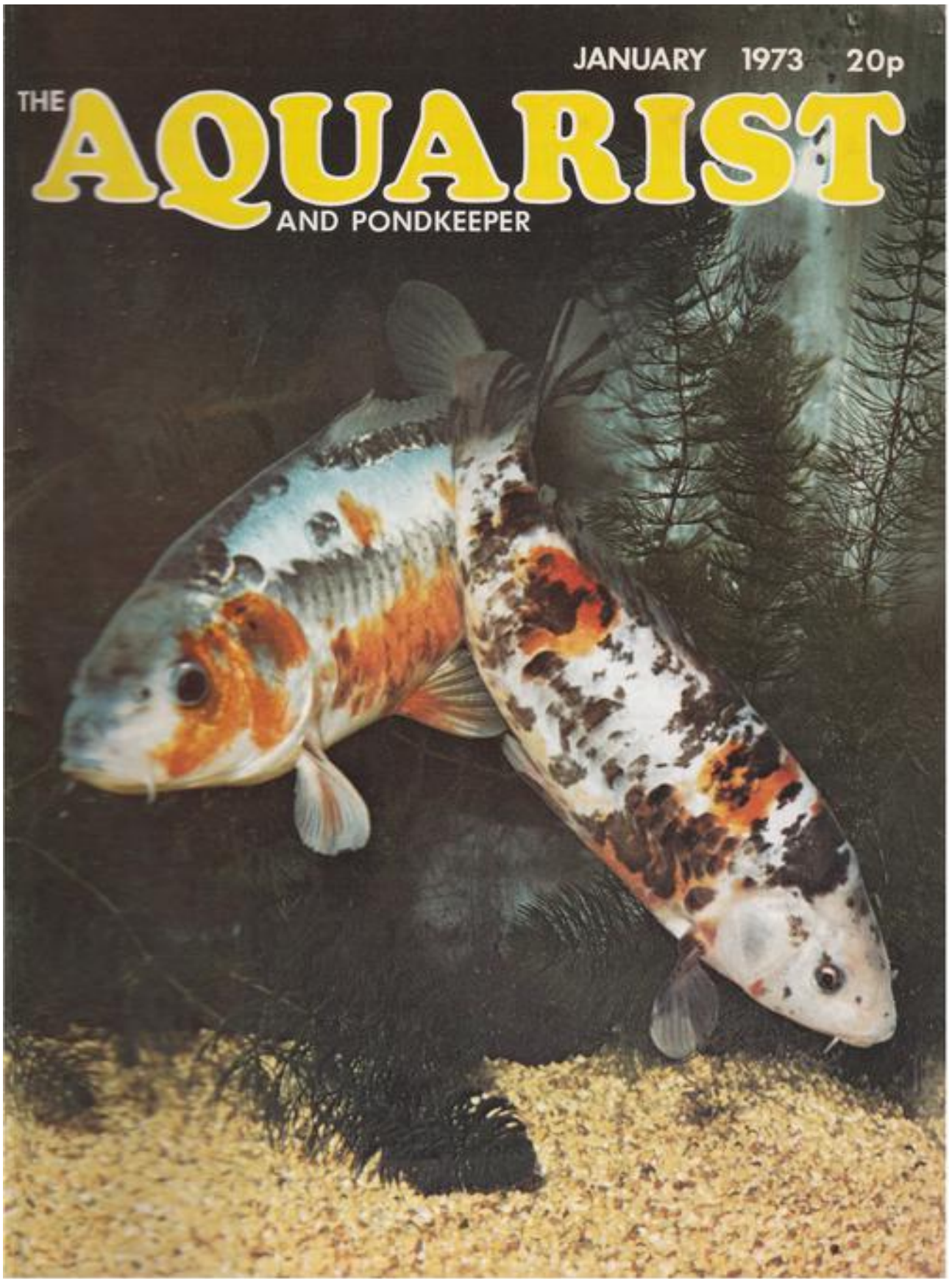


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THE AQUARIST

AND PONDKEEPER





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AND PONDKEEPER

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Our Cover

Koi. Courtesy of K. D. Fawcett,
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January, 1973

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The Editor accepts no responsibility for views expressed by contributors.

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Tilapia mossambica

by Jorgan and Pamela Hansen

OUR FIRST EXPERIENCE of *Tilapia mossambica* was some years ago when a 12-year-old friend lent us his pair for a fortnight, the idea being that we with our greater(?) experience would somehow induce them to spawn. At that time our tank-space was quite limited, and moreover, all the reasonable-sized tanks we possessed were already overloaded with inhabitants, so the only accommodation we could offer was a 45 x 20 x 15 cm. tank, which was clearly inadequate, but which we nevertheless persuaded ourselves would do the trick.

The fish struck us as large, brown, and ugly, and a monstrous size as compared with the dainty guppies and tetras we kept at that time. Although the male was frequently occupied with digging various hollows in the gravel, the pair confined themselves to looking at each other and no spawning occurred. We were quite glad to return the fish to their owner when the time came, as their appetites were insatiable and it took them no time at all to exhaust our supplies of dry food, despite being daily provided with large earthworms (which they swallowed whole) from the garden.

In January '72, undaunted by this experience, we exchanged some *H. burtoni* for 5 young *mossambica*. When settled down in a large, exclusively mouth-brooder tank, they showed themselves to be handsome and impressive, and scarcely recognisable as belonging to the same species as the previous fish. In suitably spacious accommodation the fish's size adds to its grandeur, and is in no way offputting. The maximum size attained in nature is 37 cm. (15 in.) but needless to say this size is not attained in the aquarium. It is often stated that 15 cm. (6 in.) is the expected length of the aquarium-bred *mossambica*; in fact the father of the young we received was 30 cm. (12 in.) in length.

Our specimens were 3 months old when we got them and 4 cm. (1½ in.) long. At this stage it was impossible to sex them, and, in fact, they all remained the same dullish grey-brown shade, redeemed only by iridescent glances, until the age of 7 months. Three of them thereupon grew darker in colour, and eventually turned quite black, with green scales overall, with the exception of the area from mouth to gills and down over the lower jaw, which turned white. The dorsal fin also turned black, edged with a red band 2 mm. broad; the caudal fin developed a red edge 10 mm. broad; while the

pectoral fins became red all over. These three fish also grew larger than the other two, so we were left in no doubt that we had three males. The females never became as dark in colour as the males, not even while spawning. Their fins were also edged with red but not so intensively as in the males. The only fins which didn't contain red in either sex were the ventral fins.

The fish ate all we gave them, the usual brands of dry food, *Daphnia* and *Cyclops*, and all they could find in the tank, namely thread algae and duckweed. The stones and pieces of slate in the tank were moreover constantly gnawed clean of green algae. In nature *T. mossambica* lives almost exclusively on algae and animal plankton.

In the course of July, when the fish were 9 months old, we fed them well with fine strips of raw chicken liver and heart, the idea being that they should spawn just before we departed abroad for a fortnight's holiday. In this way the period of our holiday should more or less coincide with the period the young remained in the mother's mouth, and thus would not require feeding. We would then return just in time to feed them when this was first necessary. If the spawning had occurred too long before we departed, then the young would have been released long before we returned, and would then either die or be stunted in growth.

In fact two days before we were due to leave, one of the males began to domineer the other occupants of the tank. He gleamed in distinct black, green, white and red colours, and availed himself of every opportunity to drive the other fish away from the hollow he had expended much energy in digging in the centre of the tank. The hollow was about 20 cm. (8 in.) in diameter and 2 cm. (0.8 in.) deep, in fact right down to the glass bottom, which the male cleaned again and again. His spawning tube (1 mm. long) was now in evidence immediately in front of the anal fin. When either of the females appeared, the male writhed his body to attract her to the hollow; when a female complied and the spawning ritual was performed over the hollow, but with no eggs appearing, she was roughly chased away again: it didn't seem as if a successful spawning would occur that evening.

Nonetheless the next morning one of the females was discovered with eggs in the mouth, so we accordingly

placed her in a 50-litre tank by herself. Meanwhile the remaining female wasted no time but set to work helping the male re-clean the hollow. Her spawning tube, or ovipositor, was now apparent, 2 mm. long, thicker than the male's, and yellowish in colour. Again, several times, the pair turned in a circle after each other, each with mouth towards its partner's anal fin but with not a single egg appearing. This preparatory spawning ritual took place just as frequently over the gravel as over the prepared hollow.

We never managed to observe the actual spawning; but on return from our holiday we found female No. 1 still carefully looking after her young, while female No. 2, in the community tank, also had young in the mouth. While being moved in a small container she spat out



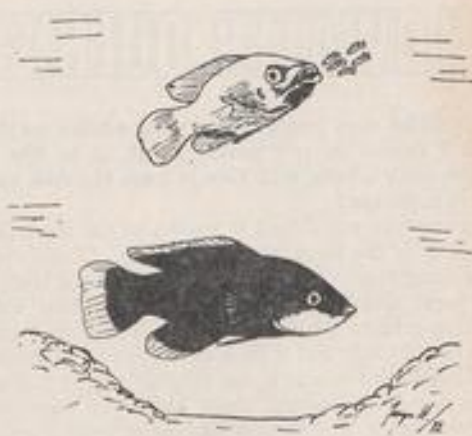
the young (which were in any case already free-swimming), but took them again when in the new tank. Our plan was to observe how long she continued to care for them, i.e., take them in to the mouth now and then; but as female No. 1 suddenly swallowed all her young, we felt obliged to move female No. 2 apart from her young, to ensure that we got at least one brood.

Female No. 1 thus cared for her young for 18 days, before devouring them, and female No. 2 also cared for her young for up to 18 days, probably exactly 18 days (releasing them on the seventeenth day when moved), before we removed her from them. Since we were away on holiday we could not observe if the young were released before this period or not; certain books state that the period of residence in the mouth is 10 days, with the female continuing to care for them for a further week.

The brood of female No. 2 was roughly 50 in number, not a large brood for *T. mossambica*, for which 300 would be a more typical brood size, but the female in

question was relatively small, 10 cm. (4 in.), and it was her first brood. The fry were indistinguishable from *Haplochromis burtoni* or *Hemihaplochromis multicolor* fry, as they were the same size when released, 6-7 mm. (0.28 in.), and had the same greyish-brown shade. From the start they were able to eat brine shrimp, *Cyclops*, and small *Daphnia*, and with frequent, small feeds, grew rapidly.

T. mossambica, as indicated by its name, originates from Mozambique in East Africa, where it was first discovered by Peters in 1852, but is to be found as far south as the province of Natal in South Africa. It thrives best at a temperature of between 21-30°C (70-85°F) but in certain localities in its native waters



Female (above) and male in breeding livery

the temperature falls as low as 13°C (55°F). It requires no special type of water and in fact is reputed to be able to breed in salt water, although living in salt water may delay maturation.

On account of these characteristics, *T. mossambica* has been found to be an excellent and invaluable fish for purposes of dam culture in protein-lacking areas of the world, and has thus been introduced into artificial dams throughout those areas. Although *Tilapia* culture in artificial ponds was known to the Egyptians some 4,000 years ago, the modern culture of *Tilapia* for food purposes began in Java in 1939 after some *T. mossambica* were mysteriously discovered in a lake on that island. The eventual crossing of two sub-species of *mossambica*, one from Zanzibar and one from Java, was found to produce males only, and the separate cultivation of these males helped to solve the problem of rapid multiplication and stunted growth which otherwise occurred.

T. mossambica is only one of many species of tropical fish eaten in their native land or cultured for food purposes in underdeveloped countries.



OUR EXPERTS' ANSWERS TO YOUR QUERIES

READERS' SERVICE

All queries **MUST** be accompanied by a stamped addressed envelope.

Letters should be addressed to Readers' Service, The Aquarist & Pondkeeper, The Butts, Brentford, Middlesex, TW8 8BN

COLDWATER QUERIES

by Arthur Boarder

I would be very grateful for your advice on the insect I found in my small pond. It is like a maggot with a long tail. Can it hurt the fish and what is it please?

The creature you found is known as the rat-tailed maggot. It is the larva of the Drone fly, (*Tubularia*). These maggots may be found in the mud at the bottom of a pond and they are able to push their long breathing-tube to the surface for air. The pupa forms inside the old skin and it then develops two breathing appendages with which it can take air whilst floating at the top of the water. Some kinds can leave the water to pupate. The fly lays its eggs in small clusters on the surface of the water. The maggot will not harm your fish and in fact may be eaten by them.

One of my goldfish has developed a lump on its side near the dorsal fin. What is it and how can it be cured?

The lump may be a cyst or form of tumour. If it is not inflamed and does not appear to cause the fish any trouble there is no need to do anything with it as it may clear of its own accord. If it gets inflamed there may be pus or other matter inside which could be removed. To do this sterilise a needle, or pointed sharp knife, and make an incision. Squeeze out any matter and then clean the wound with T.C.P. or other disinfectant. The fish should be held carefully in a wet cloth whilst treatment is being given and will not come to any harm if it is out of the water for a short time. Always get everything ready before taking a fish from the water for treatment. After this the fish may be kept for a few days in a solution of sea-salt at the rate of a tablespoonful to a gallon of water. This will save the wound from going septic.

I bred some goldfish in my outdoor pond and when about an inch long I brought them inside and placed them in three tanks. These were

aerated but the fish suddenly started to dash about the tank and they lay on the bottom, gulping furiously, later dying. What do you think was the cause of the fish dying?

There are several possibilities as to why the fish died. Those you sent were too desiccated to be recognisable and, in any case, fish should not be sent to me as I do not perform post mortems. The dashing about might suggest gill-flukes, but the fish do not die for some time, at least several days when attacked by these pests. They would also show blood streaks on their bodies before dying. It may be that the water is poisonous perhaps from copper pipes as this action of the fish could be caused by poisoned water. Tobacco smoking in the room could also be a cause as the aerator would keep sending this poison through the water. Another possibility is that there may be an electric leak in the tanks. An exposed wire to aerator could be a cause. I remember some years ago at Belle Vue Exhibition, a lady was putting some Danios in a set-up tank and when she switched the light on the fish acted as yours appear to have done. The trouble with the tank in question was soon discovered as a man touched the tank and was immediately knocked to the ground. A suspect lead was then found. You must check up on all these points and you may trace the trouble.

I have bought a four month old Oranda, which has not as yet grown its hood. How old will it have to be before it grows?

The time the hood takes to grow depends on the warmth of the water, the space available and the amount of food it eats. In other words, the quicker it grows the sooner will the hood develop. Normally an oranda should have the hood by the year following hatching but again this depends on the conditions as above.

I have twelve inches of goldfish in a tank, 18 x 10 x 10 inch, with an under gravel filter and

an airstone. How much light do I need over the tank which does not get much sunlight?

Your tank will need a 40 watt lamp to be on for about ten hours a day. Your tank should not hold more than 7½ in. of fish. I know that you may keep the fish alive with the aerator but even with this it does not signify that the fish will remain healthy.

I have a small tank with a dozen plants of *Elodea crispata* and wonder which other plants I can have?

As your tank is small I suspect that you have enough water plants already. You must allow for growth as if they get too prolific the fish will not find swimming space. Other suitable plants are:—*Egeria densa* and *Ceratophyllum demersum*. The first named used to be called *Elodea densa* and your plant is now *Lagarosiphon major*.

I have caught a Koi from my pond which appears to be in distress. It is very sluggish, its dorsal fin is kept down and there are some reddish marks on the sides of its body at the rear of the gill plates. What is the trouble?

It could be that the fish is suffering from an attack of flukes. These could be *Gyrodactylus* or *Dactylogyrus*. The fish usually gets rather thin and goes off its food when attacked by these pests. It will also mouth at the surface at times. It seems certain that parasites of some kind are worrying the fish. You could try the fish in a salt solution for three or four days to see if there is any improvement. Put the fish in a container of water and add sea salt (Tidmans will do) at the rate of a tablespoonful to a gallon of water. If the fish shows no sign of improvement wash it in fresh water and try the disinfectant cure. This means dipping the fish in a solution of a half tea-spoon of T.C.P. to a gallon of water or Dettol at a rather weaker rate. The fish must not be left in the solution for more than three minutes and removed to fresh water before this if it turns over. The treatment can be repeated after three days if no signs of a cure.

I have a fair sized tank well stocked with water plants, an under gravel filter and an aerator. I have lost three fancy goldfish with what appears to be swim-bladder trouble. The fish cannot keep down in the tank and their bodies become swollen. They appear to have to attach themselves to a plant to stop from floating to the surface. What can be the trouble?

