

The Aquarist

and Pondkeeper

NOVEMBER 1963



MONTHLY
Vol. XXVIII No. 8

TWO SHILLINGS

WALTER R. SMITH

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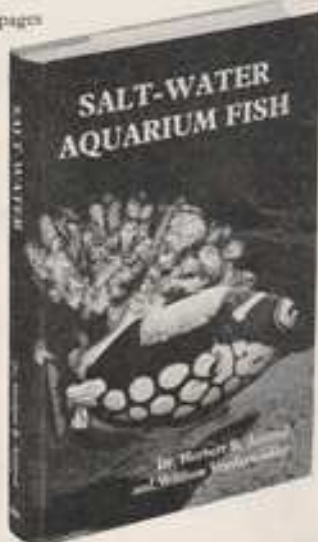
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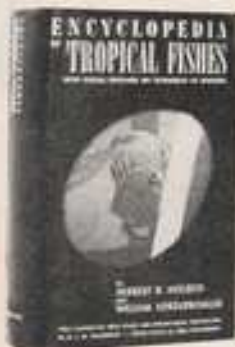
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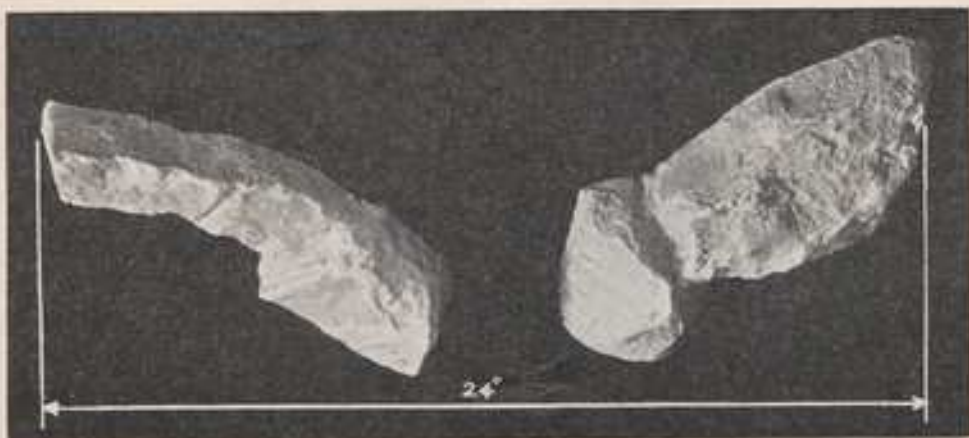
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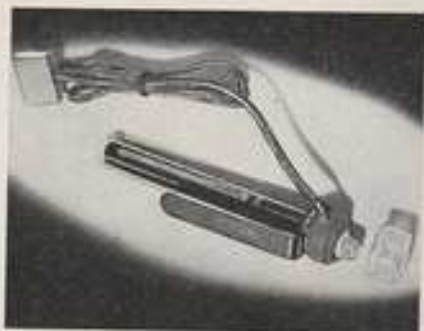
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Per 1/9 extra	
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12 x 6 x 6	10/6
12 x 8 x 8	13/6
18 x 10 x 10	22/6

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The AQUARIST AND PONDKEEPER

Founded in 1924 as "The Amateur Aquarist"



VOL. XXVIII No. 8

1963

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Fry from the Yangtze

THE middle reaches of the Yangtze River now hum with activity as thousands of people have come to catch fish fry to restock China's ponds and reservoirs and for export to foreign lands.

The Yangtze, the world's third longest waterway, is the biggest natural source of fish fry in China. During each fry season, which extends from April to July, young fish caught in Hupoh Province alone number some 15,000 million.

The fry-catchers work round the clock along a 1,000 kilometre stretch of the river, bringing in the young fishes with a kind of trap-net; and nearby wharves, railway stations and airfields co-operate as ships, trains and aeroplanes take the young fish to different parts of China and to Korea, Vietnam, Burma and other Asian countries.

The Yangtze Gorges, situated 300 kilometres west of the great river port of Wuhan as the crow flies, are a big natural spawning ground. Every year huge shoals of fishes from the numerous lakes dotting the lower river basin go upstream to spawn in the gorges. Borne downstream by the currents, the eggs in a week's time hatch into fry and are caught by the billions.

Only a small portion of the young fishes are netted. The rest find their way to the lakes. When they have matured, they migrate to the Yangtze breeding grounds to spawn just as their parents did before them.

Fishing is prohibited in the spawning grounds, and passing steamers are ordered to slow their engines so that the female fish are not disturbed on their egg-laying mission. This and other measures taken by the government have resulted in a marked increase in young fishes in recent years.

The fry of black carp, silver carp, 'big head' and other specimens are caught in the Yangtze. These fishes do not spawn when reared in captivity. With the exception of the Yangtze and a few other Chinese rivers, they breed nowhere else in the world. Noted for their fine flesh, these fishes mature fast. A black carp grows to 5 kilograms in 3 years. When fully grown the fish weighs 35 to 40 kilograms.

People in China began to breed fish for the table in ponds during the Shang Period (1700-1200 B.C.) The most popular fish reared at the beginning was the common carp, because it lays eggs while kept in confinement. This meant that there was no need to transport fry over long distances, a problem that could not be easily solved in those days.

The breeding of the common carp met with a serious

set-back during the Tang Dynasty (618-907). The common carp is called *Li* in Chinese, and this sounds like the surname of the Tang emperors. Because of this the Court ruled that all carp caught must be set free, and that any person found selling one would be fined and given 60 lashes.

This compelled the fish-breeders to switch over to the rearing of black carp, silver carp and other specimens whose fry could be obtained only in the Yangtze and a few other rivers. The good qualities of these fishes were soon known, and they have been popular table fishes ever since.

Freshwater fish breeding in China has spread from

Central and South China to Inner Mongolia and other distant regions during the past decade, thanks to the construction of reservoirs and irrigation projects all over the land. This has created an unprecedented demand for fry.

Though many hatcheries have been set up in this country in recent years and Chinese scientists have found a way to make the silver carp, the 'big head' and other fishes spawn when reared in confinement, the Yangtze river still ranks as China's foremost fry producer.

Hsu Liang-chi



(Above) Fry-catchers on the Yangtze. Young fishes trapped in the submerged nets gather in the square nets, from which they are collected periodically throughout the day.



(Right) Fishermen with specimens of the 'big head', a species spawning only in the Yangtze and some other Chinese rivers that is a rapidly growing food fish.

Leporinus affinis

THIS gracefully proportioned and handsomely marked anostomid is native to South America, from the Orinoco through Brazil to Paraguay and beyond. Its clay- to golden-yellow sides, lightening to silvery white on the belly, are crossed by nine jet-black vertical bars, the first through the gold-rimmed eye and the last across the extremity of the tail. The fins are clear to translucent pearly grey. There is no certain way to tell the sexes apart, but it is reasonable to assume that in adult fish the females are larger-bodied than the males. In the wild the species reaches a length of about 10 in. but domestication tends to keep it slightly smaller.

Like most members of its genus, *Leporinus affinis* swims in a head-downward position and thrives best in clean, clear water giving a neutral to mildly acid reaction. A temperature of 75°F (24°C), with a range of about 7°F either way, is perfectly satisfactory.

As will be readily gathered from the above, *L. affinis* is a



fish that needs a spacious aquarium and plenty of oxygen if its health is not to suffer. Given this, and the right sort of food—tiny worms, insects and soft algae and tender plant life such as *Nitella* to browse upon—it should, all else being well, live for several years. It is inoffensive by nature, but should not be trusted with fishes very much smaller than itself. Another thing to remember is to keep its aquarium close-covered, for it is an adept jumper and when in the mood can project itself through quite a narrow aperture.

J.H.

STARTING RIGHT WITH THE COLDWATER AQUARIUM

Breeding Coldwater Fishes



Photo:

Shoal of bleak

W. J. Howard

by A. BOARDER

In this last article of the series I shall deal with the breeding of coldwater fishes in aquaria. In the first place it is important that it is understood that I do not consider it an ideal method. I much prefer to breed coldwater fishes under control in a pond. However, no doubt many aquarists would like to have a try at breeding in outdoor tanks. Although it is not impossible to do this in a single tank, I can assure readers that it is by no means easy. I am well aware that many fishes have been bred in a tank when it has been the only one in the possession of the aquarist, but I consider it to be a hit and miss affair and often such spawnings are obtained more by luck than judgement. The main disadvantages with such a procedure is the probability of the parent fishes eating either the eggs or the fry.

Without doubt the best type with which to attempt breeding is the common goldfish or one of its fairly hardy varieties. Once some experience has been gained with goldfish then other species can be tried. Obviously one must have a true pair. During the warmer part of the year the male, if in condition, should show the small, white, round pimples on the gill plates and perhaps on the front edge of the pectoral fins. The female will be fatter because of the eggs she is carrying. The tank, which should not be less than 24 in. by 12 in. by 12 in., should be well planted with fine-leaved plants (even over-planted would perhaps be better). One pair only is necessary. The odd idea that one must have several males with one female is un-sound, as the milt from one male could fertilise all the

eggs laid by a dozen females. The fish can be 2 year olds. It is possible to breed with fish a year old but a better chance will arise if older fish are used. Now see that the pair have plenty of live foods. I know of nothing better as a conditioner than chopped or small broken garden worms. These can be supplemented with white worms and broken maggots.

Apart from extra feeding and seeing that the tank water is absolutely clear and well oxygenated, there is little you can do to hasten matters except perhaps to pay attention to the siting of the tank in the room. It should be where it can get plenty of light, with some morning sun if possible. This may be in such a position as would not be normally recommended for a cold tank, as extra light might cause a quantity of green algae to form. This will not matter in your breeding tank as plenty of algae will be available for the fry when hatched. Sometimes it helps if the fish can be separated for a day or so, even parting by the use of a glass slide can help. Another good idea is to run off a quantity of water from the tank and refill with cold fresh water. This sometimes triggers off the spawning activities. The early morning is the best time for this and if the day starts very bright this will also be a help.

