gold Females (20 entries): 1, 2, 5 and 6, A. Maher (Chelt); 3, Mrs. I. D. Smith (NLS); 4, A. V. Taylor (Ports). Goldlaced Females (14 entries): 1 and 2, R. Forest-Jones (Basingstoke). Coloured Females (27 entries): 1, G. Elverson (Ports); 2, S. Prior (Prov); 3, H. Garrrell (NLS); 4, G. Russell (ECS); 5, A. V. Taylor (Ports); 6, G. Tansley (ECS). Robson Females (11 entries): 1, A. R. Wooding (Spel); 2, J. C. Wilson (SLS); 3, G. Elverson (Ports); 4, H. S. White (ECS). Breeders Males (20 entries): 1, R. Alley (ECS); 2 and 3, G. Beeching (Bath); 4, E. Page (EMS); 5, T. J. Mansbridge (Bas); 6, G. Russell (ECS). Breeders Females (16 entries): 1, G. Russell (ECS); 2, R. Forest-Jones (Bas); 3, W. Howe (SLS); 4, G. Tansley (ECS); 5, C. W. Macrae (NLS). Albino Females (5 entries): 1, A. Littlewood (SLS);

2, W. G. Phillips (NLS).

International Class (152 entries): 1, Karl Fels (Duisberg); 2, Eastern Counties Section; 3, A. Herter (Berlin); 4, Willi Classen (Berlin); 5 and 6, Hans Schonwerter (Graz); 7, Karl Mengel (Cologne); 8 and 12, A. Herter (Berlin); 9, Max Heinbatch (Krefeld); 10, W. Rohmeyer (Berlin); 11, Josef Stept (Vienna).

Entries also received from Frankfurt and Passendorf.

For information abbreviations of Sections as under:

ECS Eastern Counties Section—London.  
NLS North London Section—London.  
SLS South London Section—London.  
Spel Spelthorne Section—Feltham, Middx.  
EMS East Midlands Section—Leicester.  
WMS West Midlands Section—Birmingham.  
SWS South Wales Section—Pontypool.  
Bath Bristol and Bath Section—Keynsham.  
Prov Provincial Members.  
Overseas Members.  
Bas Basingstoke Section—Basingstoke.  
Liv Liverpool Section—Liverpool.  
Ports Portsmouth Section—Portsmouth.  
Chelt Cheltenham and Gloucester Section—Cheltenham.

## Crossword Solution

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

PICK YOUR ANSWER (Solution)

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

## White Spot in Goldfish Pools

(continued from page 182)

were placed in ordinary enamel bowls of 15 in. diameter, a pair to each. The water was now changed night and morning, the bowl being scalded on each occasion. Within 10 days the fish were entirely clear of the disease, but the treatment was continued for a fortnight to ensure certainty. By using several bowls the number of fish so dealt with was stepped up, whilst those awaiting treatment were relieved by the constant changing of their water. During the whole period the fish were liberally fed on garden worms and it is fair to say they were extraordinarily fit at the finish, some even commencing to spawn whilst still in the bowls.

The pond had now stood idle for several weeks, during which time water from it had been used to irrigate the garden so that its level had fallen considerably. The remaining water was quite warm, a factor which would speed up the development and final extinction (in the absence of suitable hosts) of the white-spot parasite. When the pond was finally restored to its original levels the water was allowed to stand a week before the healthy fish were returned. Since a serious outbreak of white spot is unlikely to occur amongst coldwater fishes unless the tempera-

ture is high it may be pointed out that the method advised here is for just such a situation, for the higher temperature (the ponds were at 75° F. at the time of this experiment) is necessary for the successful conclusion of the treatment. Of course, if one is so stocked with fish that their removal from the pond is impossible, then the position is indeed awkward. Even so, I do not think that the use of chemicals would relieve the situation except with regard to methylene blue which, if used in proper strength, will most certainly destroy all plant life. This is preferable, however, to losing the fish.

The treatment which I have outlined for white spot will be found, upon application, to be effective with many complaints, and if it be remembered that the resistance of the fish plays a very important part in the avoidance of disease, then the use of drugs and chemicals can be largely discontinued. This does not mean, of course, that we shall refrain from their use when they will obviously confer some benefit (as with the treatment of some wound or sore) but that we shall try to understand the cause and course of a disease and attempt a natural cure rather than use some toxic material which may, in the long run, defeat our purpose. It has been wisely said that those who would control nature must first learn to obey her laws.