It does not seem that the fish have the ordinary swim bladder trouble, as in this case, although they cannot keep on a proper keel, they do not necessarily float to the top. I suspect they may have a form of embolism, when air bubbles get into their blood stream and can cause death. You stated you have an aerator and plenty of growing water plants. You may be pumping too much oxygen into the water with the

aerator. If your tank has the amount of water plants you state you should not need an aerator. I have kept fancy goldfish in tanks for the past twenty-seven years and have never used an aerator or filter in them at any time. Water plants should be quite sufficient to keep the water in good condition with the weekly servicing as long as over-feeding does not take place and the fish are not overcrowded.

I recently noticed that many of the goldfish in my pond had what appeared to be a black thread sticking out of their bodies. On closer inspection this seemed to be a worm or thin leach. What do you think it is please?

There seems to be little doubt but that your fish are attacked by *Lernaea* or Anchor worm. This is not a worm at all but a form of crustacean, actually a parasitic copepod. For many years it was thought that this parasite did not occur in Britain, but my suspicions were aroused by reports from readers of such a pest. By the aid of sketches and dried specimens supplied by enquirers I was able to recognise that the pest was what I had at first suspected. My statement was questioned by a biologist from the special station at the Lake District, but after he had been supplied by me with the names and addresses of writers who had found the pests, he was able to definitely identify the parasites. The one found on your fish is the female parasite which attaches itself to a fish and sucks its juices. This female produces two sacs of eggs at its rear end from which fresh young parasites emerge. The male is free swimming and much smaller, more like a *Cyclops*. You must catch the fish and remove the pests. Touch them with neat T.C.P. or Dettol and they can then be picked off with tweezers. With repeated treatment you should be able to rid the pond of the trouble and if you could keep it free of fishes for a fortnight, it should be safe, as the young parasites, if any were free, would die if they could not find a host.

Would it be possible to keep Koi in a tank indoors? If so what size tank and how big will they grow? What size of fish should I buy and how long will it take to grow too large for the tank?

You could keep Koi indoors in a tank the same as you could any other fish of the carp type. However, there are considerations which you would do well to remember. Koi can grow to at least eighteen inches in length and so you can well imagine how big a tank would have to be for such a fish. One of five or six feet long would be the minimum. If you wish to keep one or two you should only start with small fish, not more than three inches long over-all. I suggest that you try some which have been bred in this country. The rate of growth depends on the amount of food given, together with the space available. Three years would probably be the limit of time, in which you could keep a Koi

in a tank unless the tank was very large or you withheld sufficient food to encourage growth, which would be a bad way of fishkeeping.

I own a fantail goldfish and two common goldfish. I would like to enter them for some exhibitions. Please give me some information on how to enter them and where they are held?

I consider it rather hopeless for a beginner to enter a fish at an open show before he has had some experience at a club show. At an open show the competition can be very fierce. The best thing to do will be to join an aquarist club. Most of these hold table shows where it is possible for a beginner to exhibit his fish. He will then have the opportunity of getting the advice from experienced aquarists as to whether his fish is good enough to show in the open nor not. Then he should get all the information possible as to the requisites of the particular fish he wished to exhibit and so get to know what the judges will be looking for. A visit to one or two shows is a very good way of gaining information, as there are usually plenty of aquarists about willing to give advice; sometimes this can be confusing to the beginner, but sort it out and remember the salient parts. Many fish shows are advertised in *The Aquarist*.

I have recently purchased a shubunkin and a fantail goldfish. Both were healthy when I bought them but now both of them have frayed fins and look rather dejected. They have a catfish in the tank with them.

As the fish show this frayed finnage it is quite likely that the catfish has been nibbling at their fins. The catfish is carnivorous and would eat any goldfish small enough, and could bit any smaller ones. These catfish are sold as scavengers, but they are quite unnecessary in a tank with goldfish, apart from the danger. A healthy goldfish is just as good a scavenger as any catfish, providing such goldfish is not fed too much.

I have caught a number of young eels in a local stream. Will they be safe in with goldfish and will they be good scavengers?

Your young eels are probably *Anguilla anguilla*, and they can be kept in a tank. Some sand should be on the

bottom as they like to burrow into it at times. They are carnivorous and so could take a nip from goldfish. They can be fed on any live foods as used for goldfish. As for scavengers, they are no better than goldfish for this purpose. A hungry goldfish will eat any type of food and so the use of other scavengers is quite unnecessary as long as the goldfish are not over-fed.

Among my fish in a tank, I have a Calico fantail which has long streamers to its tail. If I trim off some of this, will the tail broadened out as it should be?

By trimming the tail of your fish you will not make it broaden. It will just grow again as it was before, but will probably show a thickening at the point where the cut was made. Leave well alone as some fantails do often develop longer tails than is required and this cannot be altered by trimming. There would also be the danger of fin-rot or Fungus attacking the damaged part.

I have made a garden pond and would like to make some figures for it. Where can I get them or make them with moulds?

I do not quite know what type of figures you want for your pond. This could be overdone as too many gnomes etc., can look rather silly. A central figure for a formal pond could look very attractive I know, and this is quite in order. You can get many types of figure from several of the dealers and I will include the address of a couple where you could send or a catalogue.

I have heard that Minnows can eat many pests from a pond, including leeches. Where can I get a hundred Minnows?

Minnows are not usually stocked by aquarist dealers. You could try catching some yourself with a Minnow trap, baited with bread. If not possible you might look in an Angling magazine to see if any are offered for sale, as some might be sold as bait for Perch. Another source could be to seek the help of an angler who might be able to get some for you. Even so, a hundred would be a lot to use in any pond and as to their ability of eating leeches, I doubt very much if they could eat the larger ones.

TROPICAL QUERIES

I should like to know the scientific name of the tiny flat worm that glides in its hundreds over the sides of my aquarium?

This species of planarian or flat worm is formally known as *Dendrocoelum lacteum*.

by Jack Hems

I have just read in a magazine article that the Siamese fighting fish is a mouthbreeder. How stupid can the non-specialised press get?

A lot of nonsense does appear in print but even the specialised journals contribute their share. Although we

tend to think of Siamese fighting fish as bubble-nest-builders, *Betta pictum* and *B. pugnax*, among others, are mouth breeders or, if you prefer it, mouth brooders.

I should like to know more than we are usually told about the water moss called *Vesicularia dubyana*.

All I can tell you about this useful and decorative plant is that early in the 1930s, workers in the Zoological Institute of the University of Vienna noted the moss among a collection of plants received from a botanical station on Java. But very little was heard of this plant until it received attention in the pages of *Datz*, famous German aquarium journal, previously known as *Wochenschrift für Aquarien- und Terrarienkunde*.

I have just bought two ember barbs. I should like to know the scientific name of this fish and the length it is likely to attain in a well-cared-for and spacious aquarium?

The scientific name of the ember barb is *Barbus melanampyx*. With no overcrowding and an adequate supply of oxygen it can attain a length of about 4½ in.

I should appreciate some information about the fishes popularly known as medakas.

Medakas or rice fish are members of the family *Oryziatidae*, not long ago included in the family *Cyprinodontidae*, with seven small species contained in a single genus called *Oryzias*. The best known of the rice fish is *O. latipes*, a species that occurs in many of the drainage ditches and paddy fields of Japan. It is a sombre-hued fish, but displaying an iridescent sheen of blue to green on the sides. Most cultivated forms are in shades of gold. A black form is said to exist in Japan. The eggs of the medaka are brushed off on the plants and they take about a fortnight to incubate. The fry, about as large as newly-born guppies, can take powder-fine dried food, brine shrimps and micro worms from the start. *O. latipes* has a wide temperature tolerance—from temperate to tropical—but *O. javanicus*, *O. celebensis* and *O. melastigma*, which occur farther south, demand tropical conditions.

What is the best way to encourage earthworms to congregate in one spot in a garden?

At this time of the year, if the weather is cold, earthworms tend to burrow deep into the ground, but in mild weather they will frequent the ground within a few inches of the surface. To encourage them distribute used tea-leaves, potato peelings and other vegetable wastes over the piece of ground set apart for their cultivation, and keep it moist and dark under layers of newspaper, sacking or a sheet of linoleum. Do not disturb the same area of ground, when digging for the worms, too frequently.

How does the blind cave characin find its way about without bumping into other fishes or inanimate objects?

By special organs of perception as, for example, the lateral line, which is highly sensitive to movements in, and of, the water. In short, there is a sort of built-in system of warnings similar to the echo-systems of underwater craft or the echo-system of bats.

How long has the cardinal tetra been known to the fishkeeper? I cannot find it mentioned in the older aquarium books.

If you cannot find the cardinal tetra under the formal name of *Cheirodon axelrodi* look for it under *Hyphessobrycon cardinalis*. The introduction of the cardinal tetra took place in 1956. In this year, too, it was given its correct scientific name.

I have just introduced two *Tetraodon fluviatilis* into my community tank. What sort of food should they be given?

T. fluviatilis flourishes well on small water snails, baby guppies, whiteworms, *Daphnia*, fragments of raw white fish, and the like. I must warn you, however, that as this puffer fish increases in size and boldness, it will become snappy, so if you see a number of your other fishes displaying torn fins you will know who is the culprit.

Since placing two *Scatophagus argus* in my aquarium the plants have been chewed down alarmingly. What can I do to prevent the scats eating them?

About the only thing you can do is to offer them an alternative greenfood such as cooked spinach or tender Brussels sprouts, duckweed, fronds of Indian fern, and a good wheat germ food such as Bemax. You must not forget that scats are omnivorous by nature with a partiality to vegetable food such as marine and fresh-water algae.

Do *Laubuca laubuca* and *Rasbora elegans* make good community fish?

Well, both species mind their own business and are active in the upper levels of the water. But *L. laubuca* is not particularly attractive in coloration or body shape and, for my money, *Rasbora elegans* is the best buy of the two.

Would a plecostomus catfish molest and harm small fishes such as neons and enamel fins in my decorative aquarium?

I have never known this catfish molest other fishes. For one thing it is too ungainly in its movements to do much, if any, profitable hunting. For another thing, it haunts the bottom and is very unlikely to be found swimming about in midwater. Thirdly, the position and shape of its mouth gives a clue to its food: algae, swallowable larvae and aquatic worms found in mud, and vegetable matter.

WHAT IS YOUR OPINION?

by B. Whiteside

Photographs by the Author



HAPPY NEW YEAR to all readers of, and letter-writers to, "W.I.Y.O?". I hope you'll send me as many interesting and stimulating letters in 1973 as you did in 1972!

I'm always particularly pleased to receive letters from readers in far off countries, and the first letter this month travelled over 4,000 miles to reach me. It comes from Mrs. Reta D. Cecil, of Valley View, Lodge Hill, St. Michael, Barbados, West Indies, and she enjoys this feature each month. She has frequently been tempted to write but, like myself, is a teacher, and never seems to have quite enough time for everything; however, my recent comments on the effects of copper in the aquarium finally persuaded her to write about her experiences. When she got married and went to live in the West Indies about 20 years ago, she was given a copper "tayche" which is a huge "copper" about 4 ft. across by 3 ft. deep, and which was used in the old days of windmills for boiling sugar in. "Tayches" are now much prized for orchid houses where, filled with water-lilies and fishes, the evaporating water supplies the necessary moist atmosphere for orchids. Not having read about the effects of copper on fishes, Mrs. Cecil set up her "tayche"—and a variety of fishes and plants have been thriving in it ever since! The only time that she had any trouble was when she emptied it and scrubbed it out with the yard broom, scratching the surface. For a week it killed everything which she put into it; after that things went back to normal. She has about 50 aquaria, ponds and containers, two others of which are also copper. By the time she acquired the second coppers she had read a few aquarium books, and as the metal had been brightly polished she decided to paint them. If the paint is scratched, or flakes, the water comes into contact with the bare metal, and the fishes immediately die. There is no doubt that her first "tayche" is copper, as overflow holes have been drilled around the upper edge—but she can only assume that the very hard water forms a "lime" deposit on the copper.

When she first began to keep fishes in the West Indies, she followed the example of others, and used well washed sand from the beach. When she read about the problems which calcium carbonate can cause in fishes' water, she decided that the coral sand would be about 100 per cent calcium carbonate and accordingly, on her next leave in England, she and her husband

hauled back three large cases of gravel, and threw out all the coral sand. Strangely enough, it seems to have made little difference to either fishes or plants. At school she has two aquaria containing coral sand and gravel, and both fishes and plants thrive. The plants are far better than her pampered specimens at home. However, the thing which upset her calculations was when a child arrived at school with two cardinals. She keeps hers in soft, peaty water—but the two school cardinals settled down and proceeded to thrive.

The first labyrinth fish which she bred was the fighter, and though both parents were purple, a high proportion of the offspring were Cambodians, having either red fins, red and green fins, or purple fins and cream bodies. The first batch, about 18 in number, were brought on together, and only two males fought; these were removed and the remaining males and females grew on together until they were adult, and did not fight. She bred six generations from the original stock, and seldom separated them unless they were taken out to breed; they could not then be put back with the others as they would fight. Usually they all live in a concrete tank outside, and are very tame. A pair of beautiful males kept in a community tank never fought until the day when Mrs. Cecil fed the aquarium fishes with fresh fish roe. After this feeding the two male fighters turned on each other and had to be separated. Mrs. Cecil finds that fresh roe brings fishes into breeding condition very quickly. Alas, when she and her husband returned from leave two years ago, she found that there had been 12 in. of rain, and the products of her six generations of breeding had all been washed away! Since then, using American stock, she has not been successful in breeding a single fighter. She recently bought six English-bred fighters which look more hopeful, and hopes that she will be able to repeat her breeding successes.

The water temperature in Barbados is usually around 82°F during the day, and drops to about 78°F at night. Outside, in the sun, surface water can reach 90°F, but bottom water is much cooler. "Coldwater" fishes, such as goldfish, breed well, but koi have only recently been imported. She has recently bought her second lot of golden Gouramies; the first pair, from the U.S.A., refused to breed, and finally one died, so she then bought two pairs of English fish two weeks ago. The

most likely pair were unsuccessful as the male fish beat up the female—even though ample cover was provided. The second pair have produced more young than she has ever seen before, and she has bred numerous Gouramies. The young have been separated out into four containers. She considers golden Gouramies to be very beautiful fish, and will be interested to see if her babies are all golden, or if there are variations. She wonders if the platinum Gourami is bred from the golden, as specimens which she has seen have been similar to the golden, but a mother-of-pearl colour. She has not seen platinum Gouramies advertised in *The Aquarist*, and wonders if they have been developed in America.

Mrs. Cecil continues: "We have no difficulty about heating water in the tropics, so our scope is unlimited. Our greatest enemies are health inspectors who check on mosquitoes, and occasionally become "spray-happy"; and the small green crane—commonly called the gaulin—which is an expert fisherman and can often find a way into orchid houses and clean up all the fishes



before making good his escape . . . Hoping you will find this 'news from the tropics' of some interest. I must say that when *The Aquarist* arrives I read everything, down to the advertisements—which are particularly mouth-watering when one is separated by 4,000 miles of sea from taking up their offers." (I found your letter most interesting, Mrs. Cecil, and thus included most of it. Do write again some time and let us have further "news from the tropics"!)

C/T R. S. Holmes writes from the Sergeants' Mess, Royal Air Force, North Luffenham, Oakham, Rutland LE15 8RL, and he is sorry to learn that Mr. Trevor-Jones and others find several fishes, including orange chromides, difficult to keep. C/T Holmes suggests, from his own experience, that they have been trying too hard. He suggests that it would be interesting to solicit readers' opinions on the belief, held by many aquarists and gardeners, that a little neglect works wonders. He is prompted to suggest this by two

occurrences in his own tanks. He has been trying for years, off and on, to breed orange chromides. Just keeping them was no problem to him. Success eluded him in spite of having bred other species regarded as being "difficult". His latest attempt started as a rather foolish impulse when he bought a newly imported pair and put them, without any period of quarantine, into a large community tank containing angels, key-holes, and kissing Gouramies. This was only two days before he was to depart for two weeks holiday, so the fishes were given one good feed of earthworms and left with "an abundant supply of golf balls"—vacation food blocks. A family bereavement and the resulting domestic problems meant that it was 24 days before he returned home—expecting to find his stock in the last stages of starvation; but not only were they all in very good condition, but the chromides were gallantly defending a brood of 45 babies, each about the size of a lentil. Which deserves the credit, the neglect or the vacation blocks? C/T Holmes continues: "The other source of amazement was four of those Japanese fantail goldfish with which our pet shops have been inundated in recent summers. They had been put into a 2 ft. tank in a rather cold, glass-fronted hall where I was reluctant to instal a tropical tank because of the probable heating costs. Following my attempt to hurry things and acclimatise the poor fish almost overnight, they each contracted a severe case of white spot. They all recovered without any medication at all." (C/T Holmes points out that he is neither cruel nor negligent, but was away on duty.)