There will be no doubt when the fish actually start spawning. The male will chase the female around the tank, continually nudging and pushing it through the dense foliage. This excitement cannot be missed as the fish will act in a vigorous manner quite out of character with their ordinary behaviour. Many small transparent eggs will be

laid singly. They are like small beads of jelly the size of a pin's head. They are adhesive and will stick to the water plants quite firmly. This chasing can go on for several hours, and during the chasing the parent fish may take no notice of the eggs. However, when the chasing has finished, the fish may take a more interested look at the eggs and make a meal of them. There are three things the aquarist can do now. He can leave the fish and eggs alone, and provided that there is fairly dense cover from plant life, many fry may hatch, but it is very uncommon for many fry to be reared under these conditions. Secondly he can take out some of the water plants with eggs attached to hatch out in safety in another tank or shallow bowl. Lastly he can just remove the parent fish to another tank. This last method is the best one to adopt, as it is then possible to hatch most of the eggs that have been laid, and it gives the aquarist a ten to one chance of getting some fry. The rearing has been dealt with in previous articles and so needs no repetition here.

Having obtained some experience with the goldfish and perhaps some of the varieties the aquarist may like to experiment with other species of coldwater fishes. I must state that I do not think there are many British coldwater fishes that could be bred in a tank indoors other than perhaps the stickleback (*Gasterosteus aculeatus*). Much has already been written in *The Aquarist* about the breeding of this species and so I shall not repeat the directions here. The bitterling carp (*Rhodeus amarus*) has also been adequately dealt with on more than one occasion; although this is not a British fish, as yet, it might become one through introductions to certain waters. The ordinary carp (*Cyprinus carpio*) is rather similar to the goldfish as far as breeding is concerned, although it is probable that rather larger fish should be used with this species. The green tench (*Tinca tinca*, and its variety *amarus*) could certainly be bred in a fairly large tank, but most of the breeding fishes could be rather large for any but the 30 inch tank. I have bred green tench at 2 years of age, when well grown under ideal conditions, but larger fish would ensure a greater measure of success. The rudd (*Scardinius erythrophthalmus*), could be bred in a good sized tank, and this fish lays eggs similar to those of the goldfish. The roach (*Rutilus rutilus*) is also a possibility, but only an experienced aquarist with a large tank might hope to succeed with this fish. The bream (*Abramis brama*) is also a difficult fish and one that does not offer much interest, apart from the very difficult achievement of having bred some. The perch (*Percia fluviatilis*) would also be rather difficult to breed unless a very large tank was available, and the pike



Rudd
Photo W. J. Flower

(*Esox lucius*) I consider to be quite outside the scope of the indoor aquarist.

Among the mainly river fishes are one or two species which could be bred, and they are the smaller ones, such as the minnow (*Phoxinus phoxinus*), the bleak (*Alburnus albidus*), the gudgeon (*Gobio gobio*), the dace (*Leuciscus leuciscus*), the miller's thumb (*Cottus gobio*). The trout (*Salmo trutta*) and the chub (*Leuciscus cephalus*) are too large for the amateur to breed in a tank. The river fishes I have listed would constitute a problem when trying to keep them in perfect condition for breeding. The trout especially would require almost continuous aeration and plenty of fresh water. All the other river fishes would need very well oxygenated water before they would be likely to breed.

There is undoubtedly plenty of interest in this subject for the keen aquarist, and one never knows what species might be bred if sufficient care was taken to copy as much as possible the natural conditions under which such fishes breed. The important points when attempting to breed any of the unusual fishes are: as much swimming space as possible must be supplied; plenty of cover must be given for the types which lay adhesive eggs; plenty of seclusion and freedom from interference; give all the natural foods which the fishes prefer; provide well oxygenated water, aerated for preference; and above all, you will need plenty of patience.

OUR EXPERTS' ANSWERS TO TROPICAL AQUARIUM QUERIES

I am thinking of keeping a few tanks of tropicals in a cold greenhouse. These would be heated by electric immersion heaters, but I am concerned about the rise in air temperature which takes place after a few hours of strong sunlight. Would a rise in the temperature of the greenhouse, from, say 63°F (18°C) to above 80°F (27°C) overheat the tanks and harm the fishes?

So long as the tanks are not overcrowded, we do not think warm water fishes would come to any harm in your greenhouse through a sudden rise or rapid fluctuation of the air temperature. Shutter-type air vents well above tank level would help to dissipate excessive heat.

I have a 24 in. by 12 in. by 12 in. aquarium inhabited by two dozen young red swordtails. I should like to add some black widow fish to it, but wonder whether this would be advisable. May I have your comments, please?

We advise against introducing any more fish of any kind into your aquarium. Firstly, swordtails grow quite large

and, even with artificial aeration, two dozen of them will soon be too many for a 24 in. tank. Secondly, male swordtails often develop into spiteful bullies.

After a failure in the electricity supply, a male Siamese fighting fish and a *Corydoras* catfish contracted serous-bladder trouble. Losing no time, I placed them in a salt bath. The fighting fish recovered within a week, but the catfish died. I have since been told that one should never attempt to cure a catfish of any illness with salt. Is this true?

A medium to strong salt solution will upset or kill most

snails (and leeches, too) within a few days. The recommended treatment for these fish (suffering from swim-bladder trouble) is very shallow water maintained at a higher temperature than usual.

I had several young cichlids doing well in ordinary seawater, but acting on the suggestion of an aquarist friend who told me that cichlids are happiest in acid conditions, I transferred them to a tank filled with rain water which had been run through black bog peat. In a few days all the fish were dead. Can you explain this, please?

Without a doubt the sudden change in the pH value of the water killed them. Any great change in the acidity or alkalinity of aquarium water should be brought about gradually, that is over a period of a week to a fortnight.

Will you please give me some information about the cyprinid known as the lyretail?

The lyretail, technically known as *Aphyoseiurus australis*, is native to the Cape Lopez region of West Africa. It reaches a length of about 2 in. in captivity, and is most beautifully coloured at all times. The male is easily distinguished from the female by his pointed larger and lamellose marked fins. A temperature in the middle twenties (°F) suits the fish best. It breeds easiest in acid water containing masses of fine-foliated plants, and the eggs take about a fortnight to hatch out.

I have just bought a tank measuring 18 in. by 12 in. by 12 in. Please give me the names of some of the most suitable small fishes I could keep as a community in it, and the maximum number of occupants the tank will hold.

Your tank will support about ten 1½-2 in. fish in comfort.

Among the best suited to community life are neon tetras, pretty tetras, pristella, bloodfin, flame fish, guppies, platys, harlequin fish, zebra fish, opalescent fish and white cloud mountain minnows.

I am trying with the idea of installing a 40 in. tank in an alcove in my living room. Could you tell me the number of immersion heaters I would require to maintain a temperature of 75°F (24°C) all the year round?

To be on the safe side, you will need a heater, or heaters, giving at least 150 watts. Two 75 watt heaters wired in parallel, and rested horizontally on the compost, one at each end of the tank, would ensure a fairly even distribution of heat.

Some of my barb and livebearers living together in a 24 in. tank have gone off their food and are swimming about with closed fins. Can you tell me what is wrong with them?

Closed fins are indicative of temporary malaise or actual disease. Any of the following may be the cause of the trouble: the after-effects of a chill, overcrowding, unhygienic conditions, or metal poisoning. At the onset of white spot disease, that is, just before the fish become peppered, as it were, with the tell-tale cysts, they will often go off their food and swim around with folded fins. If the fish have not been subjected to a sudden drop in the temperature, and no metal has contaminated the water, then give the bottom of the aquarium a good siphoning to get rid of dirt and any decaying matter, and fill up again with boiled water cooled down to the aquarium temperature. A sufficient quantity of a 5 per cent solution of medicinal methylene blue stirred into the water to give it a noticeably bluish tinge might prove beneficial.

COLDWATER FISH-KEEPING QUERIES answered by A. BOARDER

I have lost some coldwater fishes in my aquarium and I find that they are infested with a type of creature which sticks on the fish like a limpet. This pest is also capable of free swimming in the water. What is it, and how can it be killed?

The creatures are argulids or fish lice. They are capable of free swimming and attach themselves to a fish and feed from its juices. The pests lay eggs and some of these may have been introduced into your tank with either fishes or plants. All parasites that can be seen on a fish can be picked off with tweezers, but some may be under the tail or in such a position that they cannot be seen very easily. I have found that if a fish is immersed into a solution of a half teaspoonful of Dettol to a gallon of water, the lice will leave the fish immediately. They will swim around for a little while and then die. The fish would also die if left in the solution and so a sharp watch must be kept on it and it must be removed to fresh water if it turns over, or in any case within about 20 seconds. It may be necessary to repeat the treatment if more pests are seen later on.

I recently brought home some water plants from the wild. I kept them in quarantine for a time and then put them in my pond. I now see that one appears to be a dock. Is this likely to be the ordinary one and if so will its seeds spread all over my garden?

The plant you have is the great water dock (*Rumex crispus*), of the order Polygonaceae. This is a bog plant and can be used around the shallow edges of the pond. Its flowers are small and borne on a spray. It will be as well to remove the flower heads once they fade to prevent the seeds from falling into the water and becoming a nuisance. It is not likely, however, that the seeds will grow in the garden. This plant has no use as an oxygenator, as its leaves are above the water. It does break up the surface of a pond and can be quite attractive.

I have a small leak in the top of my concrete pond, so that the water goes down about 2 inches. I would like to be able to make an effective repair without emptying the pond or removing the fishes. How can I do this please?