Just after the last spots had disappeared, he transferred a small bunch of hornwort to a newly set up decorative tropical tank. This produced a batch of 28 young fantails! When he emptied the hall tank recently he found eggs, as well as several fry in different stages of development—from barely free swimming, to one of $\frac{1}{4}$ in. in body length. He says that he thinks we might be surprised to discover just how many readers agree that we do, sometimes, try too hard! (Do readers agree? I do!)

5 Moreton Grove, Wallasey, Cheshire, is the address which heads Mrs. Ann Law's letter, and she has some further comments to make on white spot. She has found King British W.S.3 to be "really marvellous for curing white spot on the fish". She had a fantail which was dying from this disease, and after two doses it was completely cured—the first time she has ever had this happen. Mrs. Law now swears by this product.

Miss A. E. Simpson lives at 14 Tufnell Grove, Ward End, Birmingham B8 2QR, and her letter must certainly be the most immaculately typed one which I have ever received for W.I.Y.O. Miss Simpson read with great interest the comments on "Rams", in the November edition. She has had a pair of ordinary "Rams", and one golden "Ram", in her community tank for some months now, and had no idea that they

were considered by some aquarists to be delicate, or difficult to keep. The pair spawned within two weeks of being introduced into the tank, but after twenty-four hours their eggs went the way of all eggs in a community tank. However, the pair are on the verge of spawning once more, and Miss Simpson does not intend to be caught "on the hop" again. The golden "Ram" also took her by surprise: it spawned alone, without a male present, and before the ordinary "Rams" were introduced. The fish guarded her eggs for 48 hours, but, as they were infertile and fungused over, she ate them. The three "Rams", plus a *Pelmatochromis kribensis* bought at the same time, are in a 24in. x 12in. x 12in. tank which is planted with Indian fern and Cryptocorynes, and the tank is also shared by wagtail platies, danios and tetras. Miss Simpson takes up my question about the "pecking order" in her tank. Her *P. kribensis* is the "boss" of her community tank, and she "rules the roost". She has never been seen to touch another fish, but she approaches the others head-on, and they all quickly get out of her way. The only fish which ever stood up to the *kribensis* was the male "Ram", when he was guarding his eggs, but normally even he backs down. Miss Simpson takes the point about soft water being best for "Rams". She says that Birmingham's water is well known for being amongst the softest in the country, and she thinks that this may confirm the theory to be correct. Miss Simpson ends by saying that: "'Rams' are such beautiful fish, especially in spawning colours; I'm sorry that every aquarist cannot keep them with such ease as I".

Mr. Ray Spencer is 16 years old, and his address is 15 Castledine Avenue, Quorn, Loughborough, Leics. LE12 8DN, and he enjoyed Mr. B. Simms' article on Cryptocorynes (October edition) very much. He found it very useful as he is setting up a 4 ft. tank and wondered what plants to use as a centre piece. He thinks that further articles such as the above would be welcomed by many. (Perhaps I might be allowed to say here how much I admire Mr. Simms' delightful scraper-board illustrations, of fishes and plants, which accompany his articles.) Mr. Spencer hasn't been taking *The Aquarist* for very long, and at first he found no use for the advertisements; however, he now finds them very useful. (I, too, enjoy the advertisements very much, and they have been of great use to me over the years. The kind which I particularly like, and which are not so commonly seen today, are whole or double-page spreads listing dozens of items stocked by a particular firm, and the price of each item. Such advertisements are invaluable if one wants to order products by post. What sorts of advertisements appeal most to other readers?) Ray finds it cheaper to glaze his own tanks, and offers a useful tip to others. He says that there is a new type of anti-rust paint on the market, for protecting cars, and he has used it very successfully on aquarium frames. He states that it is easy to apply,

but should be covered with several coats of good quality gloss paint. Mr. Spencer has tried to keep Siamese fighting fish in his community tank, several times, but each time the fish "sulked" on the bottom and ate less and less, eventually dying.

It's back to the subject of "Rams" with Mr. Colin Hart (I hope I've got the correct name), whose home is at 56 Alanbrooke House, Stadium Road, Woolwich S.E.18. He has had five adults for some time, and they are now showing signs of breeding. He does not agree with Mr. Trevor-Jones's view that they require very soft water or their fins will split. Mr. Hart lives in a very hard water area, and his "Rams" have beautiful fins, with no splitting. He has not found them difficult to keep, and has just set up another tank in the hope of his fish breeding. He will let us know of the results.

Philip Harle is 16 years old, and he resides at 52 Pagets Road, Bishops Cleeve, Nr. Cheltenham, Glos. He has an 18in. x 10in. x 10in. community tank, containing 3 Gouramies, 3 black mollies and 3 sword-



tails. In the "pecking order" he finds that the largest of the blue Gouramies appears to be "boss", as many fishes back off from him. Philip thinks this only natural as the Gourami is the largest fish in the tank. He finds his mollies to be excellent jumpers, and recently found a dead female on the floor. It had managed to jump out of a very narrow slit. He wonders if others have had similar experiences. (Many have!) On a recent visit to his dealer's, Philip was told about the difficulty of getting Java moss to grow. The dealer had a small piece in his tank, but would not part with it. Philip's father has a 24 in. bow-fronted tank, and has no trouble in growing a tangled mass of this plant. His father's secret is simply to leave the plant alone. Philip thinks that the plant can make a tank look rather messy, but he says that it seems to like a strong light and is useful for breeding purposes. His father's tank contains, amongst other fishes, platies. They breed rapidly and appear to be a gold colour until they change colour at maturity. Philip wonders if many platies retain their original colour right through adulthood, or if they change colour as they mature.

Photograph 1 shows a honey Gourami. I recently

bought a pair of young fish which, although they do not have much colour at present, I hope will some day resemble some of the delightful little adult fish which I have seen. I consider the honey Gourami to be one of the ideal fishes for the smaller aquarium. Would you agree? I would be pleased to hear of readers' breeding experiences with this species. A relation of mine, Mr. C. Perry, to whom the fish in the photograph belongs, has had his honey Gouramies spawn many times, but he has found the tiny fry rather difficult to raise.

I was pleased to receive another letter from Mrs. Dorothy A. Hanning, of 11 Seaton Place, Ford, Plymouth PL21 PS. She also writes about the "boss" fish in her aquarium. Mrs. Hanning often gives her fishes a chicken bone to pick the meat off, and a 3 in. marble angel spends all his time chasing the other fishes away from the food—but the foolish fish does not seem to realise that while he is chasing some fishes off, others are nipping in and getting all the food. The chief contender for the position of "boss" in the tank is a 3 in. moonlight Gourami which does not seem to be on friendly terms with any other fish. Even the 3 in. Jack Dempsey does not bother with any other fishes, except the nigger barbs—which he detests. Most of Mrs. Hanning's fishes "have a go" at one another, at some time, but no harm is done and she thinks it may only be play. Mrs. Hanning agrees that fishes enjoy Felix cat food, but she says that it does "muck up" the tank. I recently published a letter of Mrs. Hanning's, asking for information about the keeping of an iguana which she had ordered, but which had not arrived at the time of her writing. Her iguana finally arrived; he is very beautiful, though not always good tempered as he lashes one with his long tail. Mrs. Hanning says that a kind gentleman wrote to her, as a result of her letter being published, and supplied her with all the information she needed about keeping her new pet. She thinks that the animal has grown already. She wonders what can be done if one lives in a soft water area, and has water supplied through copper pipes. The water in her area is very soft, but she has not yet had any trouble from copper affecting her stock of fishes. (If the copper is not affecting the fishes, then things could be left as they are; however, it would be safer to allow the cold tap to run for a short period before collecting water to warm and add to one's tanks. Ironically, lead will also dissolve in very soft water, and the dangers of lead poisoning to humans have recently been in the news. Unless you think copper or lead may be affecting your fishes, don't concern yourself—other than by letting the tap run for a time before drawing water. However, one point does come to mind: I have seen heater/thermostat holders with metal alloy clips containing copper. I would prefer to use plastic ones myself.)

Mr. M. Cass writes from 12A St. Georges Road, Brighton, Sussex BN2 1EB, and he notes that both Mr. J. Hems and Mr. J. Boarder answered queries

about "sub-tropical" fishes in the September edition. For some years Mr. Cass kept and bred good quality guppies (Photograph 2 shows one of my better male guppies—although it would certainly never win any prizes!), but because of lack of time and space he now keeps one tank of bloodfins, one tank of white clouds, and one of Buenos Aires tetras—as well as "the pet of the house", a 3-years-old paradise fish which has glorious colours. He finds that 60°F-70°F is best for all of them, and that if the temperature is too high they swim about much too fast; and if too low they are slow and sluggish. He no longer uses filter wool in his filters as he considers that it removes all the *algae* from the water—and this is not a good thing, in his opinion. He knows that many people will disagree with his views, but recognises that everyone is entitled to his or her own opinions. Mr. Cass now only uses grit and charcoal in his filters.

Some of the pupils in my school aquarium club recently asked if the club members could have some sort of identification badge, so I wrote to Mr. J. E. Young, the Advertisement Manager of *The Aquarist*, to ask him if aquarist badges were still available from the magazine. I was pleased to find out that they are. For younger readers who may not know about the badges, they cost 20p each, show an angelfish and a goldfish on the silver coloured surface, and have areas in black, red and blue enamel. The round badge bears the magazine's legend: *Aqua cumae vitae ager nobis*, ("Water is the Cradle of Life and the field of all our Endeavours"), round the perimeter.

As three years have now passed since I severely damaged my left wrist while trying to reglaze a cracked aquarium, I feel that it would be appropriate again to remind readers to take care when working with glass—especially cracked or broken pieces. I can now use my left hand quite well, and have a faint though very distorted sense of touch in it, but the circulation in the thumb and two of the fingers is rather poor, and will probably not make any further improvement now. As I said—take care when working with glass!

For next month please send me your opinions on any points raised in the body of the text, and on the following: (a) What have been your experiences with the keeping and breeding of pencilfishes? (b) What kinds of rock and gravel do you use in your tanks, and from where did you obtain them? (c) How well, and under what conditions, have you managed to grow lace plants? (d) On what date, approximately, did your tortoise go into hibernation this year? (e) What new aquarium product, introduced in 1972, have you found to be most useful? (f) What have been your experiences with the keeping of marine invertebrates? Please PRINT your name and address on letters, add the date, and please do enclose a S.A.E. if you require a reply. I look forward to receiving your letters—and may you have a successful fishkeeping year in 1973!

THE POPULAR 'KRIBENSIS'

by David Smith

NAMED AFTER one of the rivers where it is found, the Kribensis has become one of the best known of the smaller Cichlids that are regularly available to the aquarist.

The female, especially when in breeding condition, is more brightly coloured than the male and in general only grows to about 2½ in. as against the male 3 in. The colours can vary vastly even in fish of the same brood; the most striking colour probably is the rich red belly of the female which, when in breeding condition, takes over the whole of the underparts, contrasting with the orange and bluish sheen of the flanks. Best kept in pairs, and according to the reference books, soft peaty water is recommended but I have found that well matured boiled tap-water keeps them happy and in good condition.

My first pair were about 2½ in. long when I bought them and they were in fairly good condition but in the dealer's tank bare looked anything but the fish they are as they displayed no vivid colours but just stayed huddled in the corners of the tank. On arriving home to the already cramped aquarium-scattered flat, some young barbs which were in a 2 ft. × 12 in. × 12 in. tank received eviction orders and were left to take their chance in with the angels. The tank was then landscaped with driftwood and rocks which provided numerous "caves" and other such hiding places which would make the kribensis feel at home. During the next few days little was seen of them, only the occasional glimpse as one would dart out of his or her hiding place to grab the *tubifex* and *daphnia* with which they were being fed.

On this diet the female soon began to fill out and, as they gained confidence in their new surroundings, both spent most of their time by the worm feeder waiting for the next meal. A spawning seemed imminent but the male, in the confines of a 2 ft. × 12 in. × 12 in. tank was a bit over-zealous in his courting and continually chased the female from place to place giving her no respite at all. Rather than risk injury to the female, both were transferred to a 4 ft. × 15 in. × 12 in. thickly planted community tank which housed tigers, rosy barbs and a few chequers. At each end I placed a flower-pot and

hoped that in this increased area the female would be able to escape the male's constant attention. The male soon took possession of one of the pots but the female showed no interest in the other one, so as some tigers were due to be spawned the kribensis dropped out of the limelight for a while. During this period they received the same food as the other fish, i.e., minced beef, peas, *tubifex*, *daphnia* and other odd food scraps. On returning one night from work the female had taken possession of the male's flower-pot and was continuously arching her body in a semi-circle at the male. The female continued to display to the male and then she would break off from her courting dance to dart into the flower-pot and come out again with a mouthful of gravel which she spat at the front glass with such force that one could quite plainly hear it. This went on for about two days, the female busily excavating all the gravel from inside the pot and in between her labours flashing rapid colour changes at her mate who showed only a certain amount of interest.

On returning from an evening out I found the female carrying her most vivid colours and keeping everything away from the pot, even the male was at a respectful distance. I took the flower-pot out and on inspecting found 50-60 eggs neatly placed on one of the sides. The pot was put in a 10 in. × 10 in. × 6 in. plastic tank with an airstone placed so a gentle stream of water constantly kept the eggs free of any dirt and a couple of drops of methylene blue was added to prevent fungus. The eggs hatched in four days and after a further five days the fry were jerking their way around the tank on the lookout for food. Out of the 50 or so eggs laid I counted 37 fry and they grew somewhat slowly at first even though they received good feedings of brine shrimp, micro worms and, as they could take it, grated *daphnia* and chopped *tubifex*. After four weeks they were transferred to a 3 ft. × 10 in. × 10 in. tank to grow on and at this point they began increasing in size quite noticeably. The final count raised to a length of 1½ in. was 29.

Meanwhile the parents had started the process all over again but this time I missed the spawning

altogether. I saw that the female was guarding the pot again but when I took it out I could see no eggs so I thought that maybe they had eaten them or that she was just protecting her territory. The next thing I saw, about four days later, was the female going berserk at any other fish that dared come anywhere near her. Active tigers and rosies were all cowering at one end of the tank and, on looking closely, there was the proud female with about 100 young scattered all around her. How she managed to keep all those tigers away I'll never know but she did it and she never relaxed even after a partition was put in separating her brood from the hungry "wolves" at the other end of the tank.

For both spawnings the temperature was about 75°F. as this is a constant temperature in the tank and no particular attention was paid to water conditions except that I replaced a couple of bucketsful of fresh boiled tap-water once a week. As for brood care, I think this depends upon the individual fish or pair and only by experimenting can one find out if one has a pair that are devoted to bringing up

their young. The male, after the spawning, showed no interest in his offspring at all and left the female to it. She always viewed him as a prospective enemy to her young, though, and he was always kept at a safe distance.

This amiable little cichlid is an ideal member of anyone's collection and will give one hours of pleasure in watching its behaviour. They always seem to be at their best when given a well-planted tank with hiding places provided, and with the knowledge that they have somewhere to hide if the situation demands it, will not spend their time sulking but be out and about the tank and in full view so one can appreciate their beautiful colours.

Plant life is not harmed and the only digging they do is when excavating around prospective breeding places. Fairly easily bred, given the right conditions, the young will always be snapped up by shops and one can expect a good price for them at 1½ in. as this is one fish that seems to have held its value over the years.

COMPUTERISED SALMON

by Michael Lorant

A TELEVISION-COMPUTER team is simplifying studies of the age, birthplace and sexual maturity of salmon which the fish reveal through their scales. A new electronic camera, developed by Westinghouse scientists, reads this evidence from scales carefully lifted from sockeye salmon in the Gulf of Alaska, in Bristol Bay off the west coast of Alaska and in a large number of North American rivers. Research biologists here feed the converted data into a digital computer which identifies and reports the salmon's birthplace or racial origin.

Research results help to predict next year's sockeye and also effectively save this most valuable species of Pacific salmon in North America.

Under a microscope, salmon scales reveal growth rings (*circuli*) which disclose more detailed information than that of rings in a tree's cross section. For example, *circuli* deposited on the scale while the fish is in freshwater have a finer texture than *circuli* deposited while the fish is in salt water. Thus, a research biological analysis of these variations shows how long the fish lived in freshwater and the year it emigrated to North Pacific waters. Origin is revealed by differences in growths of the scale in the first year in the ocean, North American fish growing faster than Asian.

Furthermore, biologists hope to see the day when a method will be developed to predict a fish's sexual maturity from scales. This may be possible since

larger fish (with larger scales) frequently return from the ocean to freshwater one or more years before smaller fish. Like other Pacific salmon, sockeye return to their natal streams to spawn and die.

The data reader camera making the accelerated research possible was developed in the Westinghouse astrophysics laboratory in Newbury Park, California. The highly-specialised camera scans each fish scale and records which of 64 shades of grey it sees related to location. Analysis of the recorded light values results in identification of each scale *circuli*.