As long as the leak is not a large one or well down in the pond it is not difficult to effect a repair. Get a tin of Prompt cement from any good decorator's shop, and a little fine sharp sand. Sift the sand through a tea strainer. Lower the water slightly in the pond so that the crack is exposed. Now rake in the crack so that all loose material is removed and then scrub it well with a stiff wet brush. Now mix equal parts of the cement and sifted sand and add a little water. Mix to a paste, but only make up a little at a time. This cement sets in half an hour and soon goes off, spoiling any which is not used in a short space of time. Force the mixture into the crack, starting at one end and working continuously along the whole crack. There is no need to allow the mixture to spread over the surrounding concrete. If you only use the minimum amount there is not likely to be any danger to the fishes when the pond is filled again. The advantage of using this cement is that the pond can be refilled soon after the repair is made, as the cement will set under water, but wait about an hour before filling up the pond.

In the Lancaster canal not far from Garstang, a number of small fishes have frequently been caught by anglers using a small hook and bait. In their opinion they are roach-bream hybrids. I caught some and brought them home. In the tank I examined them and now wonder if they are bitterling. Can you advise please?

From your description of the fishes it seems highly probable that they are bitterling. If they were the hybrids they would certainly produce some larger fish than the ones

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Turn of the Worm

by P. E. PAVEY

MICRO worms for young fry, Grindal worms for older fry, white worms for adult fishes. All are easy to keep, and the supply, if you wish it, can be never-ending.

First micro worms. These are about $\frac{1}{4}$ in. long, and thin enough to fit into the mouths of most week-old fry. You will need a shallow container, such as an enamel tin dish, and some stiff porridge. The proportions for this, I find, are important. Into one cup of water and half a cup of milk stir one cupful of porridge oats and cook for 3 minutes. When the porridge is cool, spread it inside the container and make several small hollows. Fill these with spoonfuls of micro worms, begged from a fellow aquarist. Cover with a piece of glass. Leave for a few days, and then inspect the mixture to see if any mould has appeared. If it has, pick it off with the tip of a knife and burn it. Be very careful not to sneeze or cough over the mixture! Place two small lengths of wood in the porridge and replace the glass. By the end of a week thousands of worms will be crawling up on to the wood, and these you can gather easily on a small clean brush—a child's paintbrush will do. If you simply wish to keep the mixture going, when it begins to go watery and develop brown patches on its surface make a fresh supply of porridge and start a new culture in another container. If you are feeding fry, you will need to make a fresh supply every week. Keep the micro worms at room temperature.

Grindal worms can be eaten by fry under half an inch

long. Fill a wooden box about 4 in. deep with a mixture of peat and leaf mould. A seed box will do excellently. Obtain from a supplier or fellow aquarist a Grindal worm culture and put this in the centre of your mould. Feed the worms with sufficient porridge to last 2 or 3 days, and cover with a close-fitting piece of glass. It is essential to keep the mould very moist! When the culture is going well you will find that the worms will thrive on fingers of brown bread sprinkled with milk. Cover the glass with a sheet of thick paper, and keep at a temperature of at least 70°F (21°C). The worms will climb on to the glass and can be removed with tweezers or a paintbrush. I find them easiest to handle with a paintbrush. If the room is cold, I put my worm box on top of one of my fish tanks.

White worms also need a box filled with peat and leaf mould, and must also be kept covered with glass and a sheet of paper. In fact, except that they do not need to be kept so wet or at so high a temperature, they can be treated exactly the same as Grindal worms. Be careful not to overfeed them to your fishes. They are a very rich food!

If you find mites in the worm boxes, don't worry. They won't harm your fishes; in fact some of your fishes will enjoy eating them.

Remember to look at your worms every other day. Keep their food fresh, and don't give them too much at a time. Highly important—don't forget to water your Grindal worms!

The Aquarium Hobby in Schools

by A. R. LEEKE

EDUCATION authorities are rapidly becoming aware of the usefulness of aquaria in schools. Many Education Committees now make grants to schools to enable them to purchase the required equipment.

When I worked with the school aquaria in Ryder Brook Secondary School we had more tanks than most schools, thanks to the generosity of the headmaster. We had seven tanks ranging in size from 18 in. by 12 in. by 12 in. to 48 in. by 18 in. by 15 in. and all except two were occupied by tropical fishes.

The amount of money spent on the aquaria had to be limited, so there was only one filter between the seven tanks, but this was a fairly large, outside model so we changed it to a different tank each day. This way all the water was kept clean.

The pump used was a Hyflo fish-house model, which ran continuously day and night. Each tank had aeration: the 18 in. tanks had one airstone, the 24 in. tanks had two airstones and the 48 in. tank had four.

One tank was serviced every day except Saturday and Sunday. This servicing consisted of fixing in the filter, siphoning the mulm off the gravel, scraping the algae off the glass, topping up with fresh water and polishing the reflector.

All the tropical fish tanks were kept at a temperature of

78°F (25°C) and the coldwater tanks were kept between 55° and 65°F (13-18°C).

The types of plants used varied considerably, but the main types used were *Elodea*, Amazon swords and *Vallisneria spiralis*. *Elodea* was used mainly in the breeding tanks and the others were used for display. Once I had several Madagascar lace plants given to me by a friend, and when I planted some in the school aquaria they grew better than all the others until, one Christmas holiday, I came into the laboratory only to find all the inhabitants of that tank, both plants and fishes, dead and decaying. The temperature was 34°F (1°C). Looking around the tank I noticed the heater and thermostat were missing. To this day I do not know who or what took them, but they really made my blood boil! Later I totalled up the cost of material lost and it came to £17, and all the dead fishes were mine!

The tropical fishes kept varied considerably. We had guppies, platys, mollies, gouramis, zebras, angels and one fairly large red-tailed black shark. All fish, with the exception of the angels and the red-tailed black shark, were bred in school. The first to be bred were naturally the guppies (I still breed them), and the last to be bred were the gouramis. I think nearly every member of the

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The Fishes Called CHARACINS



Epiplatys orbicularis

by HARRY LODER

Photographs by BARRY PENGILLEY

THE fishes known as characins form a very large group in Nature, consequently many species are usually available to the aquarist. The most common, or more usually available, species are the ones that originate from central South America. Most of these are now bred in Europe—Germany and Holland being the two main European countries of supply; some supplies of the more difficult to breed South American characins come from British Guiana. These wild-caught fishes are usually very strong and travel well.

There are a few rarer South American characins that are not often seen in the shops, but most of the difficult to obtain species are African. Not many of these are small fishes; mostly they are members of the large and medium sized group of species, such as *Pseudocrenilabrus heteropus*.

The *Aleates* genus and other magnificent fishes from the Congo are the ones I class as difficult to obtain. The difficulty is, of course, only relative to African fishes; most of the American fishes are handled at source as a regular export, whereas the African stock is very irregular. The African livestock exporter is much more interested in handling large animals such as giraffes, rhinos etc. (it takes a lot of *Aleates longipinnis* at 7s. each to take the place of a

£2,000 Barrings giraffe, and four chimpanzees will earn as much as a riverful of bad travelling little fish!). The distractions of Africa are very great; the South American collector, on the other hand, has very little else to collect but fishes, mostly characins, and of course, reptiles and butterflies, which are both seasonal and rather 'slow lines', unless very rare.

These are some reasons why you see good selections of South American characins, of all species, in your aquarist's shops, and very few African (and these only at big prices). I think that there are still some wonderful species that we have not yet seen to come out of Africa; maybe when the 'wind of change' stops ruffling the surface of the water we shall see them.

The fish-keeper can place the characins into three groups according to size: small, medium and large. The small species can be very small and the large very large, by aquarium standards that is, and the reason should never meet in the same tank. I have kept the small and the medium species together, and the medium and large with success. I have also tried the small and large, but it is difficult to say whether or not this was a success as the small species kept disappearing. The large size fishes are,



*Thayeria
boehlkei*

of course, only large aquarium-wise, angler-wise they are only toddlers.

The three sizes need exactly the same kind of care, with of course, more room the bigger they are. They need clean water, slightly acid for best colour, temperature on the high side, 75-80°F (24-27°C), housed with not too many plants (all plants really growing and not just stood there pretending to be alive as do some plants that are not receiving enough light). Give plenty of swimming room;

you can crowd these fishes as they are very strong and do not soon show ill-effects. In fact the only ill-effect you will see is a lot of dead fishes. Characins are not sick for long—a few hours only; they are either alive or dead. No in-between for the characin! You can easily ascertain if crowding is the cause of death, as it will be the biggest and most well-grown fishes that die first.

Feed them well; this is not difficult as they are obliging feeders, and will eat almost anything you offer. They are

*Soccon fish
(Hemigrammus ocellifer)*



of course, fishes with teeth, and they know how to use them. Then, they have grand little teeth; I have seen a young *Hypessobrycon serpa* have both eyes bitten out by his little teeth in less time than it takes to say *Hypessobrycon*. But do not let me mislead you into thinking that characins are savage fishes. In the above-mentioned instance, the young serpa was deformed; had he been in proper condition he would not have been attacked. Characins, like most fishes and birds, are liable to kill their ailing members; it is only that characins are fast and neat in the way they do it.

As mixed community fishes characins are very good, provided that the aquarist does not persist in keeping the one specimen of characin in with other species. They are playful with each other, but this playfulness turns to spite-

very strong and if they do not live longer in the company of their own species, they do at least live happier lives.

I know that only a very small proportion of aquarists show fishes at fish shows and that a smaller proportion of these enter the furnished aquaria classes, but we are all showmen when our friends arrive and want to see our pretty little fishes. Also our relatives are very liable to tell us the truth, at times, about our tanks, especially if the tanks are like one I saw in a public place the other day; about 200 female guppies, of all sizes, one female *Barbus filamentosus*, a good crop of brown algae and one well-chewed Amazon twisted plant were the complete display. There is no reason why the home aquarium should not be just as beautiful as the ones you see at the shows, and a good selection of characins will be half the battle won.



Jewel tetra (*Hypessobrycon callistus*)

when if the characin is on his own with other species who do not understand him as a playfellow. So the policy is, in mixed communities, to have at least three of each species. This is really a good rule with any fishes, because with three of a kind you do get what is known as the beauty of repetition. This is not a gimmick to sell more fish, but a quest of aesthetics; the only things more beautiful on their own are women and horses.)