So precise is the study that biologists separate by tweezers from the left side of the salmon only "the second scale above the lateral line on the diagonal column which extends from the posterior insertion of the dorsal fin."

The data reader camera is expected to read a scale for all desired information in less than five minutes compared with an hour for a human reader working with a microscope.

While use of the camera and computer system is the most unusual reported to date, other applications of it are also envisaged. Typical and important ones could be: medical electronics, directly measuring blood-cell count or making other physiological records; mapping; astronomical photographing; seismic shock studies; missile test range data reduction.

AN UNUSUAL OPEN SHOW

by B. Salisbury

At most open shows it is the section devoted to either furnished aquaria or aquascapes that appears to draw the most attention from the general public, admiring not only the aesthetic beauty of the exhibits but also the skill of the exhibitors in obtaining such natural looking set-ups.

Just imagine, if you can, litter-strewn banks, sloping down through broken bottles and rusty tin cans to half-submerged car tyres, looking like the back of an enormous monster, and, farther out, beneath the surface, long fingers of hornwort threading through the spokes of discarded old bicycles, car wheels, etc. This was the scene that confronted the members of the United Aquarist Society at the start of our open-air furnished aquaria competition advertised in the August issue of the *Aquarist*.

Had we been a bit too ambitious? Should we, perhaps, have chosen a much cleaner, tidier lake? Our aim was to promote interest in aquatic life in general by setting up furnished aquaria and aquascapes at the water's edge, to show the public how beautiful it could be above and below the water line, and in our folly we had stated that we would use only the natural resources in the area, but in this case the "natural resources" looked more like the aftermath of a flood on a corporation rubbish-tip than an attractive boating lake.

Our spirits were at rock bottom, but it had been

advertised, and it had, therefore, to be done and so, after a resounding chorus of "let's go on with the show" from our chairman, we all set to and whilst some erected the posters and staging, others collected a mountain of rubbish from a 100-yard stretch of the bank as an anti-litter/anti-pollution demonstration. This being completed, we then all awaited our chairman's signal to start on our tanks.

As anyone who has been to an open show will confirm, setting up a furnished tank can take anything up to four hours even with everything pre-washed, pre-designed and all the crisp green plants pre-leaded. We had allowed ourselves two hours in which to complete our set-ups to coincide with the peak public picnic hour, and we had to start by collecting our own gravel.

The peaceful scene as we all awaited our signal was enhanced by a family and their picnic who had gradually moved closer during the morning, to observe our efforts and then the whistle blew. This resulted in all our members snatching buckets, shovels, garden sieves, etc., and tearing off towards the water's edge and the picnic family, grabbing everything they brought with them, especially their children, and putting as much space between them and these curious mad aquarist creatures, as fast as their legs could carry them.

The site we had chosen, Hollow Ponds, Whipps



A real 'open' show

Cross, Leyton, was originally an extensive gravel working and so collecting and washing enough gravel for our tanks was not too much of a problem but, fish, plants, wood or rockwork was another matter entirely. Two of our members managed to obtain what we can only assume were chunks of a demolished concrete army bunker, complete with protruding lengths of the steel reinforcement, but as they were coated with a fair amount of algae (the concrete, not the members), it looked perfectly acceptable. The rest of us made do with the pieces of driftwood we managed to dredge up from the bottom.

Plants of any acceptable condition were few and far between, single strands of hornwort, occasional small bunches of *elodea*, thick green clumps of thread *algae* (even that was used quite effectively) and very young rushes used as a substitute for *valis*, or *sagittaria*.

The whole scene was quite bizarre. In collecting and washing the gravel, wood, plants, etc., the water around the edge of the lake had been stirred up into a murky black liquid with the consistency of pea soup, and obtaining clean water involved frequent trips into the deeper undisturbed areas. One member overcame this problem by hiring a boat for an hour and another overcame it by simply walking straight into the lake, an action which nearly led to the sinking of a boat hired by a member of the public who was rowing his wife and children around a small island. They were at peace with the world until suddenly they nearly collided with an adult male, fully clothed including jacket, tie and hat, walking along chest deep in the water and carrying a bucket of it on his shoulder. After their initial shock, they behaved like typical British stock and as they rowed past, bade him good afternoon, as though it was the most natural thing in the world for him to do.

The last and almost insurmountable problem was obtaining the fish. Our children had been armed with small nets and jars but their tireless efforts had so far resulted in a fair supply of *daphnia*, a large swan

mussel, but not a sign of even one stunted stickleback. Two competitors had brought their fishing tackle but throughout the entire afternoon the only thing they had hooked was the club secretary (wading chest deep and carrying a bucket of water) and so it was decided to approach the local fishermen. The net result was extremely rewarding, for as the anglers had spent their time keeping one eye on their floats and the other on us we found them only too keen to display their catches in our aquaria and we were supplied with a fine selection of fish including an eight-inch perch for a two-foot tank and two twelve-inch tench for two eighteen-inch tanks. We were very surprised and pleased to find that this semi-polluted water could still contain fish in such excellent condition.

Now, our tanks complete, we had only to ask the spectators if they would judge the entries. Their enthusiasm was very gratifying and in all a little over sixty people helped to decide the winners of our competition from a total of eight entries (six furnished and two aquascapes) and many more recorded their approval of our demonstration. Subsequent correspondence has left us in no doubt that the venture, apart from being extremely enjoyable, was well worth the effort.

With the day drawing to an end, we had not only to return all the fish and plants, etc. to the lake, but had to dispose of all the rubbish, including the concrete army post and would like to thank the Forestry Commission for their help in this, whilst making no mention of the young lad who suggested that we dump it all back into the lake!

We then started making our various ways home with two thoughts uppermost in our minds. First, that our efforts had at least made one section of the lake debris-free and safe for children and fish alike, and secondly, as everyone to whom we had spoken that day felt as strongly as we do about preserving these aquatic environments—just *who* the heck is dumping all that rubbish?

ANEMONES AND HERMIT CRABS

by R. T. F. Gantés

DURING your strolls on the sea-shore you have most probably encountered a strange living conglomeration composed of a hermit-crab wearing one or several sea-anemones on its shell.

The hermit-crab is a species of crab afflicted with a hereditary infirmity: its long, tender, naked abdomen is such a tempting morsel that hermit-crabs would have long been eaten into extinction had they not found a means of protecting themselves by thrusting their vulnerable parts into the empty shell of a deceased sea-snail. This shell they are obliged to drag along with them permanently and change to a larger one as they grow.

The sea-anemone is a beautiful marine animal whose shape, colouring and sedentary habits remind one of a flower. It is composed of an adhesive foot and a cylindrical, fleshy body crowned by a bunch of tentacles that surround the mouth and can be compared to petals. But beware! This fairylike being is a living death-trap, for its lovely tentacles contain millions of stinging-cells and as soon as a prey touches them, it is promptly stabbed and paralysed by the venom. The sea-anemone then folds them towards its mouth and enjoys its meal.

When one first comes across this assemblage of creatures that seem to have so little in common, it is natural to suppose that it must be the result of a stroke of bad luck, of an unfortunate clash of horoscopes. One cannot imagine the hermit-crab to be happy to have to carry this extra weight nor the static anemone to be pleased with this "kidnapping": the poor anemone, after thinking it had settled in a cosy corner for life, suddenly discovers it is being jolted off to an unknown destination abroad an uncomfortably bumpy vehicle. One could therefore suppose that the anemone, at the end of its pelagic childhood as a larva, had fixed itself on an old shell as it would on a stone or rock. Up came a hermit-crab feeling rather tight in its own shell, saw this one, tried it on, found it suited him better and walked off with it as well as with its first and protesting owner. Here is now our sedentary anemone condemned to an existence of ever-roaming adventure, while the hermit-crab pants and toils under the weight of this unwanted guest.

The little boy scout that lies at the bottom of every man's heart might then be tempted to do a good deed and separate the two "victims" of a cruel fate. But, as it is too often the case when good deeds are dictated by ignorance, this one again would be definitely unwelcome. For these two animals are partners and *want* to be together.

This has been proved by a certain number of observations verified by a lot of experiences. Let us say, to begin with, that there are many kinds of sea-anemones and many kinds of hermit-crabs. We can come across innumerable hermit-crabs that do not bear anemones, and innumerable anemones that do not live on hermit-crabs. But it had been noticed that *certain* species of anemones can practically only be found on shells occupied by *certain* species of hermit-crabs and that these particular hermit-crabs almost always have those particular anemones on them. Consequently, the coupling of these types of hermit-crabs and sea-anemones cannot be considered accidental, because if it were the two creatures would be encountered more often separate than united.

Can we then tell how this partnership takes place and of what it consists? Careful watching and experimentation have given the answer inasmuch as our local species are concerned, but all the cases have not yet been studied.

Let us take the one of our common sea-anemone *Calliactis parasitica* that dwells, often several at a time, on shells occupied by various types of hermit-crabs. If one removes *Calliactis* from the shell, the crab picks it up and replaces it and it sticks on immediately. Better still: each time the crab is obliged to move into a larger shell it transplants the anemones from the old home to the new one! It does this by tickling them with its pincers and the anemones, instead of adopting a defensive attitude, let go of the shell and allow themselves to be transported.

So far it would seem that the anemone submits passively to the decisions of the hermit-crab. However, if we remove the hermit-crab before it has had time to transfer its guests on to its new dwelling, we will soon see the anemones sadly drop off the empty shell.

Adamsia palliata, another variety of anemone, is much more selective: it is found exclusively in the company of a one and only species of hermit-crab, *Pagurus priadauxi*. The relationship between the two animals is far more intimate than in the previous case. The shell of *Pagurus* is almost always too small. In fact it is less a protection for the crab than a means of fixation for the anemone. As soon as the anemone is captured, it flattens out and wraps itself round the crab like a tunic, forming its true protection. Without *Adamsia*, *Pagurus* would be dangerously naked. But on the other hand, it seems that *Adamsia* cannot live without *Pagurus*. Separated from its crab, *Adamsia* fixes itself to the

bottom and soon dies, even if it is fed!

It seems, therefore, that the hermit-crab brings something more than feeding facilities (shared meals, transportation to better hunting grounds), to the sea-anemone, but what, exactly, we cannot tell.

If a moral can be found to this story, it is given by Robert Tocquet in his study of animal and vegetable associations entitled "Better than Mankind".

"We must," he writes, "emphasise the evident fact that mutual help is a law of nature as important and widespread as that 'struggle for life' wrongly given by the Darwinists as the unique, implacable and universal rule. . . . To transpose the notion of universal belligerency on a human level is a criminal sophism."

PRODUCT REVIEW

Es-Es Micro-Moat Culture Dish, made in England by Singleton Bros. (Electronics) Ltd., Truro Hill, Penryn, Cornwall. (I do not know the price of this product at the time of writing.)

This compact little unit consists of a black, moulded, polypropylene dish, the plastic being rigid, non-brittle and virtually unbreakable. It can be washed in ordinary detergents and sterilised in boiling water if required. It comes complete with a transparent, rigid, plastic lid, and a small brush with which to remove worms from the Micro-Moat for feeding to aquarium fishes. The unit is equally suitable for raising micro-worms or grindal worms, and a couple of units for each type of worm will ensure a continuous supply of fresh live foods. The unit comes complete with full instructions as to appropriate recipes for food/culture media, etc.—something which I personally appreciate as I always like to be told by manufacturers how best their products can be used. The Micro-Moat from Es-Es—or several of them—should prove to be very useful to aquarists who wish to raise their own smaller forms of live foods.

Reliant Test Kits, for testing pH of fresh water; the pH of marine water; and the nitrite level; cost, per kit, 50p, 80p and £1.10 respectively. They are manufactured by Reliant Products, 150 Clayhill Road, Basildon, Essex. The sole distributor is C. J. Skilton, Great Gibcracks Chase, Butts Green, Sandon, Chelmsford, Essex.

The Reliant fresh water pH test kit, unlike many others, does not use bromothymol blue as the indicator; the indicator which is supplied is not named, but it is a clear, wine colour. It is supplied in a brown, glass bottle, with an "eye dropper" screw cap. The kit's test tube is 3 in. long, and made of clear glass. In use, the tube is half filled with the water to be tested; three

drops of indicator are added and the mixture shaken; the resulting solution is then compared with the colour chart supplied: the colours shown cover a pH range of from 6.8 to 8.2. Colours range from dark wine at pH 8.2, through red, and orange, to yellow at pH 6.8. The kit also contains two plastic drums of chemicals with which to adjust the pH of water. (The chemicals look like sodium bicarbonate and sodium biphosphate, but are not named.)

I tested samples of water from four of my own tanks, plus a sample of tap water, with this kit and with the kit reviewed above. As the pH readings from my four tanks was well below 6.8, I was unable to obtain any reading using the Reliant kit; however, the Wardley's indicator did cover the appropriate range. Both kits gave similar readings when tap water was tested, as the tap water was slightly alkaline.

I was unable to test either of the other two kits as I do not have any marine aquaria.

Kiho RII Aerator, price £2.60, distributed by T.F.H. (Great Britain) Ltd., 13 Nutley Lane, Reigate, Surrey. (The country of manufacture is not stated on this product.)

This sturdy little aerator has a blue, plastic casing and a black, rubber base which is held in place by four screws. It has twin outlets, each of which is fitted with an adjustable nozzle to control the air output. It works on the vibrator principle and has two diaphragms. The vibrator "arms" are a single unit, with one "pivot." A felt air-filter pad is fitted into the rubber base.

I found the pump to be acceptably quiet in operation, and the four rubber feet on the base limited the movement of the pump when placed on a horizontal surface. The rubber base also has two "loop holes" by which the pump can be suspended, if desired. I found that the pump could operate several filters, or other items of

aquarium equipment, without difficulty; however, as mentioned before, until a set of "standard" tests for aquarium pumps has been agreed upon, such statements have little scientific meaning.

This compact little pump has a very attractive appearance, and should appeal to those who like pumps with more than one air outlet.

Rena Super Air Pump, price £3.15, made in France, and distributed by Impelec, 89-89a Park Street, Slough, Bucks.

The leaflet supplied with the latest Rena Super air pump states, in three languages, that the pump is "of the highest quality and manufactured with great precision to give continuous service during many years without trouble." Having bought a Rena Super a number of years ago—I don't recall exactly how many, it's such a long time ago—I can agree that the manufacturer's claim is fully justified. Few other pumps have given me such long and reliable service! The Rena Super which I have just received doesn't appear to have very much different about it when compared with the older model; this would suggest that the original design is still considered to be entirely satisfactory.

This pump has a heavy, brown, plastic casing, is about 5½ in. × 2½ in. × 1½ in., and has a white push-on base in synthetic "rubber" (for want of the correct name). The base holds a felt air filter pad of about 1½ in. in diameter; it has four "rubber" feet; and an aperture by which the pump can be hung up, if desired. (I suspend my pumps on thin strips of rubber cut from old car tyre tubes, as these help keep noise levels low.) On the other side of the Rena Super is an accurate screw device for controlling the air output, and also the air outlet itself. The pump has a large, rubber diaphragm, and the vibrator arm is firmly screwed to the side of the casing. All parts of the pump can be replaced easily, without special tools, and a range of spares is available.

In operation I found the pump to have a low noise level, and a good air output. The makers claim that it "will operate a minimum of 10 diffusers"; I found that it would operate three simple, outside filters as well as one large outside filter which makes use of an air-stone, and which takes "a lot of air" to operate it, judging by the fact that several different makes of smaller pumps were unable to operate even this large filter on its own. Even when operating the above four filters, the Rena Super still had "air to spare," and had I had a couple more simple filters to hand, I'm sure that this pump could have operated them as well.

I would recommend the Rena Super to any aquarist without reservation—particularly to those who require a relatively large supply of air, a compact and reliable pump, and a pump the noise level of which is acceptably low. (It must be borne in mind, of course, that my own figures for filters have little scientific meaning.)

Rena Undergravel Filter System "GE," made in France, and distributed by Impelec, 89-89a Park Street, Slough, Bucks.

The system consists of sections of perforated, plastic grid, each of which slots into other sections. The "G" platform section is approximately 1.8 in. wide by 3.7 in. long; "G" sections cost 30p for a box of 12. "E" sections consist of a standard platform complete with an airlift holder; they cost 4½p each. Lift tubes cost 6p each.

This undergravel system enables aquarists to build up a base filter which exactly fits any given size of aquarium. Unfortunately, as I was only supplied with 6 "G" sections, 1 "E" section, and no lift tube, I was unable to test the filter in use; however, the sections which I did receive were soundly constructed and linked firmly and easily together.

Stainless Steel Worm-Mincers, price £1.75 including postage, marketed by Mr. J. Mosley, 11 Moorcroft Avenue, Oaksworth, Keighley, Yorks.

These worm-mincers, which were previously on the market, have been recently re-introduced. The test sample which I received consisted of a pair of stainless steel plates—one marked "Left" and one "Right." Each plate is approximately 3 in. × 2 in. Towards the upper part of each plate is the "mincing" area, consisting of a series of "close together" circular grooves cut into the metal. The ridges between the grooves number 18 on each plate, and the diameter of the circular "mincing" area is approximately 1.9 in.

No instructions for use were enclosed with the sample plates when they reached me; however, I tried using the "mincers" with a selection of garden worms of different sizes. When I pressed and turned the plates, leaning heavily upon them, I only managed to squash the worms, releasing the soil which was in their insides. Obviously I was not using the Worm Mincers correctly. On reading Mr. A. Boarder's "Coldwater Queries" (November edition), I discovered that one of his answers concerned "worm shredders." I then tried the "Worm Mincers" again, this time using a "rubbing" technique as mentioned by Mr. Boarder, and found that the earthworms were certainly "minced" into a fine pulp. Variations on the amount of "rubbing" used produced appropriate variations in the consistency of the "mince" which resulted, and I was able to produce "minces" which would suit even very tiny fishes. However, I did find that if the earthworms were cleared of soil before being "minced," the resulting "pulp" was virtually free from soil and ready for immediate use.

"Stainless Steel Worm Mincers" should certainly appeal to those aquarists who don't fancy chopping up worms with scissors or razor blades.

B. W.

OUR READERS WRITE

Pale Trail to Confusion

As a fairly recent newcomer to marine fishkeeping I would make a plea to the trade regarding the nitrate test kits which are currently offered for sale.

Instructions issued with these kits glibly refer to "pale" pink, "strong" pink, etc., which we are supposed to ally to figures like 1.0 ppm, .01 ppm, as quoted by the experts.

These terms, "pale," "strong," etc., are relative terms and meaningless as a standard of measurement. (Ask any beer drinker.)

One kit I have gives a "pale" pink reaction but another product used on the same sample shows not pink but a decidedly mauve tinge!

Why can we not have a colour card guide as issued with the pH kits especially in view of the fact that nitrites are a swifter killer? After all, these kits are certainly not cheap, considering their contents.

More articles on Marines please.

W. R. REED,
17 Bradden Street,
Westwood,
Peterborough.

B.M.A.A.

Our Association, the British Marine Aquarist's Association, celebrated its second birthday in October 1972, and looking back over these years I am pleased to be part of this association.

On joining the association I had been keeping Marines unsuccessfully for about one year. Owing to the vast information received through our own "Marinews," published monthly, I have been very successful with the Marine hobby. Also I have met varied and interesting people concerned with the association.

Our association is the only National Marine Association in existence that deals solely with the Marine hobby in this country. We are at present a young association, but undoubtedly our membership will increase as we go on.

It seems a shame that so many potential members are pursuing our hobby and probably making expensive mistakes which they might otherwise avoid if they joined our Association.

On behalf of myself and the Management Committee I would like to thank all our members who have contributed to the Association by joining, and also by

helping to make it become one of the outstanding Associations of the future.

M. STRONG, B.M.A.A. 51,
Public Relations Officer,
38 Plasterton Avenue,
Canton,
Cardiff CF1 9HH.

Discus-Keeping Simplified

In reference to the article published in November's issue "Discus," a summary of notes for the beginner by R. H. Cooke, is it not about time that these so-called experts ceased trying to pull the wool over people's eyes by writing volumes of codswallop about these fish.

I have kept Discus for 2½ years now and have only experienced difficulty when (at first) I tried to follow these experts' advice.

I prepared a tank 3 weeks in advance of actually receiving six *Symphysodon aequifasciata axelrodi*. Water filtered through peat to get a pH reading of 6.8, temperature 84°F. Introduced the fish correctly and sat waiting, watching in trepidation. Sure enough one by one three of my 1 in. Discus keeled over.

I have kept Cichlids for a long time with great success, for I treated them like Cichlids, so I decided to treat my Discus in the same manner. Out came half the water, replaced with boiled tap water and cold from the mains to make the tank water up to 86°F. Thermostats up to the same temperature, in with a good helping of *Tubifex* and, lo and behold, thriving Discus.

I am sure there are many other aquarists far more experienced than myself, who experience little trouble in keeping these fish.

Let's have less of this guff about no gravel (Discus blow worms from gravel and this is a natural way of feeding) or American terms like bugs. My Discus go from saffron yellow to a deep brown, sometimes black, taking up orange, red, to light brown in between. I feed them on *Tubifex*, White Worm and Oxheart. I use plastic plants because I am lazy and they require less attention, and one large outside filter, changed fortnightly.

I treat my Discus as ordinary Cichlids and apart from my first losses have had no trouble at all. Tank 36in. x 15in. x 12in. angle iron unsealed. Apart from the Discus I keep one large *Plecostomus* in the tank to keep the algae down and it takes no notice of the Discus, they ignore it completely.

So let's have a common-sense article written by aquarists who refer to baby fish as fry and not "Wrigglers" (another American word), protozoans as such, and not "bugs" and you will have a lot more happy readers.

J. T. G. OISNER,
124 Burnthouse Lane,
Exeter, Devon.

Continued on page 393

From a Naturalist's Notebook

by Eric Hardy

A NEW British fish, the yellowfin tuna, *Thunnus albacares*, was stranded at Portmeirion, in Traeth Bach, the estuary of the rivers Glaslyn and Dwyrd on the Caernarvonshire coast of North Wales on October 14th and identified at the Marine Biological Station at Menai Bridge. It was probably brought by the Gulf Stream from its normal autumnal movement from July to early October, which takes it from the Gulf of Mexico to the Bahamas/Bermuda area and so far as 42 degrees north in 65° water temperature.

It was about 6 ft. long and 250 lb. in weight, much less than this large tuna's maximum growth to 8 ft. and some 450 lb. Though not so well known in the North Atlantic as is the short-finned bluefin tuna, a regular autumn visitor to British waters, the long-finned, long-tailed yellowfin, one of three species bearing this name, is the most brightly-coloured of all these predatory pelagic fish of circumglobal distribution. It ranges through the Atlantic to South Africa, the Red Sea, India and Australia and through the Pacific to Japan and Chile. In Europe it had not previously been recorded north of Spain and Portugal.

Named from its bright yellow fins and finlets, which fade after death, it also has a golden yellow band along its body, while young specimens are marked by vertical white lines or rows of white spots. In case this does not interest the average tropical fish-keeper, I might add that yellowfin have been hatched artificially by Professor Harada in the fish tanks of Kinki University, in Japan, though the larval fish died after 20 days when feeding started, because of transportation and water-quality problems. 14,000 larvae were in a culture tank 5 metres in diameter.

The much-used standard book on British fishes, by Travis Jenkins, is out of date on British tunas. His plain "Tunny" *Thunnus thynnus* should be the Blue-fin or Short-finned Blue-fin. His Pelamid should be called the common Bonito (*Sarda sarda*), a name he gives to *Pelamys thynnus*, which in turn should be renamed the Skipjack, *Euthynnus pelamis*. What he calls the Plain Bonito, *Auxis rocheri*, should be called the frigate mackerel (*A. thazard*). If you use Prof. le Danois lavishly-illustrated 1957 *Fishes of the World*, you will find the name yellowfin given to another species. Like skipjack, bonito, etc., this colloquial name covers more than one species, hence the need to supplement it with its scientific name and pray that modern systematics won't alter it again. There are already 14 synonyms for the new British fish, which is called *Neothunnus macropterus* in Rosa's 235-page 1950 monograph on the

scientific names and distribution of the tunas.

Ludwigias are well-known in hot or cold water aquaria and garden-pools. Though some 25 species exist, mostly in North America, the term is generally used loosely for the commonly-grown South American *L. mullerii* or "false loosestrife", or "bog loosestrife", which is more decorative than oxygenating in a tank. Growers know well its two forms, aquatic and terrestrial which, as in so many aquatic plants, are merely habits produced by a changing environment. This occurs also in our prostrate native *L. palustris*, wrongly called "Hampshire purslane", which has 3 or 4 Hampshire localities like a watercress- and water-purslane-ditch near Brockenhurst, and beside ponds and streams in parts of the New Forest. It is also kept by aquarists and their surplus specimens introduced it into the Failsworth canal near Manchester and even a Ship Canal dock at Salford. Sir E. J. Salisbury, the botanist, has recently drawn the attention of the Botanical Society to its variable habit. As a wet mud-plant it is prolific as an annual, red-stemmed and fruiting freely with almost bell-shaped fruits of a pale yellow, striped with green. In dry seasons, however, it survives on land as a much smaller plant producing far fewer seeds, and as a perennial.

Rushes may be less glamorous waterside plants, but their confusing habit of hybridizing (shared with several other plants) has made one of them specially interesting in the "slacks" or shallow pools among our south-west Lancashire sand-dunes. In May 1913, R. S. Adamson of Manchester University discovered that the mainly Scottish rush *Juncus balticus* had reached the slacks of Birkdale-Ainsdale dunes, a southern suburb of Southport and still its southernmost haunt. My notes from the late J. D. Massey, a local botanist, state it was first found in 1912. Short, stout stems grow upright in straight lines from its creeping roots. Then, in 1933, on the south side of Ainsdale Shore Road it was found to have hybridised with the common soft rush *J. effusus* and formed a colony, which was unfortunately at first wrongly identified at Kew as hybrid a with *diffusus*, and then exterminated by the building of Ponting's holiday-camp, excepting for specimens transplanted to the nearby Nature Conservancy reserve. In 1966, another colony was found beyond the Sandy Lane new houses on Hightown dunes, further south.

In 1951, *balticus* was found to have hybridised with the common hard rush *inflexus* in the Birkdale dunes on the north side of Ainsdale Shore Road, then this was found in the Ainsdale Nature Reserve (which is on

Freshfield, not Ainsdale, dunes) and subsequently on a separate dune system in the Ribble estuary, the Star sandhills between Lytham St. Annes and Squires Gate, Blackpool, where several uncommon duneland orchids, grass-of-Parnassus, *Monotropa*, etc., grow. This appears to be the only part of the country where hybrid Baltic Rushes have been found.

The fact that anglers have been transplanting barbel from the lower Shropshire Severn, and Teme, and these bottom-feeding fish have successfully colonised after introduction a few years ago, to the Lancashire Ribble and other north-western waters, may be causing some concern among riparian owners of rich salmon-fisheries; but this would be more interesting if these fish were a permanent success in any north-western waters. Like much else in our fauna, barbel are native to the rivers flowing to the North Sea via the eastern Pennines, not to those reaching the Irish sea via the west. It may be due to evolution or origin from the old Rhine-North Sea river systems of Europe but it is also in the Danube. It is not in Lakeland either.

Years ago, barbel were introduced to the lower Wyre, in Lancashire, and for a time pre-war were not uncommon there. The barbel's main British haunts are the Rivers Thames, Lea, Kennet, Kentish Avon, Hants Stour and Avon, Huntingdon Ouse, Yorkshire Ouse, Wharfe, Yare, Swale, Yorkshire Derwent, Trent, etc.

One of the most comprehensive and lavishly-produced new books: *Insects of the World* (392 pages, 88 in colour, McGraw-Hill, £6.50) is Prof. Leigh Chadwick's translation of the German work by Walter Linsenmaier. It covers the biology of insects in general and the natural history of the main groups in a very readable and informative manner. There is a 26-page section on Water Insects—the mayflies, dragonflies, stone-flies, alder-flies, caddis, water-bugs, moths, beetles and two-winged flies—plus colour plates. This

large demy-quarto work is a very sound source of information for any school or club library. It might have made quicker reference if all the captions had been beneath their own plates instead of tabulated at the end. Though the text is largely general, many English examples are given; but it refers briefly to the aquatic *Hydrocampa* moths without their better-known name of China Marks. Naturally in such a comprehensive work, it cannot mention all the 1,400 species of mayfly, 2,000 stone-flies, 300 water-boatmen, 4,000 Dytiscid beetles, over 3,000 caddis flies and numerous members of other groups. It deals more with how they live, for the water insects include the oldest of known insects living 150 million years ago. The crucial importance of caddis and mayflies all over the world is that countless fish depend upon them for survival.

Even dragonflies, as a group, are incomparably older than man. A big dragonfly may reach speeds about 60 m.p.h. and even small species have muscles to beat their wings at 50 to 90 beats a second. So many as 24,000 gill-leaflets arranged in 6 double rows help many dragonfly nymphs to respire in their aquatic stage. By means of proboscis and forelegs, water-boatmen may chirp at mating time, and some North American species stick their eggs to living crayfish. Some large predatory, creeping water-bugs are 4 in. long and troublesome fish-killers.

Did you ever wonder how and why the large yellow-bordered Dytiscid beetle, with its air-reservoir beneath its wing-cases, comes to the surface head first rather than hind-first when replenishing its air supply? An air-bubble on its neck grows in size, bursts and rents a hole in the surface-film. This magnificent volume should at least dispel the brainwashing of public minds that insect and pest are synonymous terms. Walter Linsenmaier maintains a zoological museum in Ebikon, Switzerland.

OUR READERS WRITE

continued from page 391

Pen-Pals on Tape

I would like to hear from readers who may be interested in joining me in a "Round Robin" on tape, to exchange news, views and advice about anything relevant to fishkeeping. Items of general interest could be edited into an "audio magazine" for circulation to all members.

The use of four-track tapes is preferred, but I will gladly circulate two-track tapes for the benefit of readers who own two-track recorders.

Each "Robin" will involve five people, on four tracks of about twenty minutes each. (If my arithmetic seems wrong, I should point out that each participant will record over the track of the person to whom he or she sends the tape, since this person will not want to hear

his own previous recording.)

I would appreciate brief details of particular interests to give me some idea to whom I am talking on the initial tape. This does not mean date of birth, height, weight or religion! Any information sent will, of course, be divulged only to others on the same tape.

I derive a great deal of enjoyment out of corresponding, on tape, with people with whom I have apparently nothing in common except possession of a tape recorder. So, as aquarists, we should find we have a lot to talk about. Who knows? We may develop a "live" version of "What is Your Opinion?"

C/T R. S. HOLMES,
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A POND FOR KOI

by Arthur Boarder

SO MANY pondkeepers have asked me what kind of pond is the best for Koi that I thought it would be a good idea if I gave some information on the subject. There is one very important point I must emphasize, and it is that these handsome fish grow to a large size and so are not suitable for a small garden pond. The Koi can grow to at least twenty inches long and so it can be well imagined that to try to keep them for long in a small pond is not likely to bring much success. Also, it is a fact that given the right conditions and plenty of food they can grow very quickly, far outpacing ordinary goldfish in their rate of growth.

It is, of course, difficult to state the minimum size for such a pond, but one of less than 14 x 12 feet and at least two feet deep will not be satisfactory. As for the pondkeeper who has the space for these fine fish, I think that a pond twice the size of the one stated would be grand. To make such a pond as is suitable for these fish, it is first of all necessary to choose the site with care. One with no overhanging trees will be suitable and in good light if possible. It is always easy to provide some shade if necessary from strong sun, but unless some sunshine can reach the pond it will not be as satisfactory as a sunnier spot.

If the garden has a general slope, it will be a great advantage, as then it will be possible to make the pond at the highest level. This advice might cause some

wonder, but a pond should not be at a low position in the garden as rain water could run into it and bring with it undesirable substances and chemicals. The great advantage of the higher level pond is that it will be possible to run out some of the water with little trouble should it be necessary to change any of the water from time to time. One of my ponds is in such a position and I can siphon out at least half the water with very little trouble. The method is to insert one end of a hose in the pond and run the other end down to the lower part of the garden. With a small spouted water-can, I run water into the lifted end until a fair amount of water is in the hose. Then if the end is quickly laid on the ground the water will start to flow.

Now for the shape of the pond. This will no doubt be an individual choice, but I suggest that it be made square or oblong in shape. This is because I recommend constructing the pond with a Butyl or similar lining. If an irregular pond is made then there is likely to be a large amount of liner wasted. I found this out when I fitted a Butyl liner to my pond. It is of an irregular shape and as the liner was oblong, there was a lot of spare Butyl to be cut away. Had the pond been square or oblong there would have been less wastage.

Having decided the shape of the pond, it can then be marked out. Such a pond must be correct at the angles, or it will never look right when completed.

To get the right angles at the corners put in four pegs at the decided position. Then measure across from one peg to the opposite peg at the other end. Compare this with the measurement from the other two pegs and when they agree the pond will be of the correct shape. Now the liner should be ordered and here one can be misguided. The usual method of estimating the size of liner required is to give the length plus twice the depth and the width plus twice the depth. This sounds fair enough, but I never recommend any pond to be made with vertical sides but with a gradual slope. Therefore if the sizes stated are given for your liner you will find that there is likely to be some waste. You will find that even if you have to have a good overlap at the sides for the liner it will stretch down when the water is added.