As most characins are shoaling fishes, the more fishes the more handsome the shoal. I, like most judges, prefer to see a shoal of one species per tank. This is ideal, of course, and in furnished aquaria classes has almost become a 'must'. For this purpose the characin is hard to beat; a good shoal shoal of small characins, or a small shoal of medium characins, soon move about and catch the judge's eye.

I have found little fault with the characin, but, like all things, nothing is perfect (how boring perfection would be!). The fault I do find is one that can be corrected; as individuals the characins are rather 'sulky' and always rather wild. The need for other individuals of their own kind is

An aquarium 24 in. by 12 in. by 12 in. will house up to 40 small characins, and it is possible to have 20 different species, in pairs, at a cost of well under £10, which could include neons, X-rays, bicolors, glowlights, serpas and rosy tetras, penguins, the *Nannostomus* group and many more that I could add to this list (but I will not because I want to give your dealer a chance to offer you his selection; if he knows his business he will have a good choice for you).

I have, up to now, shown you the characin as a purely decorative fish, but he is also of interest as a breeding subject. It is impossible to deal with the breeding of each individual species in this article, but there are similarities in the requirements for breeding of some of the species, which can, with one or two variations, be applied to almost all the small characins: 1, soft, slightly acid water; 2, clean Infusoria- and bacteria-free water; 3, temperature of approximately 82°F (28°C).

These conditions are rather difficult to achieve if one attempts to use living plants as a spawning medium, so I recommend commercial spawning mops, or, if you can get it, nylon waste to make your own. The eggs require plenty



Congo tetra (*Phenacogrammus interruptus*)

of cover, as the parents eat them avidly; nylon waste or plenty of spawning mops give the necessary cover if simply used.

Use no gravel please—this alters the reaction (pH) and soon encourages bacteria. Aeration? Yes, and filtration, slight during the spawning act and afterwards when the eggs hatch. For lighting there are species variations. Strong light seems to be deadly to the eggs of some species, especially neons. Light with some species seems to stimulate spawning whereas with other species it prevents a beginning. The latter also applies to individuals of the same species. I have noticed many species of fishes spawning in strong moonlight. The light question is maybe much more important than we think; the only way really to settle it is to make the experiment yourself, but as you see, light can, and does, have a big effect. It does not seem to make any difference with the following species, either for spawning or hatching: beacons, flames, X-rays, yellow tetras, *Nannostomus axonotus*, *N. marginatus*, serpas and rosy tetras, black-line tetras, black widows, red-finned

tetras and silver tetras. These are all possibly classed as easy to breed, for this reason.

Times of hatching also vary according to species but approximately 24 to 36 hours at 82°F (28°C) applies to most.

I personally have had most success when using trios (two males and one female); some of my friends disagree and use pairs only, but I suppose here again we must take individual fish into consideration.

Any meaty food should get your breeding fish into condition. Chopped chicken liver is one food that usually does the trick, *Daphnia* also helps and I always recommend chopped earthworm.

For feeding the fry *Infusoria* is best as a starter. It is particularly necessary with the new emperor tetra; nothing else seems to do for the fry of this characin. Follow on with brine shrimp, nauplii of *Cyclops*, sifted *Daphnia*, hard-boiled egg, dried egg-powder, soya-bean flour; then, by the time they are eating fine dried food, you have got them; they are yours, you can go ahead and count them.

The Threat to Wild Life

These items are taken from "World Wildlife News", issued by the World Wildlife Fund.

U.S.A.

DURING the past 12 years the United States Fish and Wildlife Service, an official Government agency, has poisoned some 225,000 acres of lakes and 2,500 miles of streams, mainly with rotenone. The aim is to remove so-called undesirable or 'trash' fish and restock with game fish for anglers. Among the 'trash' fish so removed are many unique endemic species. In the south-western United States no fewer than eight species of fish

have become extinct as a result of this programme since 1935. The continued existence of 39 others is in danger; these 39 constitute nearly two-fifths of the known native freshwater fishes of Western North America, north of Mexico. (*National Parks Magazine*.)

FRANCE

The lakes of the Somme valley above Amiens, important both for fisheries and for wild fowl, are threatened by a decision of the French Minister of Public Works to take the Nord Canal through them, thus mixing and polluting their waters, instead of, as originally intended, keeping it on a separate course which would avoid the lakes. The degree of pollution would be aggravated by the creation of an industrial zone at Péronne, higher up the canal. (*Le Saint-Hubert*.)

'Fail-Safe' Aquarium Heating Systems

by F. C. BOUCHER, B.Sc.

ALTHOUGH several articles have been published from time to time in *The Aquarist* on devices to guard against failures in the heating system, I have yet to see an arrangement which provides protection against all possibilities, and yet is reasonably simple to install.

Such a system is shown in Figure 1, and the method of operation is very simple. The three thermostats are set to close at different temperatures. For example, number 1 at 80°F (27°C), number 2 at 75°F (24°C) and number 3 at 70°F (21°C). For normal operation number 1 is closed, number 2 is controlling the temperature, and number 3 is open. In the event of failure of any component in the main heating system, the temperature drops until number three thermostat closes, thus either operating the alarm, or starting the emergency heating system, depending on the position of the switch. This protects against all forms of failure except thermostat 2 sticking in the closed position, which would cause the temperature to rise. In this case thermostat 1 will open and break the circuit, and the neon lamp will light to indicate the fault; the circuit would then continue to operate at the increased temperature indefinitely.

Components Required

The neon lamp must be rated to operate at mains voltage, or a lower voltage lamp may be used in series with a high resistance. Thermostats 1 and 2 are quite normal, but thermostat 3 must be capable of carrying a high current, as described below. All three thermostats must be placed near each other in the tank, otherwise the temperature differential over different areas might be sufficient to operate an emergency thermostat. Heater A is used for normal operation, and heater B is specially wound to operate from a 12 volt car battery. There is an alarm bell across thermostat 3 which is operated from its own small battery. The switch is of the single pole two-way type and it should be rated at 5 amps. This switch is left connected to the alarm circuit, but when the bell rings, it can

be changed and the car battery connected to operate heater B.

The majority of aquarists will not wish to leave a large car battery complete with acid on the living room carpet, permanently connected, but would prefer to connect it only when the alarm operates. If, however, protection is required for a period while the owner is away, the battery can be left connected with the switch in the 'heat' position, so that the heater will automatically come into operation when thermostat 3 closes. If the car battery is left in position, it must be charged regularly, even though it has not been in use. A fully charged battery with a capacity of 40 ampere hours can operate a 40 watt heater for about 12 hours continuously, which should keep the temperature above danger level for at least 24 hours, allowing for periods when the thermostat is open.

Low-Voltage Heater

Heater B is constructed as follows. An old burnt-out heater is removed from its glass tube and the winding replaced by part of a 1 kilowatt electric fire heater spiral (chosen because of its general availability). The resistance of this is approximately 53 ohms, assuming that it operates from 230 volts, and the proportion which is required for the heater is calculated by reference to the Table, which shows the resistance required to make aquarium heaters of different powers operating from a 12 volt supply.

Let us assume that a 50 watt heater is required, and the length of the fire spiral is 10 inches. The resistance of this spiral will be 53/10 = 5.3 ohms per inch. The table shows us that the resistance required is 2.9 ohms, and this can be obtained by the use of 2.9/5.3 = 0.55 inch of the spiral. For greater accuracy the spiral could be pulled out straight and the above calculations based on the extended length.

Increased efficiency will be obtained if two lengths of wire twisted together are used, each length being double the amount required for a single wire. In our example of a

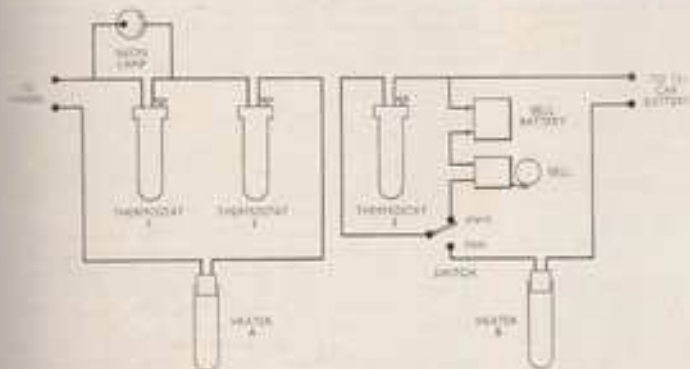


Fig. 1. Circuit diagram for complete heating system

Table

Rating (watts)	Resistance (ohms)
20	7.2
30	4.8
40	3.6
50	2.9
60	2.4

Resistance of aquarium heaters for 12 volt operation

Fig. 2. First alternative failing temperature alarm and heater system

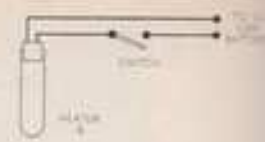
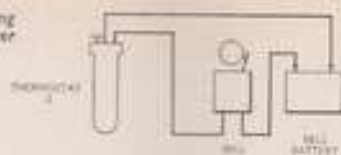
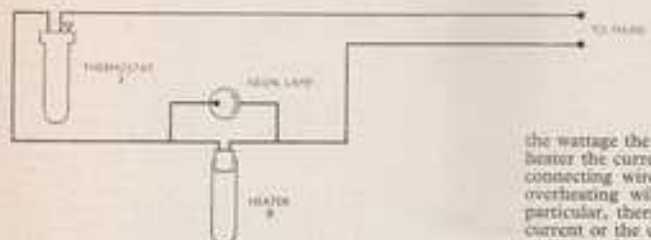


Fig. 3 (left). Second failing temperature alarm and heater system



50 watt heater two 1.1 inch lengths would be used. The advantage of this method is that with the longer wire the heat is spread over a greater area of the heater and each wire does not get so hot (although of course the total amount of heat produced is unchanged). This method is recommended if 50 or 60 watt heaters are being constructed.

The amount of wire required is carefully measured, cut, stretched and wound round the heater former. Two pieces of about 20 gauge copper wire should be used for the connections between the ends of the element and the lead near the bung. All joints should be soldered and it is important to see that no additional resistance is introduced into the circuit by poor connections, otherwise the efficiency of the heater will be impaired. The ends of the element should be wrapped several times round the copper connecting wire to provide a good mechanical joint in the event of the solder melting. The greater the area in contact, the less chance there is of the solder melting under normal operating conditions. Sometimes trouble is experienced because, when the heater is hot, the air inside the tube expands and pushes the bung out. This can be cured by heating the air inside before finally pushing the bung home.

When deciding on the wattage of the heater to be used, the aim should be to use the minimum possible power for the tank concerned, 10 watts per gallon being the usual formula used. This is because with the low-voltage system described, a much higher current is flowing in the circuit than with normal mains operation, and the greater

the wattage the higher this current will be. For a 60 watt heater the current will be 5 amps, and all components and connecting wires should be able to carry this, otherwise overheating will occur with a consequent fire risk. In particular, thermostat 3 must be capable of carrying this current or the contacts will quickly become burned. The majority of thermostats have two ratings, one for direct current (D.C.) and the other for alternating current (A.C.), the D.C. rating being the lower. A car battery provides D.C. current so the thermostat must be rated to carry 5 amps D.C. Ratings given in watts should be ignored in this respect since they will refer to mains voltage operation only.

Alternative Arrangements

Because thermostats of this nature are expensive, many aquarists may prefer to keep the low temperature alarm system separate from the emergency heater, as shown in Fig. 2. A normal thermostat may then be used for the alarm, since this takes very little current. The emergency heater wattage must then be selected so that the minimum acceptable temperature is just maintained with continuous use of the battery. This modification does mean that it is not possible to leave the battery permanently in position to come into operation automatically on failure of the heater. Incidentally, one very handy alternative use for this heater is in keeping a carrying vessel warm when fish are being transported long distances by car.

Yet another alternative system which guards against all forms of failure except power cuts is shown in Figure 3. The heater is now a normal mains one and the alarm is a neon lamp similar to the one across thermostat 1, but this time it is across the heater so that it will only light when the emergency system comes into operation. If an audible warning system is required the bell can still be used in conjunction with a transformer in place of the lamp.

The Aquarium Hobby in Schools

continued from page 142

School Aquarium Society breed at least one variety in the aquarium.

Although our main interest was with the keeping of tropical fishes they were not by any means the only things to be kept.

We had many species of fishes and amphibians from our own rivers and lakes. The freshwater fishes kept were perch, carp, golden orfe, wels catfish, roach, rudd and Albin shad. Goldfish were also kept but for some unknown reason they died off and we never replenished our stocks.

Frogs and toads were also kept and bred in our largest tank. We raised over 100 frogs and 89 toads to maturity.

The School funds did not allow us to realise our greatest ambition, an alligator.

One of the best things about being in charge of the aquarium came once every 3 months. We would go out on a Monday and spend two very enjoyable hours selecting fishes. After all—it was not our money!

Other things we did included going out during the summer months collecting fishes, amphibians and plants for the aquarium. We spent many happy hours on the banks of rivers and lakes in Lancashire, Yorkshire, Derbyshire and Cheshire with our fishing rods, nets and water containers.

Our pride and joy was not only used by the members of the Aquarium Society. Teachers in the Science Department often used it as well to show the younger forms the development of amphibians and fishes.

Lizards Becoming Snakes?

by ROBERT BUSTARD, B.Sc.



Eyed sand skink, a species that does well in the vivarium

SNAKES and lizards belong to the same order of reptiles—the Squamata. Snakes are placed in the sub-order Serpentes and lizards in the sub-order Lacertilia. It is common knowledge that snakes once possessed limbs and, indeed, vestiges of these have been retained and modified as mating spurs in pythons and boa constrictors. One cannot, however, distinguish lizards from snakes by the presence of absence of legs as, although no snakes now possess well-developed legs, many lizards also lack these. Legless lizards still retain many lizard-like features; the shape of the head, for example, is lizard-like and the eyes usually have well-developed lids, absent in all snakes. The evolutionary path of these animals need not concern us further, although it is in itself fascinating, but many of these lizard species which are either legless or have poorly developed limbs make interesting vivarium specimens.

The slow-worm (*Anguis fragilis*), which occurs in Britain, is an example of a completely legless lizard, as are its relatives the glass "snakes" of Europe and America (*Ophiomorus squalis* and *O. vernalis*). As well as these popular examples there are many others which combine fascinating habits with hardiness in the vivarium. Although many of these are members of the skink family, degenerate are found in a great number of lizard families.

Eyed Sand Skink

The skink genus *Chalcides* shows a progression from well-tanned limbs to an almost legless condition. The eyed sand skink (*Chalcides ocellatus*) possesses good limbs although they are small in comparison with the 6 inch normal. This skink does exceptionally well in the vivarium, where its requirements are modest. No special hiding places are necessary, as at night or when alarmed the eyed skink "swims" into the sand, completely disappearing in a few seconds. My specimens live in a 24 in. by 18 in. by

Photographs by
the author

18 in. vivarium with 4 inches of coarse sand. Coarse sand is preferable as, although they possess a transparent lower eyelid and modifications of the ear opening to prevent sand entering, very fine sand can be a problem particularly to breathing—it makes them sneeze. The eyed skink likes a warm day temperature (77-86°F; 25-30°C), but at night 59°F (10°C) is suitable. A small dish of water must always be present and I keep another small dish supplied with mealworms or grubs. In addition to these, bluebottles are supplied from time to time.

Three-toed Sand Skink

The three-toed sand skink (*Chalcides tridactylus*) from Mediterranean regions is frequently kept in this country. It can be described as a slow-worm with tiny limbs, the forelimbs scarcely an inch below the ear and the tiny hind limbs just in front of the tail base. Its total length is about a foot, of which considerably more than half is accounted for by the elongated body. The vivarium for these lizards should have facilities for climbing if they are to be seen to advantage, and this applies also to *Tetradactylus* and *Chamaesaura* described below. All are suitable for a vivarium similar in size to that for the eyed sand skink.

The vivarium, which should have a peat-sand or soil floor, is best provided with branches, moss and even some small climbing plants or young orange trees. A temperature of 77°F (25°C) during the day is suitable for all three. A water dish must always be present and food can be selected from among the following: spiders, flies and bluebottles, maggots, mealworms and beetles.

Plated Lizard

The short-legged plated lizard (*Tetradactylus sept*), which attains a total length of about 7 inches and is a dark bronze colour, possesses a long tail and well-developed limbs. The similarly coloured whip lizard (*Tetradactylus tetradactylus*) has much smaller limbs and a proportionately longer tail, which accounts for 12 of its 15 inches. Both of these lizards travel rapidly through grass by a writhing movement of the body and tail, during which the legs are folded back against the body. In the vivarium their antics in catching food are delightful to watch. Both species will soon take bluebottles from the fingers and these are just within the maximum size of food that can be swallowed, and then only after considerable chewing. The sinuous movements of the whip lizard and the way in which the tiny forelimbs are vibrated when it is excited make it a most interesting species to watch. *Tetradactylus* alone of the three genera lays eggs. The eggs are decidedly oblong in *T. tetradactylus* and each specimen lays two eggs. The

specimens of *Tetradactylus* which I have kept have always had a slightly damp vivarium. This is easily maintained by spraying the moss every few days. These lizards are natives of South Africa.

The anguine lizard (*Ghamosaurus anguina*) is also from Southern Africa, although very similar forms occur in East Africa where the author has obtained them. This lizard has keeled scales and the tail accounts for more than three-quarters of the total length of 20 inches. The limbs are very much reduced, as can be seen in the photograph, and considerable patience was required to pose the specimen with the minute pale coloured forelimbs extended over the dark body region so that they would be visible. The anguine lizard, which belongs to the zonure family (Cordylidae), is, like the whip lizards, particularly partial to bluebottles, and is an excellent climber.

Silver Sand Lizard

The last two species, like the first two described in detail, belong to the Scincidae. They inhabit South Africa. The silver sand lizard (*Scincus biperi*), which is an attractive silvery pink colour with dark spots, possesses only two limbs, the front limbs being absent. It measures about 5 inches in total length and lives mainly underground, feeding



Silver sand lizard, a species with only one (hind) pair of legs



Short-legged plated lizard

on worms and slugs. The speed with which it can disappear into dry sand is fantastic. The virtually non-functional hindlimbs can be seen in the photograph.

The golden sand lizard (*Acoetia roslegreni*) has no external limbs and X-ray examination has shown that no internal rudiments exist. This 10 inch lizard possesses a tail of only 2 inches, and the head has a hard pointed snout for pushing its way through hard soil. The golden-amber coloration with black markings in the form of small spots is decidedly attractive. Food, as for the silver sand lizard, is worms and slugs, and both these lizards are viviparous.

South Africa is very rich in these degenerate forms and gradations occur in some of the genera mentioned above. Those interested should read the chapter "Lapsed Limbs" in Dr. Walter Rose's excellent book *The Reptiles and Amphibians of Southern Africa*, which was recently reviewed in these columns.

The price of the species recommended in this article is likely to vary from 7s. 6d. to 15s. for *Chalcides* species to about 30s. for some of the others.



The anguine lizard possesses tiny limbs, the forelimbs being smaller than the hind ones

The Es-Es Story

IN a newly published 16 page booklet describing aquarium products currently manufactured by their firm, Singleton Bros. (Electronics) Ltd. recall how difficult things were for the tropical fish-keeper 30 years ago. The Es-Es was the first aquarium heater to be made to the now-familiar glass-tube design, and to-day a number of other accessories for the aquarist are marketed under the Es-Es trademark. As well as descriptions of these items, the booklet contains a page 'For the Beginner,' notes on raising water fleas for fish feeding and information about aquarium heating in relation to tank capacity and room temperature. *Es-Es Aquarium Products* is obtainable from Singleton Bros. (Electronics) Ltd., 53, Victoria Street, London, S.W.1. for the price of postage only (sixpence).

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.