When excavating the soil, the problem might be where to put the soil. I suggest that it can be piled round the side of the pond so that the finished pond is higher than the surrounding land. This will then give you the chance of emptying some of the water as suggested above. A raised pond can be very useful, as it will be possible to see the fish more easily apart from the ease of emptying when necessary. The sides could also be raised further, by the inclusion of breeze blocks, etc., as it will be quite safe from any leaks once the liner is fitted. With a concrete constructed pond, the making of a raised pond is always a problem as leaks in the wall can occur, especially after severe frosts.

I suggested that the pond need not be more than two and a half feet deep and this is because if the pond was deeper it would be likely that the fish would not be seen. Actually, two feet is sufficient as then the water in the pond will keep more pure and reoxygenated than if it was very deep. Some concrete slabs should be obtained and these will do for anchoring the liner when the pond is filled and to make a path around later on.

Once the earth is excavated the base must be inspected to make sure that there are no pieces of broken glass or sharp stones to cause a puncture. The base can be thumped down with the back of a spade to level it off. If the type of liner I have recommended is used I do not think there will be much fear of a puncture. I have tested a piece of the liner by placing it over a very rough stone and hitting hard with a hammer. No impression whatever was made on the liner and so I consider that the likelihood of a puncture is very remote. I must emphasise, however, that I do not think that the cheaper types of plastic liners would have withstood such harsh treatment.

When excavating the earth there is no need to make it deeper than the required depth as would be the case when using about three inches of concrete. To fit the liner it should be stretched out on level ground if

possible and wiped over to remove any dust or powder. It can then be laid across the hollow and secured at one side by some slabs. Then stretch the other side and secure this. The ends can then be made fast with the liner suspended over the excavation. Make sure that the edges are quite secure and then run water in from a hose. As it enters it will stretch the liner to conform with the shape of the pond.

Once it is filled the outside can be dealt with. A continuous path round the pond can be made with concrete slabs. I used some which were one foot by one and a half feet, and found them very suitable. When laying these slabs, it is a good plan to let them project slightly over the pond so that the top of the liner is hidden. The pond is now ready for planting, but I suggest that no soil or gravel is placed on the bottom. It is better to set all plants in containers. These can be of the open plastic type and it is quite easy to make these with plastic netting, shaped and tied with plastic string. The openwork type allows the roots of plants to spread out and do their work in using up some of the waste matter from the fishes.

There are many types of coldwater plants from which to choose, but I do not recommend using too many different kinds. If this is done it may be found that some do better than others and the weaker growing kinds will be choked out. A good type is the *Elodea canadensis*, as in a short space of time this can grow over most of the bottom of the pond and not grow up too high so as to hide the fishes. Hornwort (*Ceratophyllum demersum*) can also be used as this useful plant never makes any roots and so pieces can be tied in bunches and anchored on the bottom with a stone. Another good oxygenating plant is *Lagarosiphon major*, previously known as *Elodea crista*.

I think that one or two water lilies are a must, as their fine flowers add so much to the beauty of a pond. Do not, however, overdo the number used. Usually they grow fairly quickly after the first year and if one over-plants then the surface of the pond could be covered with leaves and so the fishes might not be seen. Once the water plants can be seen to have made some new growth the Koi can be added. Although large ones look very impressive, I do not recommend having very large ones for a start. Small fish will soon grow and are more likely to thrive than if they had spent some years in different conditions. With adequate space and food the fish will grow very quickly. Their food can be pellets, dried cat-foot, wheat germ and, of course, as many garden worms as can be obtained. A mixed diet of dried and live foods will keep the fish in good condition but remember that large Koi can eat a lot of food, especially when the water temperature is near 60°F. As the water cools down feeding can be restricted and perhaps very little need be given for most of the winter except in the milder spells when a little can be offered.

WATER LETTUCE

by Jorgan and Pamela Hansen

THIS is a beautiful and useful floating plant, but one which requires adequate space and attention. We first obtained the plant at an auction at Helsingør Aquarium Club; it is practically unobtainable in Copenhagen where they can't seem to be able to grow it. We ourselves have tried to produce it in number, but found this uneconomical with regard to the space and light it demands, and the fact that it deprives the other plants in the tank of most of the light.

The large fluted leaves of water lettuce are light-green in colour, have no leaf-stalk, and grow in the form of rosettes. They are stiff and furrowed lengthwise, and tightly covered with hairs. These have a water-repellent effect, as they enable water to roll off the leaves in small drops, as water rolls off a duck's back. An air-filled cushion on the underside of the leaf-base enables the rosette leaves to float. The leaves can obtain a length of between 5 and 18 cm. and a breadth of up to 6 cm. In the evening when the light fades the leaves rise up and stand erect at an angle of 45 degrees or more.

The roots are long and feathery and whitish-yellow in colour. According to aquarist literature, growth is best when the water in the tank is shallow enough to enable the roots to reach the bottom soil; but they can, in any case, reach a maximal and considerable length of 45 cm. (18 in.).

Water lettuce reproduces by means of runners which are formed from small pockets near the base of the leaf. If the plant is left to itself, an increasing number of small plants form from runners, and yet more plants from these runners until, in the course of a fantastically short time, the surface of the tank is completely overrun by them. If one nips off these constantly appearing runners, the leaves of the mother plant are thereby enabled to grow larger, and one inhibits an excess of plant growth.

The plant also flowers, but one doesn't often notice, as the flower is small and unimpressive. The whitish holster leaf is covered with hairs on the outside, while inside are to be found, above, a circle of 6 stamens, and below, a single pistil. When flowering is almost completed the style curls in towards the anthers so that the stigma can be pollinated by the plant's own pollen.



One flower we observed bloomed for 2 days and then withered. We tried to pollinate it artificially as at that time we didn't know that the plant was self-pollinating, and thought that the lack of pollen-spreading insects might prevent fertilisation.

Water lettuce affords protection to livebearer fry, which seek hiding-places among its roots (which will, moreover, often be a chosen spawning-site for egg-layers) and are an excellent anchorage for the bubble-nests of labyrinth fish.

Water lettuce comes from the family *Araceae* and was classified by Linnaeus as *Pistia stratiotes*. There appears to be only the one species of *Pistia*, whose name comes from the Greek word for "river bed" or "pond." "*Stratiotes*" means "warrior," and this appellation has been said to have arisen from the use of the plant to heal wounds in times of war.

The plant originates from tropical America and the West Indies but has since spread to most other tropical areas. It prefers mostly quiet shallow waters in low ground areas but is also found in plateaux. It often occurs in large numbers, forming a dense mass of foliage. On account of this it provides an ideal hiding-place and shelter for mosquito larvae and has thus been blamed for fostering the spread of malaria in the West Indies. In South-east Asia and Africa it has been used as food and as one of the ingredients in soap, and is still used in certain areas as animal fodder and fuel.

MARINE QUERIES

by G. V. Wardle

Can native marine fish and invertebrates be acclimatised to "tropical" (75°F) conditions?

The short answer is, some can, some can't. However, there are many interesting and colourful specimens which can easily be adapted to "tropical" conditions.

Suitable invertebrates include the common beadlet anemone *Actinia equina* which is often found high up on the shore where temperatures sometimes soar into the eighties during the summer months. The beautiful snakelocks anemone *Anemoma sulcata* will also thrive in the higher temperatures. The dahlia anemone prefers things cooler and will not usually do well in a tropical tank. A beautiful crustacean which can be tried in the tropical tank is the spiny squat lobster *Galathea strigosa* which is a bright reddish-brown with red-tipped claws and vivid blue lines over the carapace.

Likely fish include the common blenny or shanny *Blennius pholis*, the tompot blenny *Blennius gattorugine*, the corkwing wrasse—*Crenilabrus melops* and the thick-lipped grey mullet *Mugil chelo* which grows much faster under tropical conditions. There are, of course, many others which can be tried to ascertain their suitability.

Having kept freshwater fish for a few years, I would like to have a go with tropical marines. Can you give me any pointers on how I should proceed?

The best advice that could be given to a novice mariner is to read as many good books on the subject as possible. Wide reading will build up a mental picture of the techniques, apparatus and fish you want to keep. Far too many aquarists blunder into marine fishkeeping without reading a single book on the subject.

Useful books for beginners are: *The Marine Aquarium* by Wolfgang Wickler (Studio Vista); *Know How to Keep Saltwater Fishes* by William P. Braker (The Pet Library Limited); *Tropical Marine Aquaria* by G. F. Cox (Hamlyn all-colour paperbacks). None of these books is expensive and they will help you a great deal.

Apart from the above books, seek advice from reputable dealers, who know how to look after their livestock. Good dealers will be only too pleased to help you.

My dealer has some small batfish which he says are the short-finned variety. Can you give me some information on these fish as I would like to purchase one?

In all likelihood your dealer has *Playtax orbicularis* which is the most commonly seen batfish. The short-

finned batfish is *Playtax vespertilio* which is not very attractive and seldom seen for sale. *P. orbicularis* are very peaceful fish which grow rapidly in captivity. Specimens over 12 in. deep are quite often seen, and they can achieve their large size in a few months if fed properly. This type of batfish will eat large quantities of almost anything. I have found that they particularly relish earthworms. Needless to say, a large tank with a depth of at least 20 inches is essential. It is pitiful to see large batfish in shallow tanks with their dorsal fin sticking right out of the water. During the course of growth the colour changes enormously and generally speaking the large specimens are a drab brown, while young specimens are a bright reddish-brown. Do not keep bats with aggressive fin nippers as the bats wonderful flowing finnage will be ripped to shreds. As an extremely peaceful species *Orbicularis* are defenceless against these smaller aggressors. Coral is not recommended as they can injure themselves on sharp edges.

Lastly, bats are great personality fish and tend to become a family pet, and will greedily take food from his owner's fingers.

What system, natural, semi-natural, clinical, is best for the marine aquarium?

This question has been hotly debated for many years, but is still an open book. Without doubt all three schools of thought, i.e., Natural, Semi-Natural and Clinical, have all been tried and proven by different aquarists. Briefly, the Natural system does not use filters at all but merely airstones. Filtration is effected by live corals, living rocks, plants, etc. This system is favoured by the writer. The Semi-Natural system which is perhaps the most commonly used system relies on high turnover undergravel filters and the establishment of nitrifying bacteria in the gravel bed, which remove or convert ammonia and nitrite into nitrate salts which can be utilised by algae for growth.

The Clinical System generally incorporates powerful mechanical filters which remove all particles of solid waste from the aquarium. It is also now realised that if the filter medium is left unattended, nitrifying bacteria form in it, so that it also acts as a biological filter after a while. However, if the filter medium is cleaned regularly it would only provide mechanical filtration and regular water change may be necessary to prevent the build-up of toxic substances. Ozonisers and protein skimmers are frequently used on clinical set-ups. The protein skimmer is a useful device for removing albumen.



THE EGYPTIAN SPINY-TAILED LIZARD

by H. G. B. Gilpin

Uromastix aegyptius, the Egyptian Spiny-tailed Lizard, is one of the Mastigures and is a striking animal, particularly interesting in its defence mechanisms and adaptations for survival in its own particular environment against the hazards of predators, water shortage and peak temperatures.

My specimen was brought into the country by a student from Kuwait, on the Arabian Gulf. He tells me that locally it is called the "Thub" or "Dhab" and states that in the wild state the adults reach a length of twenty-four inches. This is confirmed by a friend of mine who has seen a number of the species approxi-

mating to this size. Some authorities quote twenty-six inches as the maximum overall length.

My animal was caught in dry, sandy, desert country and reached me three weeks after capture, including ten days in England before it came into my possession. During this period, unfortunately, it endured considerable fluctuations in temperature. This was particularly regrettable as Mastigures require a high temperature to keep them active and in its absence decline to feed. On occasions when it was exposed to sufficient heat, I am told it was observed eating dandelion blossoms.

When I first received the lizard, it was extremely lethargic, so much so that I brought it home unconfined in any way. In fact, it clung to my knee in the car throughout the entire journey, without showing any inclination to wander. Under the influence of sunlight streaming in through the windscreen full upon the animal's body, it brightened considerably, giving a clear indication of the effect of heat upon the species.

Uromastix aegyptius, if not beautiful, is a most arresting animal. Mine holds its rather tortoise-like head well above the line of the body and has a wide, much flattened body fifteen inches in overall length, six inches of which is made up by a stout tail, heavily armed with twenty rows of sharply spiked scales. It is three inches across the shoulders and two inches across the widest part of the head. The eyes are small, bead-like and piercing, giving the animal an appearance of determined aggressiveness. The dorsal surface, covered with small, granular scales, is olive brown, spotted with yellow rings and crossed with six zig-zag yellow bands. Ventrally it is a uniform yellow. The basic colour of the back is variable and at times it pales to a yellowish brown hue, again darkening within a few hours.

Although the legs are powerful and the hind toes slightly fringed to enable it to deal with the loose, sandy ground of its native terrain, naturally it has a slow, lumbering gait, too slow to enable it to escape from a man if encountered at a reasonable distance from its burrow. If found near its burrow, however, the story is very different. It will allow the intruder to approach within a dozen feet or so and then disappear with unhesitating celerity.

The burrows are deep, some eight to nine feet long and four to five feet below the surface, excavated by the lizards under piles of stones and, although they feed and move about above ground by day, they sleep in them at night, closing the entrance when the temperature is unduly low. They are also used during hibernation and to retire to during the hottest part of the day as, like other lizards inhabiting arid or semi-arid regions, they require some means of controlling their body temperatures in an environment of thermal extremes. When pursued, they retreat to

the burrows, blocking the entrance with their spiny tails.

Apart from man—the Arabs are said to eat them—the main enemies of the Egyptian Spiny-tailed Lizards are birds of prey and small, carnivorous mammals. They rely upon their cryptic coloration to protect themselves from the former whilst their defence against the latter is to lash out vigorously with well armoured tails. If freshly taken into the hand, they adopt this measure but, whilst rearing upwards in warning, rarely use their powerful jaws, capable of inflicting a severe wound, to bite. In captivity they soon become tame and will learn to take food from the hands of their owner.

Feeding Mastigures in confinement presents real problems unless the temperature is maintained at between 85° and 95°F. At 70°F they are sluggish and show no interest in food.

Food is taken into the mouth by the oval, fleshy, unforked tongue. The broad, spatulate teeth of the adults, adapted to cutting off suitably sized pieces at a time, suggest that the mature animals, at least, are herbivorous. Certainly they will eat pieces of apple, flowers, berries, dandelion and lettuce leaves but they undoubtedly prefer crickets, locusts and grasshoppers. The young ones are almost certain to be far more exclusively insect-eaters than the adults.

If persuading the animals to feed in captivity is difficult, it is infinitely harder to get them to drink. They invariably decline to drink from a vessel, nor will they lap drops of water from vegetation. The problem was surmounted in the case of my animal by squeezing drops of water from a sponge on to the back and tail. The skin darkens immediately on contact with the water which is as instantly absorbed. In the wild state Mastigures probably take in water, condensing from the air when the temperature falls, through the media of their skins. Even in desert conditions, damp areas occur below the surface and the Mastigures reach these regions by way of their burrows, so that for a considerable period out of the twenty-four hours they are in close contact with moist sand.

When this method is adopted in confinement, care must be taken to limit the water to the actual skin of the animal and avoid allowing the vivarium to become wet. If the surroundings do become too wet the lizard will die.

Moisture on the skin is also important during the skin changing process which does not take place satisfactorily if the animal is allowed to become too dry. Mastigures are not the only lizards to take in fluid in this way. Most probably other desert dwellers, such as the Australian Bearded Lizard, *Amphibolorus barbatus*, obtain their moisture, at least partially, through the skin.

COLLECTING MARINE FISH

by R. D. Sankey and R. G. Jones

(The authors have considerable experience of tropical reefs having between them visited the Red Sea, Kenya, Seychelles Islands, Comoro Islands, Madagascar, Persian Gulf, Singapore, Ceylon, Indonesia, New Guinea and Philippines).

TO MANY people, marine aquarium fish are a readily available commodity and many shops have a large selection of marine fish from several different tropical areas. The purpose of this article is to increase the marine aquarist's awareness of the methods and problems encountered collecting fish on a coral reef. Since the actual method used to catch the fish can, in certain cases, cause long-term or permanent damage to the metabolism, this is more important than one would initially suppose. Also the side effects of various collecting methods upon the reef environment should be considered. Below are categorised specific methods of collection that we have both seen in action in the Red Sea, East Africa, Ceylon, Indonesia and Philippines.