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

Bitterling

I WAS very interested in the article on the "Breeding Habits of the Bitterling" in the July issue of *The Aquarist* as to a very large extent Mr. Laurence Perkins confirms observations I recorded in *The Aquarist* in 1924 and repeated in further detail in 1949.

I have recently met Mr. Perkins and find that our observations are even more identical than his article would suggest.

It appears that Mr. Perkins was under the impression that I had recorded that the eggs of the bitterling were placed by the female in the inhalant siphon of the mussel, whereas he was satisfied as a result of his photographs that the eggs were deposited in the exhalant siphon. In fact, I stated in my article of 1949: "The female would hang head down at an angle of about 75 degrees and then suddenly dive down on the mussel, striking it on the mouth of the siphon with the part of her body which is immediately in front of the ovipositor".

I would have thought it was clear that I was referring to the exhalant siphon but if this is not so, for record purposes, I now wish to confirm that this was my intention. I would also point out, that in the extracts I quoted in my 1949 article, the Dutch scientists expressly state that the ovipositor is inserted in the exhalant siphon of the mussel. However, Mr. Perkins' fine photographs have gone a long way to prove that the observations I made and recorded over 40 years ago were accurate and for that I am very grateful.

Even now I am not sure that all bitterling spawn the way Mr. Perkins and I have described. I would refer readers to a very interesting article by Dr. de Wit in *The Aquarist* (July, 1954) in which is reproduced a series of prints for a cine strip apparently showing the long "ovipositor" being withdrawn from the exhalant siphon. I wonder if it would be possible to persuade Dr. de Wit to comment on Mr. Perkins' photographs and also to reproduce some further prints from the film showing the long ovipositor going in and coming out of the siphon.

W. S. PITT,
Walton-on-Thames, Surrey.

Why Peppermints?

I HAVE news for Mr. B. R. James ("Peppermints, Piccololes—or What?", *The Aquarist*, September). There appears to be at least one other variety. I obtained a 'peppermint' some months ago and had the same difficulties trying to identify it. It is almost identical to Mr. James'

type 2 with these exceptions: the eyes are yellow with black pupils; it rests by 'gluing' itself to the glass, in almost any position, although usually head upwards.

Its swimming action suggests a highly inefficient or totally non-existent swim-bladder, i.e. when it wishes to traverse the tank, it first climbs to the top of the glass and then launches itself forth, swimming hard, trying to gain the other end of the tank before it strikes the bottom.

I would suggest that it is not related to the *Plecopterus* or *Otocentrus* family, which usually have an adipose fin and a forked caudal. It may, however, be akin to the *Gyrinocheilus ayrooides* of Thailand.

Incidentally, why 'peppermint'? Did the "well-known distributor" taste them before christening them?

S. BARRATT,
Corby and District Aquarist Society,
Corby, Northants.

Marine Tropicals

WE are writing to ask how many of your readers have been successful over a period of 1 to 2 years in the keeping of tropical marine fishes. We would also be interested to hear what happened to John Bourton's unicorn blennies (*The Aquarist*, April, 1962).

We have been fairly successful in keeping native marine and brackish fishes but understand that tropicals are more delicate.

PETER L. LEE,
F. P. TOWNSEND,
Sheffield, 7.

Public Aquariums

I AM writing this letter after my first visit to a famous public aquarium on the Sussex coast and must I feel tell you and other readers how disgusted I am at the state of this aquarium. Others in zoos etc. that I have visited over this country have also been disappointing.

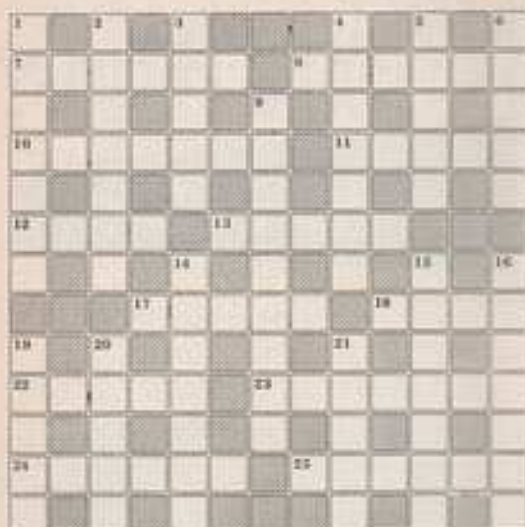
Although the tanks of tropicals were aerated and presumably filtered the plants were very sparse and half-dead. I realise that the tanks should not have many plants as the untrained eye would not be able to see the fishes, but the uncleanness is unnecessary.

I should also like to see a change from the standard type of fishes that I and others have. I expected to see something really different and more exotic in a public aquarium and I think quite rightly so.

D. F. M. BLACKMAN
Gravesend, Kent.

The AQUARIST Crossword

Compiled by L. BRADLEY



CLUES ACROSS

7. Ten on (ang.) (6) 17. Seat (3)
 8. Tropical carp (6) 18. Galt (4)
 9. *Hydrocharis* (7) 22. Scottish squire (3)
 11. Unwanted visitor in my aquarium (5) 23. Either *Acrossocheilus* or *Alburnus* (7)
 12. Could be used as a fish house (4) 24. The funny fish of the aquarium (6)
 13. Contained within the skull (3) 25. Type of fishing (6)

CLUES DOWN

1. *Corydoras* (7) 14. War he wanted? (7)
 2. Not honest (7) 15. Displayed by most tropical (7)
 3. Wounded with a knife (3) 16. Many are inclined to be washed (7)
 4. Water flea (7) 18 and 20. *Gymnocypris* or *Carassius* (5, 5)
 5. Many tropical fish are imported from here (3)
 6. Written composition (3) 21. Race course (3)
 9. Not left on ship (6)

Solution on page 154

Coldwater Queries Answered

continued from page 141

you have described. It is possible that some have been put into the water by an angler or aquarist. Some years ago large shinals were found in the Sawmill River, New York, and they had been put there without doubt. They were in shoals and so many were caught that it is believed they were wiped out. Bitterling carp do not grow much above 3 inches for the male and 2 inches for the female.

At our club we have had arguments about frogs. In the summer they have to come to the surface to breathe but in the winter they can stay under the water for long periods, even when the pond is frozen over. Do the frogs need less oxygen in the winter?

The common frog usually hibernates through the winter and in this torpid condition has no need to breathe. Like some other creatures which hibernate, it seems to depend a lot on how severe and long is the cold spell. For instance, during a warmer spell in the winter the frogs may be seen at the surface of the water. When it is very cold for some time they remain partly buried in the mud at the bottom. Many frogs die under the ice after a long spell of cold because it may have become slightly warmer at the bottom and the frogs have become roused. They then try to get oxygen at the surface and because of the ice are unable to do so. In consequence many die and this is the reason why dead frogs are often found with dead fishes after a severe freeze up when ice has covered the pond for about 2 weeks or more.

I have just started to keep coldwater fish and have four veiltails in a tank 19 in. by 19 in. by 10 in. They are aged about 2 months. When do fry cease to be called fry and become fish? Can you prescribe a diet for them? How often should they be

fed and what is the best temperature for them? Do young fish usually prefer swimming near the surface? What size do veiltails grow to and how long do they live? When feeding with *Daphnia* it is possible to see many small creatures like tiny transparent worms; what are they?

The young of fishes are usually called fry when they are very tiny and usually shoal. They have not yet taken on the proper fish shape. When they do they are referred to as youngsters or young fish. This stage depends on the type of fish and the rate of growth. With goldfish reasonably well fed, they become fish after 3 weeks at the most. Feed on the usual goldfish foods, both live and dried. During the warm weather feed as often as they can clear up the food in 10 minutes, but no more than three times a day. Never have uneaten food lying on the bottom for long. The warmer the water the quicker can the fishes digest their food. Most aquarium fishes prefer to swim near the top as there is usually more oxygen there. They go to the bottom to feed but generally swim near the top after. Veiltails can grow to a body length of 3 inches and if well cared for can live for 12-15 years. The creatures you see among the *Daphnia* are planarians, a type of flat worm which may do no harm to your fishes. Veiltails like a minimum temperature of 50° F (10° C).

I had stocked my pond with some small goldfish and three small catfish. I have now read that it is dangerous to other small fishes to have these in the pond. How can I catch them?

You can net them from the pond or empty it and get them that way. Should neither of these ways be possible you will have to fish for them. Tie a medium sized garden worm on a piece of twine and lower it in the pond, preferably in the evening. Have a small stick as a float and when a fish has swallowed the worm draw it out carefully. Have a net ready to slip under the fish when you raise it from the water in case it drops off. Catfish can eat other fishes about two-thirds their own size.

News from AQUARISTS' SOCIETIES

Monthly reports from Secretaries of aquarists' societies for inclusion on this page should reach the Editor by the 15th of the month preceding the month of publication.

The annual show of the **Blackpool and Fylde A.S.** was one of the best they have held. There was 228 entries and an excellent attendance. The results were as follows: **Tropical Fishes**—1, G. N. Hadley (Blackpool); 2, B. Crook (Blackpool). **Open Coldwater Fishes**—1, Mrs. G. N. Hadley (Blackpool); 2, B. Crook (Blackpool). **Open Tropical Fishes**—1, G. N. Hadley (Blackpool); 2, R. Crook (Blackpool); 3, B. Tattersall (Ayrington). **Coldwater Fish—Fancy Goldfish**—1, Mr. Philipson (Ayrington); 2, B. Crook (Blackpool). **Common Goldfish**—1 and 2, B. Crook (Blackpool). **Any other variety Coldwater**—1 and 2, B. Crook (Blackpool); 3, T. Williams (Blackpool). **Livestock—Hollies and Best Fish in Show**—1 and 3, Mr. Penster (Bradford); 2, Mr. Hunt (Newcastle). **Seedlings**—1, Mr. Swindhurst (Blackburn); 2, Mr. Fisher (Blackpool); 3, Mr. Stockdale (Preston); 4, Mr. Hunter (Wigan); 5, Mr. Campbell (Bury); 6, Mr. Wakling (Huddersfield). **Guinea Pig**—1, Mr. Hickson (Belle Vue); 2, Mr. Wilman (Blackpool); 3, E. P. Lewis. **Best Fish shown by a member other than the Best Fish in the Show winner**—R. W. Crook (Blackpool). **Labyrinth**—1, Mr. Hughes (Manchester); 2, Mr. Hill (Glossop); 3, Mr. Hasler (Fighurst); 4, Mr. Lewis (Barnley); 5, Mr. Hunt (Newcastle); 6, Mr. Houghton (Barnsley). **Barbs and Guppies**—Barbs: 1, R. Simpson (Blackpool); 2, Mr. Lewis (Barnley); 3, Mr. Yocice (Mossley); 4, Mr. Hasler (Wigan); 5, Mr. Hadley (Blackpool); 6, Mr. Hughes (Belle Vue). **Cichlids, Oscars**—1, Mr. Simpson (Liverpool); 2 and 3, Mr. Crook (Blackpool). **A.O.V.**—1, Mr. Mulla (Liverpool); 2, Mr. Hunt (Newcastle); 3, Mr. Walsh (Kilburn); 4, Mr. Simpson (West Haugham); 5, Mr. Partridge (Middlesbrough); 6, Mr. Wilman (Blackpool). **A.S.V. Tropical**—1, Mr. Lewis (Barnley); 2, Mr. Wilman (Blackpool); 3, Mr. Hoobler (Belle Vue). **Breeder's Livestock**—1, Mr. Hickson (Belle Vue); 2, Mr. Warren (Wigan); 3, Mr. Simpson (Barnsley). **Goldfishes**—1, Mrs. F. Willits (Blackpool); 2, Mr. Partridge (Middlesbrough); 3, Mr. Hughes (Belle Vue). **School Fishes**—1, Mr. Hughes (Belle Vue); 2, Mr. Wilman (Blackpool). **A.O.V.**—1, Mr. Mulla (Liverpool); 2, Mr. Hunt (Newcastle); 3, Mr. Walsh (Kilburn); 4, Mr. Simpson (West Haugham); 5, Mr. Partridge (Middlesbrough); 6, Mr. Wilman (Blackpool). **School Children's Individual**—1, Mr. Hughes (Belle Vue); 2, Mr. Wilman (Blackpool); 3, Mr. Hoobler (Belle Vue); 4, Mr. O'Hanlon (Blackpool). **Member with most awards**—Mr. B. Simpson (7).

RESULTS and final positions of the table show were: **Hastings A.S., Portsmouth A.S., Crawley A.S. and Brighton A.S.** held a Brighton Barbs: 1 and 4, D. Hancock (Preston); 2, H. Armitage (Preston); 3, E. Browning (Brighton). **Characins**—1, D. Hancock (Preston); 2, J. Hall (Brighton); 3, T. McCasack (Brighton). **Livestock**—1 and 2, A. B. Jackson (Crawley); 3, C. Ward (Bradford); 4, M. Hatley (Brighton). **Cichlids**—1, F. Martin (Hastings); 2, J. Stillwell (Preston); 3, R. Browning (Brighton); 4, Mrs. C. Dowling (Brighton). **Best Fish of the Show**—1, Hancock (Preston); 2, Total points all classes: Brighton A.S., 296.583; Portsmouth A.S., 293.28; Hastings A.S., 293.793; Crawley A.S., 290.73. Judge: J. Stewart, F.R.A.S.

PLANS for the annual open show were tentatively discussed at the October meeting of the **Preston and Bury A.S.** It was agreed that May next year would be the ideal time. Details to be arranged at subsequent meetings. One new member was enrolled, more are required and Subscribers in the vicinity are cordially invited to the Church House, Bury, on the second Tuesday of each month. The Table Show was for Guppies and resulted as follows: 1 and 2, F. Campbell; 3, P. Jennings.

RECENT activities of the **Yeovil and District A.S.** included the annual dinner when over 80 members including wives attended and where cups and shields were presented to winners at the annual table show. Also the tenth annual general meeting when the following members were elected: President, M. Emmons; chairman, D. S. Langford; vice-chairman, C. H. Ruffell; treasurer, T. C. Perry; Secretary, M. Hulbert; 98. The Avenue, Yeovil, Somerset; R. Jackson, A. Nicholls, T. J. Sharp, W. H. Dodd, H. G. E. Adams, D. Mason.

AT the annual general meeting of the **National Aquarists Society** the following officers were elected: President, W. A. Bone; vice-president, E. J. Barst; secretary, E. H. Mass; 43, Whitstarch Avenue, Edgware, Middlesex; treasurer, D. G. Armitage; ass. secretary and librarian, H. G. A. Haeridge; council: Mrs. J. Kesteven, E. Turner, J. Seale; Bulletin editor, L. B. Kesteven.

The new president paid a warm tribute to Mr. L. B. Kesteven who had been president for many years. He had now undertaken the post of Bulletin editor as the previous one, Mr. G. F. Harvey, could no longer find the time to do it. The members also endorsed a vote of thanks to Mr. G. F. Harvey for the sterling work he had done for the last ten years.

Meetings will be held the second Wednesday of each month at St. Mary's Church Hall, Crawford Street, London, W.1 (near Baker Street Station). Aquarists interested in membership should contact Mr. D. G. Armitage, 142, Hayes Chase, West Wickham, Kent.

THE annual general meeting of the **Manchester A.S.** took place recently when the following officers were elected: Chairman, N. Rafter; joint secretaries, E. B. Carr, P. Brevin, Fernan, Western Estate, Macclesfield and H. Wilson, Glen Cottage, Eton Avenue, Macclesfield, Cheshire; show secretary, Mrs. E. Wilson.

The society will hold an open table show on Sunday, 1st December at R.W. A. Pavilion Fens Avenue, off Buxton Road, Mansfield. For particulars contact Mrs. E. Wilson (show secretary).

DISPENSE the fact that all the Coldwater classes were excluded from their recent annual show, there were still over 200 exhibitors at the **Bethnal Green A.S.** show, and the organizers would like to take this opportunity of thanking all who helped to make the show the success it was. The results of all classes were as follows: **Tropical Fishes**—1, Walthamstow A.S.; 2, Farnham A.S.; 3, Bethnal Green A.S.

Coldwater Fishes—1, Walthamstow A.S.; 2, Farnham A.S.; 3, Bethnal Green A.S.; 4, Farnham A.S.; 5, Bethnal Green A.S.; 6, Farnham A.S.; 7, Farnham A.S.; 8, Farnham A.S.; 9, Farnham A.S.; 10, Farnham A.S.; 11, Farnham A.S.; 12, Farnham A.S.; 13, Farnham A.S.; 14, Farnham A.S.; 15, Farnham A.S.; 16, Farnham A.S.; 17, Farnham A.S.; 18, Farnham A.S.; 19, Farnham A.S.; 20, Farnham A.S.; 21, Farnham A.S.; 22, Farnham A.S.; 23, Farnham A.S.; 24, Farnham A.S.; 25, Farnham A.S.; 26, Farnham A.S.; 27, Farnham A.S.; 28, Farnham A.S.; 29, Farnham A.S.; 30, Farnham A.S.; 31, Farnham A.S.; 32, Farnham A.S.; 33, Farnham A.S.; 34, Farnham A.S.; 35, Farnham A.S.; 36, Farnham A.S.; 37, Farnham A.S.; 38, Farnham A.S.; 39, Farnham A.S.; 40, Farnham A.S.; 41, Farnham A.S.; 42, Farnham A.S.; 43, Farnham A.S.; 44, Farnham A.S.; 45, Farnham A.S.; 46, Farnham A.S.; 47, Farnham A.S.; 48, Farnham A.S.; 49, Farnham A.S.; 50, Farnham A.S.; 51, Farnham A.S.; 52, Farnham A.S.; 53, Farnham A.S.; 54, Farnham A.S.; 55, Farnham A.S.; 56, Farnham A.S.; 57, Farnham A.S.; 58, Farnham A.S.; 59, Farnham A.S.; 60, Farnham A.S.; 61, Farnham A.S.; 62, Farnham A.S.; 63, Farnham A.S.; 64, Farnham A.S.; 65, Farnham A.S.; 66, Farnham A.S.; 67, Farnham A.S.; 68, Farnham A.S.; 69, Farnham A.S.; 70, Farnham A.S.; 71, Farnham A.S.; 72, Farnham A.S.; 73, Farnham A.S.; 74, Farnham A.S.; 75, Farnham A.S.; 76, Farnham A.S.; 77, Farnham A.S.; 78, Farnham A.S.; 79, Farnham A.S.; 80, Farnham A.S.; 81, Farnham A.S.; 82, Farnham A.S.; 83, Farnham A.S.; 84, Farnham A.S.; 85, Farnham A.S.; 86, Farnham A.S.; 87, Farnham A.S.; 88, Farnham A.S.; 89, Farnham A.S.; 90, Farnham A.S.; 91, Farnham A.S.; 92, Farnham A.S.; 93, Farnham A.S.; 94, Farnham A.S.; 95, Farnham A.S.; 96, Farnham A.S.; 97, Farnham A.S.; 98, Farnham A.S.; 99, Farnham A.S.; 100, Farnham A.S.

AT the **Guest Keen & Nettlesolds Pond and Aquarium Society's** monthly meeting, the Chairman welcomed guests from the Filton and Wolverhampton Societies, for an interesting talk on Fish Diseases by Mr. L. Dodge, chairman of the M.A.P.S.

There was also a Table Show for our variety Egg-layer for the late Mr. A. Whittington's Trophy, this was judged by Mr. Paul Stokes of Wolverhampton. The result was as follows: 1, C. Richards; 2, W. DeWison; 3, W. DeWison.