One of the most arduous but successful methods is by skilled manoeuvring of a pair of handnets, usually about 20 to 30 c.m. each in diameter. This requires specific techniques for different species and, in Indonesia for example, we found that each man specialised in catching only one or two species; to become skilful much experience and cunning is required with handnets but the fish caught generally suffer only minor skin abrasions which soon heal. Breakage of coral and other environmental damage is minimal.

Seine nets are sometimes used in addition to handnets, and are necessary for some of the faster swimming reef species. A good example of the use of seine nets is the capture of the surgeon fish *Acanthurus leucosternon* in East Africa. *A. leucosternon* is very active, swimming over large areas of coral and rock, browsing on algae. A seine net about 10 m. long is positioned in a "U" shape by two divers, great care being taken to ensure that there are no holes through which the fish can escape. They then attempt to drive the surgeons into the net; success is limited for the fish usually avoid the net or else find holes which even the divers did not see. *A. leucosternon* only butts against the net a few times and, unless it becomes tangled or is quickly captured, it will swim straight back out of the seine net and be lost. In Ceylon teams of up to ten people

participate in driving shallow water fish into previously positioned nets.

An unusual catching device is the "Slurp Gun", used mostly by amateur collectors. It is equivalent to a giant syringe and fish are sucked into a chamber. Its application is limited to small fish (e.g. pomacentrids) trapped in holes but since other methods are equally successful, it is not often used. The main advantage is that the fish are virtually unharmed and there is no destruction of coral.

Traps, consisting of baited wire or bamboo baskets with a funnel entrance, are widely used, especially in the Far East where they are used for the capture of fish from deeper water, since most of the divers are only equipped with simple goggles and cannot operate efficiently below about 10m. Fish caught this way have to be carefully brought to the surface to prevent fatal swelling of the air bladder, due to decompression. The long-term effects of keeping fish that normally live below 30 to 40m. in aquaria are not fully known, though clearly light and pressure are important factors. As any other Aqualung divers will know, the amount of light penetrating to these depths is small and only at the blue end of the spectrum. Specimens caught by this method often suffer external damage, especially on the mouth, since they attempt to escape by swimming against the frame.

Chasing fish into corals and then breaking off the coral and removing the fish by hand is much practised in Ceylon, mainly for balistids (trigger fishes) small pomacanthids (angels) and pomacentrids (damsels), resulting in much destruction of coral. Moreover, the fish are generally bruised and cut after being pulled from sharp coral. These afflictions may take several days to become fully apparent on a seemingly healthy fish and in a few cases are fatal. Far more destructive to both fishes and coral is collection by dynamite which is still practised illegally in Ceylon and certain other eastern countries; although most fishes collected are only suitable as food, a small percentage is, nevertheless, exported for aquarium use and these are often so shocked that they never feed again.

Small hooks and line are occasionally used for certain species but, unless the fish are both lucky and carefully treated after capture, fatal secondary mouth infections will result.

Chemicals such as derris root extract (containing rotenone) have long been used for the capture of food-fish but only recently have chemical methods been applied on a large scale to the capture of marine aquarium species. In our opinion the most harmless of these chemicals is quinaldine, which is used primarily for the capture of Labroides, small *Pomacanthus*, blennies, gobies, etc. This chemical is applied on an individual basis and a fish is never exposed to it for longer than one or two minutes; its effects are approximately equivalent to chloroform on mammals, in that the fish become dazed and is then easily netted. We have not observed any long-term ill effect. Owing to the relatively high cost of quinaldine per animal caught this method is not widely used. The two most commonly used chemicals are sodium cyanide and rotenone, which are considerably cheaper.

Rotenone, an extract from the derris root, better known as an insecticide, has a paralysing effect on fish. The initial response to rotenone poisoning is a reduction in gill rate, brought about by paralysis of the opercular muscles. This leads to gradual anoxia and is combined with further paralysis until death ensues. If the fish are quickly removed from the rotenoned area and placed in containers of clean sea-water they will undergo a partial recovery. Unfortunately, they have usually been exposed to the rotenone for several minutes by the time they are caught and anoxia (lack of oxygen) for this amount of time results in permanent damage, especially to the central nervous system. The fish may live anything from a few minutes to a few weeks. Overall survival rate is minimal, even for the most proficient of marine aquarists let alone the novice, and the sheer wastage of this method is totally out of proportion to the small number of surviving fish. Furthermore, large areas of coral are poisoned and the aftermath is a disturbing sight, the bottom being littered with dead and dying animals, the majority of which are of no use to the collectors.

In the Far East, the widest used chemical appears to be sodium cyanide, which is applied either by squirting a non-specific concentration around a likely coral head, or else by pouring a gallon or two of solution, containing up to a kilo of cyanide, over a large area. Many readers will doubtless be aware of the lethal effect of very small doses of cyanide on human beings, and the same applies to other animals. The effect of cyanide is to block an essential enzyme, (cytochrome oxidase) involved in respiration, and normally results in death. As with rotenone, if the fish are quickly put into clean sea-water they may effect a partial recovery and this is sometimes helped by the addition of ferrous sulphate or sodium thiosulphate, (cyanide antidotes). Exposure to cyanide causes widespread internal damage and, if the fish survives the short-term effect of cyanide poisoning, it usually succumbs within a few weeks due to irreparable metabolic damage. Fishes caught by this method may often seem in good condition but will suddenly and inexplicably deteriorate.

It is clearly advisable for the aquarist to attempt to purchase fishes caught by nets and other mechanical methods since the fish's health can be assessed by external appearance. Thus, if the fish has a clean skin, free from infection or abrasion and is feeding, it may be assumed that it is in good health. How, though, can one tell if a fish has suffered rotenone or cyanide poisoning? The answer is that in many cases it is almost impossible and the fish will appear externally healthy. The only practical solution is to avoid rotenone or cyanide caught fish.

In both the authors' opinion, the use of sodium cyanide and rotenone in the collection of aquarium fishes is wrong on ethical, environmental and commercial grounds. Fortunately, other countries are now legislating against the use of these chemicals and it is to be hoped that the end of these collecting methods for other than scientific purposes is near.

BOOK REVIEW

Tropical Aquarium Fishes, Freshwater & Marine
by George Cust and Graham Cox. Published by Hamlyn at £2.50.

The co-authors of this book are widely known among aquarists who read about their hobby and both share a reputation of knowing their subject and of being dedicated enthusiasts. This product of their researches is intended for both beginners and advanced fish-keepers but tends to conform to the general pattern of many recent publications in this field where the reading matter takes second place to the illustrations.

Both the tropical and the marine self-styled "Catalogue of Fishes" are aptly named and comprise ninety

pages between them, leaving forty-five for the real meat of aquarium and fish management which covers all the relevant basic aspects.

Time was when books on the fishkeeping hobby were comparatively few and sparsely illustrated but informative and accurate. The trend is now towards more and more books on the subject with more and more colour photographs but with less attention to detail and accuracy in the text. While many such inaccuracies may be no more than typographical, they have no place in an expensive volume which has the appearance of a quality production. The moderately experienced aquarist will supply his own corrections to: *Abramites microcephalus*, *Corydoras*, *Molliensia*, *Serresalmus*, *Rooseveltia nateri* and *Pristilla riddlei* (to quote at random from text and index) but the newcomer to the hobby has a good chance of getting away to a bad start

when familiarising himself with the generic and specific names of his favourite fishes.

Home Aquarium by Shinji Makino. Published by Ward Lock at £2.50.

The author, a Japanese, is known as the first man in the world to breed the Neon Tetra in 1953. He is President of the Japan Tropical Fish Research Centre, a member of the Ichthyological Society of Japan, a member of the Japan Society for the Study of Reptiles and Amphibians, and Chairman of the All Japan Guppy Association.

Not unlike the volume reviewed above, this book provides a lavishly illustrated (colour and black and white photographs by the author) general approach to aquarium keeping, both freshwater tropical and marine tropical and the greater part of the 100 or so pages comprise a catalogue of fishes, both popular and semi-rare, with notes on their breeding habits.

Goldfish find no place in this *Home Aquarium* except for a mention *en passant* in reference to the Chinese "... fixing a mutation that produced a red body in the 'Crusian' carp."

The translation from Japanese is, in the main, quite good although there are occasional lapses such as "an unforgettable forgotten sight" in reference to a "well-managed marine aquarium". There is, too, a description of the important role of aquarium plants which utilise a process of photogenesis.

Amphiprion percula are described as *Actinicola percula* but the many species of clown fish do tend to attract a variety of names.

Your Book of Fishes by Heather Angel. Published by Faber & Faber at £1.25.

This little book is well produced, well illustrated and written with clarity. It is aimed at the young reader with the intention of arousing interest in fish. This it may well succeed in doing but as its scope is so wide, covering freshwater fishes, marine fishes, how fish breed, photographing fish, catching them, farming them and curing their ailments, it is inevitable that but a sketchy outline can result within the compass of a mere seventy pages. Although this does not detract from its merits, the price could be considered as somewhat excessive.

B.K.K.S.

FOR their first attendance at the Belle Vue Aquarists' Festival the British Koi-Keepers' Society arranged a Japanese-style setting for their display of Koi.

Committee Member, Mr. W. R. Seal, of Stockport, devised the stand, which attracted a great deal of interest and many visitors. Other local members gave their full support and provided some of the Koi on show, which ranged from 2 in. to 12 in. in a wide variety of colours.

The Chairman and Secretary attended for the two days and were very pleased to meet numerous old and new members.

Membership now exceeds 200 and several members have this year successfully spawned their Koi. Details of some spawnings, in England and Wales, have been included in recent *Newsletters* which all members receive at regular intervals. Anyone interested in Koi-keeping will be sent full details of membership, subscriptions, etc., upon application to the Secretary, Mrs. Hilda Allen, 1 Anthony Close, Peterborough, PE1 3XU.

At the recent London meeting the following officers were elected: Chairman, Mr. E. A. Allen; Vice-Chairman, Mr. E. A. Gibbins; Committee Member, Mr. W. A. Martin. One of the Vice-Presidents of the Society, Mr. Colin Roe, was the guest speaker at this meeting.



Mrs. Hilda Allen, Secretary, B.K.K.S.

THE HARDY EUROPEAN REPTILES AND AMPHIBIANS IN CAPTIVITY (Part 9)

by Andrew Allen

16. The Marsh or Laughing Frog (*Rana r. ridibunda*)

Description.—With lengths of 12-17 cms., this is certainly the largest frog in Europe, and adult specimens from Southern areas can be really impressive. The feet are fully webbed, the skin is smooth, sometimes with small warts. There are very large and prominent vocal sacs. The back may be various subdued shades of olive, green and brown, with few or no markings. The thigh is grey with olive or brown bars, and there may be a faint green mid-dorsal line. Ventral coloration is white or cream with grey patches.

Distribution.—The type form is found in Holland and much of Germany, and through Central Europe to the Urals and Iran. This is an aquatic species that particularly favours large bodies of water like lakes and marshes, though in the South of its range it also inhabits small ponds and ditches. The introduction of this animal to parts of South Kent and Sussex has been accompanied by a considerable measure of success, and it is fair to regard this species as a member of the English herpetofauna.

Breeding Habits.—Mating takes place in April or May, when the stentorian croak of the male can be heard from afar off. Eggs are laid in several large clusters of spawn, each of which may contain several thousand eggs.

Care in Captivity.—The great size of this frog and its aquatic habits create many problems for the herpetologist who attempts to keep it in captivity.

In general terms it cannot be recommended as an inhabitant of the indoor vivarium, a characteristic that it shares with most other large members of the Ranidae. It jumps considerable distances, requires a large amount of room, and is unlikely to prosper in a vivarium with less than twenty-four square feet of floor space—e.g., one of 6 ft. × 4 ft. Obviously

this is rather beyond the scope of most living rooms or hallways! Even when given such spacious conditions it is still likely to damage itself against the walls of the vivarium, for it is nervous of temperament and settles down very slowly. Damage so caused, especially to the delicate nose area, is likely to lead to probably fatal infections. If an indoor vivarium is used, it should be divided equally into areas of land and water. The aquatic half should contain water at depths of between an inch and a foot, and should be planted with sturdy coldwater vegetation. The terrestrial half should be fairly open, but with one or two densely planted areas. The vivarium should be exposed to the sun, for this commodity is absolutely essential to the health of the Marsh frog. Without it the frogs will languish and their colours will deteriorate to a muddy, unpleasant brown. Winter is a difficult time, for the frogs must either be transferred to a specially constructed hibernating box (a very dodgy business), or the vivarium can be moved to a suitably cool location (which is impossible if it is of decent size), or they must be over-wintered, never a course of action to be recommended. It would be a brave person indeed who could contemplate housing this species indoors, especially when we add to the other faults of this frog a croak of stunning proportions. Keep a couple of male Marsh frogs in the bedroom and you will soon be sleeping at a suitably distant hotel, or facing legal proceedings from your next-door neighbour.

It is better from every point of view to relegate these animals to an outdoor vivarium in the garden. A reptiliary, so often a perfect answer to the herpetologists' problems, cannot however be wholeheartedly recommended. These frogs could comfortably leap out of the average reptiliary, especially if under the added stimulus of panic. Exterior walls of perhaps four feet in height would be necessary,

and these would only prove practical in a very large reptiliary, on account of the shade that they would shed. By far the best form of accommodation for this species is a large greenhouse, where the hot, humid conditions and the bountiful jumping room will prove greatly to the taste of the inhabitants.

Unless nervousness causes them to go on a hunger strike, these frogs are fairly easy to feed, capturing their prey both on land and in the water. All the normal invertebrate live-foods will be accepted, with earthworms an excellent basis for the menu. A variety of foodstuffs should be offered, in very substantial quantities, for this frog has a distinctly healthy appetite. In essence anything that moves is fair game for *Rana ridibunda*, and this includes small vertebrates such as lizards, newts, goldfish, minnows and fledgelings.



Half-grown Marsh Frogs photographed *in situ* on Romney Marshes

Naturally this latter characteristic is not welcome in the community vivarium. The Marsh frog will fit into very few communities for there are only a handful of Reptiles and Amphibians that are totally

safe from its rapacious jaws. Amongst these are the Eyed lizards, fully adult Green lizards, land tortoises, large Common toads, Clawed toads and adult Edible frogs. Snakes and terrapins should be avoided as companions for they are natural predators upon this species.

Thus the Marsh frog cannot be recommended to the amateur, for it is a difficult animal that requires specialised attention. But this should not disguise the fact that it is highly attractive, with interesting and unusual habits.

There is a very important sub-species, *R. r. perezi*, which is similar to the North African forms of this species. It is very widely distributed in Portugal, Spain and Southern France.

17. The Edible Frog (*Rana esculenta*)

Description.—This frog is very similar to the last, indeed many herpetologists regard the Marsh frog solely as a sub-species of the Edible frog. However, *Rana esculenta* never attains the same bulk, with males growing to about 8 cms. and females rarely up to 12 cms. in length. General build is slightly slimmer than in the Marsh frog, and the hind limbs are a little longer. The back may be beautiful, clear grass-green or a rather muddy brown, with black spots and patches. There is a yellow mid-dorsal line. The belly is white, sometimes flecked with grey.

Distribution.—It inhabits much of Western Europe, including France, Belgium, Holland, Germany, South Scandinavia, West Russia, Hungary, Rumania and Italy. Introductions to Southern England have not been notably successful, colonies tending to survive for some years before declining and eventually dying out. It frequents freshwater of any kind, including ponds and ditches much too small for the tastes of *Rana ridibunda*.

Breeding Habits.—These are similar to those of the Marsh frog. Mating commences in May, when choruses of males begin to croak lustily.

Care in Captivity.—The Edible frog is slightly more amenable to captivity than its close relative, but still poses a number of tricky problems.

Though it requires rather less space than the Marsh frog, it is otherwise every bit as difficult to keep in the indoor vivarium. Ample jumping room, a large pool and bright sunlight must all be provided, but even so it is unlikely to prosper.

However, it does make an excellent inhabitant of the outdoor reptiliary, if this has high walls, generous pond, abundant greenery and an open, sunny position. Greenhouse and cold-frame are even better, and the frogs will revel in the hot, moist atmosphere and the life-giving sun. I have specimens of this species both in an outdoor pool and a cold-frame, and they have thrived in each case, though their colours are slightly more glorious in the latter and

they spend longer hours on view.

Their diet should ideally be midway between that of a typical small frog or toad and that of the Marsh frog. They have a greater appetite than most, and can cope with the largest worms and beetles, or even with a newt or baby mouse. Their rapaciousness should be taken well into account when planning the community vivarium. Because of their smaller size and reduced appetite they will fit into more communities than the Marsh frog, but their companions must nevertheless be chosen with immense care. They can safely be housed with Eyed and Green lizards, tortoises, Common, Moor and Agile frogs, Common and Clawed toads, Crested and Marbled newts and Fire salamanders. Needless to say, all of their companions should be fully adult in view of their highly antisocial cannibalistic ten-

dencies.