MEMBERS of the **Leyce Aquarists** had a most enjoyable evening at their last meeting when Mrs. Smith of Morecambe demonstrated the setting up of a 800 tank, not a tank for exhibition purposes but as an object of beauty in the home. Mrs. Smith stated that a tank was like a beautiful picture but with one great advantage, it could be changed at will. She demonstrated the various ways of setting up the tank using different types of rocks and plants, and said that if members would set up their tanks as she demonstrated, their views would no doubt allow that extra tank that the aquarist always wanted. The secretary is J. Mills, 13, Brookfield View, Boston-Lancs.

THE annual general meeting of the **Belle Vue (Manchester) Aquarists Society** was held in the Palm Court Restaurant, Belle Vue Gardens, and the officers elected were as follows: Chairman, Mr. E. R. Owen; vice-chairman, Mr. S. Taylor; hon. secretary, Mr. C. Kelly; hon. treasurer, Mr. J. L. Kelly; show secretary, Mr. W. Hughes. The management committee elected were: A. Anstey, S. Baker, C. Belding, H. Anstey, J. Coffey, E. Gill, A. Hickson, M. Hutchinson, M. Pollard, G. Thompson, A. Lewis (joint representatives).

The next meeting of the society will be held on the first Wednesday of the month in the Palm Court Restaurant, Belle Vue Gardens, Manchester.

THE **Ladbroke Tropical Fish Club** held its first annual show recently, and a good turnout of the members assured an enjoyable and informative evening. The judging was done by Mr. Eric Large, who congratulated the Club both on the quantity and the quality of the fish on show. The results were as follows: **Male Guppies**—1 and 2, T. Glass; 3, Mrs. V. Wilton. **Female Guppies**—1, T. Glass; 2, Mrs. V. Wilton. **Mollies**—1, Mrs. D. Wright; 2, T. Glass; 3, R. Nichol. **Platies**—1, Ray Langridge; 2 and 3, R. Nichol. **Swordtails**—1, T. Glass; 2, R. Nichol; 3, Mrs. V. Wilton. **Barbs**—1, T. Glass; 2, Characins; 1, T. Glass; 2 and 3, Ray Langridge. **Labyrinth**—1 and 2, T. Glass; A.V. Caribbi; 1, T. Glass; A.V. Caribbi; 1, T. Glass; 2, Ray Langridge; 3, E. Willet. **Danio**, **Barbus**, **W.C.M.M.**—1,

2 and 3, Mrs. V. Wilton, Egg-laying Toothcarp; 1, 2 and 3, T. Glen, A.O.V. Tropical Fish; 1, A. Wright.

RECENTLY the Willenden and District A.S. were guests of Chelsea A.S. at their club premises. The Table Show arranged was a round bag of 14 fish, each club exhibiting 12 fish of any variety, which must have given the judge for the evening, Mr. Ted Jessop, quite a problem selecting the first four. Chelsea were the eventual winners by a margin of 10 points. Mr. Forrest of the Chelsea club, provided the evening's entertainment with a film show consisting of a good selection of underwater film in colour. The results were as follows: 1, Mr. Morrish (Chelsea) with a Butterfly Fish; 2, Mr. B. Large (Willenden) with an Angas Cat; 3, Mr. Hootyworth (Chelsea) with a Blind Cave Fish; 4, Mr. E. Hobbey (Willenden) with a Synodontis Cat. Final points—Chelsea 914; Willenden, 904.

NEW SOCIETY

RECENTLY a new club has been formed in Newcastle known as the Tyneside Aquarist Group. Meetings are held fortnightly on Friday evenings under the chairmanship of Mr. W. Hadden at the Club's former headquarters at 109, Westwood Road, Newcastle upon Tyne, 1.

THE committee of the Leith Aquarist Club are now as follows: Chairman, D. W. Paterson; vice-chairman, C. H. Wilson; treasurer, C. Razi; Secretary, J. Paterson, 30/2, Paisley Drive, Meadowfield, Edinburgh, 6. Committee: H. Foster, B. McLaughry, B. Stuart, A. Halliday; junior member, I. Stewart.

The monthly Table Show results were: Egg-layers: 1, T. Wilton; 2, L. Wilson; 3, D. Paterson. Livebearers: 1, J. Evans; 2 and 3, C. Barr, junior; 1, E. Stuart; 2, D. Shale. Highest priced fish of show and awarded Fish Trophy of the Month: E. Stuart, with Weather Loach.

AT the last meeting the members of the Tipton and District A.S. entertained the members of the Wolverhampton A.S. to an Intra-Society table show. The classes were Barbs, Cichlids and A.O.V. Egg-layers. Tipton won by 11 points to 8, and individual placings were: Barbs: 1, J. Stanford (Tipton); 2, H. Williams (Wolverhampton); 3, P. Bellon (Wolverhampton); Cichlids: 1 and 2, W. Davison (Tipton); 3, H. Williams (Wolverhampton). A.O.V. Egg-layers: 1 and 2, J. Denman (Wolverhampton); 3, C. Whitehouse (Tipton). The judge was Mr. Ham Brown of Southbridge, and he awarded Mr. J. Stanford Best Fish in Show.



The Aquarists' Badge

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

To obtain your badge send a postal order for 2s. 6d. to *The Aquarist*, The Butts, Half Acre, Brentford, Middlesex, and please specify which type of fitting you require.

THE Open Table Show results of the Bradford and District A.S. were as follows: Livebearers: 1 and 2, H. Fletcher (Bradford); 3, T. Barnes (Tadcaster); Barbs: 1, A. Furb (Bradford); 2, J. Hodgson (Accrington); 3, D. W. Asherton (Bradford); Characins: 1, Mrs. Brent (South); 2, D. Hanson (Halifax); 3, J. Hunt (Tyneside); Carps and Minnows: 1, J. Hunt (Tyneside); 2, R. Edson (Bradford); 3, C. R. Wilson (Bradford); Anabantids: 1, L. Greenall (Tadcaster); 2, J. Hooper (Bradford); 3, C. R. Wilson (Bradford); Fishery: 1, C. Bunn (Bradford); 2, J. Hunt (Tyneside); 3, J. Batten (Tadcaster); Cichlids: 1, J. Hunt (Tyneside); 2, R. W. Crook (Blackpool); 3, J. Hodgson (Accrington); Catfish and Loaches: 1, Mrs. Brent (South); 2, G. Fowsey (Middlebrough); 3, J. Hodgson (Accrington); Toothcarps: 1, G. Holmes (Bradford); 2, L. Greenall (Tadcaster); 3, A. Moss (Accrington); A.O.V.: 1, H. Greenwell (Bradford); 2, Mrs. N. Mason (Middlebrough); 3, J. Hooper (Bradford); Breeders' Livebearers: 1, J. E. Abgarrood (Bradford);

J. A. Moss (Accrington); 3, A. V. Ford (Bradford); Breeders' Egg-layers: 1, L. Greenall (Tadcaster); 2, D. Farkin (Bradford); 3, Mrs. Wilton (Blackpool); Coldwater: 1, A. Dierwood (Accrington); 2 and 3, L. Booth (Blackpool). Best Fish in Show: Electric Catfish; Mrs. Brent (South).

SECRETARY CHANGES

Middlebrough and District A.S. (Mrs. N. Mason, 25, Burnard Avenue, Parkfield, Stockton-on-Tees, Co. Durham); Fyfeclaw A.S. (Mr. E. R. Kemp, 8, Langley Mansions, Langley Lane, London, S.W. 5).

ANNOUNCEMENT

THE Nottingham and District A.S. thank the many exhibitors at their recent open show, and apologise for the delay at the prizegiving.

Any exhibitors who did not receive their award cards or First Prize please contact W. J. Christian, 7, City House, 3, Maid Marian Way, Nottingham.

THE Warren Country Section of the F.G.B.S., have now moved from Wantstead House, and the new meeting place is 36, North Street, Platonow. This is the home of the Federation libraries, Bill Myers and if there are any people interested in the Guppy within travelling distance they will be given a warm welcome. For full details, please drop a line to—L. Randall, 116, Brook Street, Bath, Kent.

Crossword Solution

C	C	S		D	W	E					
A	E	R	A	T	E	D	A	N	I	O	S
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A	D	E	D	C	U	N					
C	L	O	W	N	S	C	O	A	R	S	E
K	W	T									

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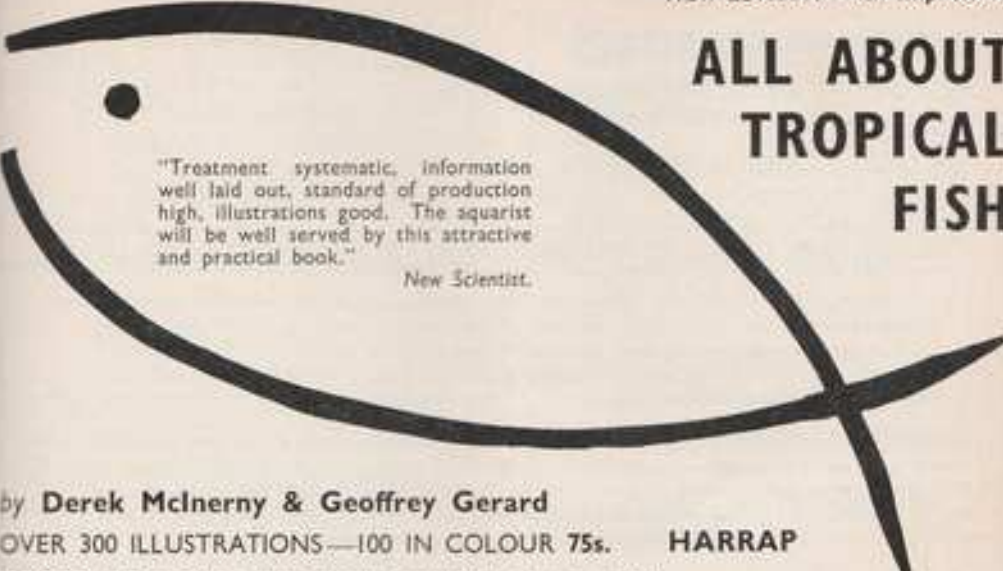
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PREPAID ADVERTISEMENTS continued on page 154

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