In conclusion, *Rana esculenta* cannot be recommended for indoor vivaria of any description, but it does make an excellent inmate of all the outdoor vivaria. Its glorious colours will add life and light to any community of drabber batrachians, for there can be few more splendid sights than a proud Edible, resplendent in vital greens, basking in the full rays of the sun, or leaping agilely after some distant prey. At times like this you forget utterly its many faults, for it is truly one of the most beautiful and attractive of all the Reptiles and Amphibians available to the amateur.

There are no sub-species.

The next article deals with the familiar Common frog, and the less familiar Italian, Greek and Iberian frogs.

LAMPREYS

by Bill Simms

THE LAMPREYS of our streams and coastal waters belong to the class Cyclostomata, and are so primitive that they are not considered to be true fishes. They appear to be direct descendants of the jawless Ostracoderms, which were among the oldest known vertebrates of a period many millions of years ago. Because of this they have been studied intensively to see if they can provide any clues to the prehistoric scene so long ago.

The interest of aquarists is on a different level, but nonetheless serious for that. We know that lampreys can live well in an aquarium, and because of their strange form and manner of feeding they make fascinating subjects.

There are three species of lamprey in Britain: the sea lamprey; the lampern or river lamprey; and the pride or brook lamprey. Some authorities think that these three species are actually one only, and that their living conditions have modified them to show the obvious differences between the three.

Sea lampreys live and grow in the sea, but towards the end of their lives they ascend rivers to spawn. The lampern spends a little more time in freshwater, and has been known to overwinter there, but essentially is also a creature that grows in the sea. The pride lives almost entirely in freshwater, but does at times visit the sea, and can occasionally be found in estuaries.

These are mainly differences of habitat, and because of them there are differences of diet. Life is more prolific in the sea, so that there is a greater abundance and variety of food, and this always enables any creature to develop fully. Because the differences of these three lampreys fit into this pattern of more development in the marine species, and less in the freshwater kinds, the theory of one main species is upheld. There are arguments the other way, though,

and here we will deal with the lampreys as three distinct species.

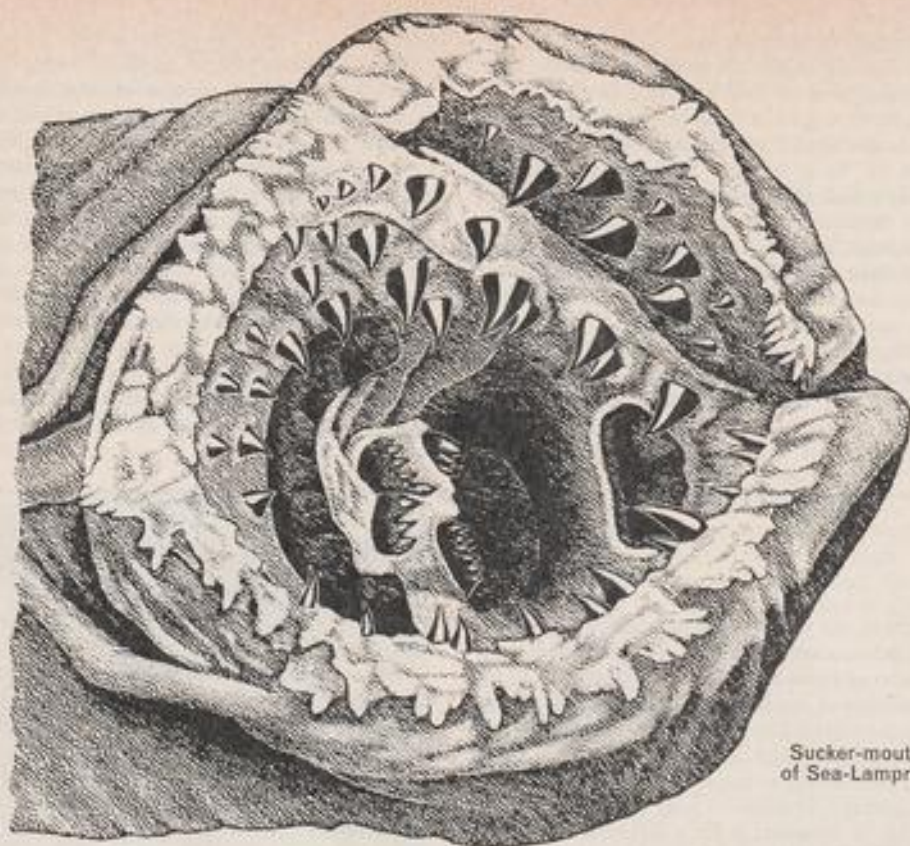
The sea lamprey can reach a length of over 3 ft., and has a ridge down its eel-like back that is a cartilaginous substitute for a backbone. The scale-less skin is dark grey-brown in colour, mottled with a lighter shade. Its eyes are set so far at the side of its head that this fish can look straight down as well as up, and therefore can see whatever it wants to fasten on.

There are seven gill slits along each side of the body just behind the eyes, and these suck in water as well as expelling it. This is necessary because when the sucker mouth is fastened on to anything it would not be possible to draw in water for oxygen through the mouth as other fishes do.

Because of its difference from the mouths of true fishes, the sucker mouth of the sea lamprey is its most interesting feature. Situated under the snout end of the lamprey ahead of its eyes, it is a circular orifice, fringed with soft white flesh that can fasten on to anything with the aid of the suction created by the lamprey.

Inside the mouth is fish-white flesh liberally studded with sharp red teeth, fashioned from a horny substance that renews itself. These teeth are arranged in a regular pattern, and are supplemented by smaller teeth growing on the tongue. All of them rasp the flesh of any creature the lamprey fastens on, but the tongue-teeth, although smaller than the others, are extremely mobile, and so do more of the scraping. The constant suction from the throat ensures that all particles and fluids extracted from the victim are disposed of quickly.

Fish of all kinds, but particularly cod, herring and mackerel, form the bulk of the sea lamprey's food. It fastens on to some fleshy part, and cannot be shaken or scraped off until it has satisfied its hunger. There is



Sucker-mouth
of Sea-Lamprey

evidence that it does not feed at all in the short time it is in freshwater to spawn.

The lampern, which reaches a length of about 15 in., differs in having fewer horny teeth lining the mouth, and in a slightly different layout of the teeth on the tongue. It spends a large part of its life in the sea, but when adult migrates up the rivers in the autumn. There it remains until about April, when the spawning commences, and during this time it does little or no feeding.

The pride rarely grows beyond 9 in. long, and has far fewer teeth than even the lampern, and what teeth it does have when mature are blunt. It lives almost entirely in small streams, and does all its feeding when in the larval stage.

Lamprey of all three sorts spawn early in the year. The male travels up to a stony, fairly shallow place, and there starts a trough-like nest of stones. These are moved out of its way by means of the suction mouth, and when the female arrives to help him the two of them occasionally work together to move a particularly large stone.

The female then lays her eggs, which can number many thousands, and the male follows her into the nest to fertilise them. Afterwards the two lampreys make

some effort to cover over the eggs. Then comes a slight difference in the three species. The eggs of the sea lamprey hatch in about 10 to 15 days into toothless *larvae* called ammocoetes. These tiny eel-like creatures are blind, and move into the mud at the bottom of the stream, to live there for about 4 years, while feeding on microscopic creatures in the mud. When it is about 6 in. long the sea lamprey *larva* then metamorphoses into the mature form, and at once migrates to the sea, to live in its parasitical fashion on living fish for about 4 years.

The eggs laid by the lampern follow a somewhat similar pattern, but differ in hatching in fewer days. The *larvae* live in river mud, and feed there on similar microscopic food. When they change into the adult form to migrate to the sea they remain there for about 2 years only.

The pride, or brook lamprey, only grows to about 9 in. long, and spends most of its life in the immature larval stage. It is a matter of some months only, for by the spring following the egg hatching the pride becomes mature, developing eyes and small blunt teeth. There is some evidence that the pride does not feed when adult, and all the lampreys appear to die soon after mating.



from AQUARISTS' SOCIETIES

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

OPEN Show results of Weymouth A.S. were as follows: Class B: 1 and 2, B. Bisson (Basingstoke); 3, K. Forrester (Weymouth); 4, A. Cox (Weymouth). Class C: 1, C. Harding (Cardiff); 2, M. Medway (Weymouth); 3, G. T. Orton (Weymouth); 4, J. Jackson (Basingstoke). Class Ca: 1, B. Bisson (Basingstoke); 2, C. Harding (Cardiff); 3, D. Kelly (Weymouth); 4, C. Rossiter (Gloucester). Class Cb: 1, J. H. Jackson (Basingstoke); 2 and 4, M. Strange (Basingstoke); 3, B. Bisson (Basingstoke). Class D: 1, M. Strange (Basingstoke); 2, B. Snell (Yate); 3, K. Forrester (Weymouth); 4, K. Forward (Yeovil). Class Da: 1 and 4, R. Christopher (Dorchester); 2, K. Forrester (Weymouth); 3, T. Hamshire (Bristol). Class Db: 1, T. Hatton (Weymouth); 2 and 3, P. Willis (Portsmouth); 4, J. Bragg (Torbay). Class E: 1, A. C. Tull (Salisbury); 2, J. E. Forward (Yeovil); 3, K. Forrester (Weymouth); 4, J. Grant (Salisbury). Class Ha: 1, C. Rossiter (Gloucester); 2, T. Hamshire (Bristol); 3, Mrs. Matthews (Torbay); 4, C. Harding (Cardiff). Class Hb: 1, J. H. Jackson (Basingstoke); 2, N. Gray (Bristol T); 3, A. Harmsworth (Basingstoke); 4, J. Jefferies (Bournemouth). Class G: 1, A. C. Worth (Weymouth); 2, M. Medway (Weymouth); 3, T. Edwards (Weymouth); 4, A. E. Rendell (Yeovil). Class H: 1, D. Norman (Dorchester); 2, P. Carter (Weymouth); 3, G. T. Orton (Weymouth); 4, M. Strange (Basingstoke). Class J: 1, K. Forrester (Weymouth); 2, A. Harmsworth (Basingstoke); 3, C. Harding (Cardiff); 4, N. Gray (Bristol T). Class K: 1, B. Bisson (Basingstoke); 2, A. E. Rendell (Yeovil); 3, J. Edwards (Llantwit Major); 4, P. Carter (Weymouth). Class L: A. J. Hilliard (Bath); 2, A. G. Cox (Weymouth); 3, R. F. Adams (Salisbury); 4, D. Kelly (Weymouth). Class M: 1, T. Hatton (Weymouth); 2, A. J. Hilliard (Bath); 3, T. Jones (Weymouth); 4, N. Gray (Bristol T). Class N: 1, B. Bisson (Basingstoke); 2, M. Medway (Weymouth); 3, C. Harding (Cardiff); 4, P. Carter (Weymouth). Class O: 1, M. Medway (Weymouth); 2, A. Wain (Didcot); 3, P. Simpson (Weymouth); 4, G. Harris (Cardiff). Class P: 1, J. Bragg (Torbay); 2, D. Fitzgerald (Weymouth); 3, E. Walbridge (Weymouth); 4, P. Osman (Torbay). Class Q: 1, M. Strange (Basingstoke); 2, N. Gray (Bristol T); 3, E. Walbridge (Weymouth); 4, R. F. Adams (Salisbury). Class R: 1, T. Jones (Weymouth); 2, B. Bisson (Basingstoke); 3 and 4, R. Griffiths (Torbay). Class S: 1, T. Edwards (Weymouth); 2, M. H. Cleall (Weymouth); 3 and 4, N. Gray (Bristol T). Class T: 1, M. Strange (Basingstoke); 2, B. Bisson (Basingstoke); 3, M. Mansbridge (Southampton); 4, P. Carter (Weymouth). Class XBM: 1, P. Willis (Portsmouth); 2, M. Medway (Weymouth); 3 and 4, C. Harding (Cardiff). Class XOT: 1 and 2, K. Bisson (Basingstoke); 3, K. Forrester (Weymouth); 4, C. Bragg (Torbay). Class UAD: 1, T. Hamshire (Basingstoke); 2, R. F. Adams (Salisbury); 3, J. Axe (Yeovil); 4, J. Hulbert (Yeovil). Class UBC: 1, K. Forrester (Weymouth); 2, R. Christopher (Dorchester); 3 and 4, J. Hulbert (Yeovil). Class V: 1, J. M. White (Weymouth); 2 and 3, V. Collins (Yeovil); 4, K. Forrester (Weymouth). Class W: A. E.

Rendell (Yeovil); 2, V. Collins (Yeovil); 3, Mr. Matthews (Torbay); 4, J. E. Forward (Yeovil). Class BTy: 1, N. Gray (Bristol T); 2 and 3, K. Bisson (Basingstoke); 4, A. J. Davidson (Basingstoke). Competing Societies: Basingstoke, Weymouth, Dorchester, Bath, Bristol, Bristol T, Bournemouth, Cardiff, Didcot, Gloucester, Llantwit Major, Salisbury, Southampton, Torbay, Yeovil, Yate, Portsmouth.

OVER 400 entries at the Hounslow and District A.S. were judged by the F.B.A.S. judges R. Essen, H. Towell, K. Nutt, D. Cannon, E. Nicholl, P. Tomkins, A. Jeffs. Will the following lucky ticket holders who have not yet collected cash and other prizes at the show contact the secretary, Mr. H. Parrish, 18 The Barrons, Twickenham (Guess the Wright competition) No. 18. Raffle: G. Whitehouse, 5 Crossroads, Hanswell, No. 385; M. Gosd, 9 Coleman House, High Street, S.E.20, No. 0934; S. Piers, 6 Stratford Road, Hounslow, No. 0120; W. Hyatt, 48 Fieldway, Shalford St. Peters, Bucks., No. 0074; R. Mayor, Greenleaves, Rosewood Way, Farnham Common, Bucks., No. 3144; R. J. Smith, 24 Park Avenue, Hounslow, No. 2207; Mr. Armour, 12 Kilmot Gardens, W.12, No. 2357; R. Allen (K. Whitaker), c/o Magna-lex, No. 0522.

Class AK: 1, D. Reilly; 2 and 3, Mrs. R. Taylor. Class B: 1, S. Mason; 2, R. Beook; 3, B. Smith. Class BA: 1, K. Smith; 2, Mrs. P. Coyle; 3, B. Smith. Class C: 1, J. Richardson; 2, P. Coyle; 3, D. Darr. Class CA: 1, T. Taylor; 2, D. Darr; 3, A. P. Taylor. Class D: 1, J. Batts; 2, T. Tigg; 3, G. S. Denise. Class DB: 1, R. Romney; 2, A. Constantine; 3, W. Johnson. Class E: 1, P. Coyle; 2, D. Darr; 3, C. Fisher. Class EA: 1, E. C. Farnham; 2 and 3, A. P. Taylor. Class F: 1, H. Garrard; 2, D. Darr; 3, B. Smith. Class G: 1, 2 and 3, D. Lambourne. Class H: 1, G. Sellers; 2, C. J. Beazier; 3, D. Armour. Class I: 1, R. Goodson; 2, H. Garrard; 3, Mrs. P. Coyle. Class J: 1, Mrs. H. Pratt; 2, T. Taylor; 3, J. Batts. Class K: 1, Mrs. S. Parrish; 2, Miss S. Hayes; 3, D. Reilly. Class M: 1, D. Reilly; 2, P. Coyle; 3, M. Garrard. Class NBT: 1, D. Reilly; 2, J. Batts; 3, K. Ryden. Class O: 1, L. Brazier; 2, M. G. Walker; 3, J. Murphy. Class P: 1, Mrs. J. Garrard; 2 and 3, J. Murphy. Class Q: 1, M. Strange; 2, R. Pierce; 3, P. Coyle. Class R: 1, J. Batts; 2, G. Madder; 3, J. Murphy. Class S: 1, Mrs. M. Nethersall; 2, D. A. King; 3, K. Smith. Class T: 1, D. Norman; 2, J. Hamson; 3, D. Sutton. Class UAB: 1, L. Bowler; 2, F. Pinder; 3, Miss C. Godfrey. Class UCD: 1 and 2, C. F. Beazier; 3, L. Roberts. Class W: 1 and 3, D. Norman; 2, F. Pinder. Class X: 1 and 2, L. Roberts; 3, J. Greaves. Class XBM: 1 and 3, D. Lambourne; 2, Mrs. R. Brewer. Class XOT: 1, D. Lynne; 2, K. Ryder; 3, J. Thorne. Specialist Class: 1, D. Lambourne; 2, M. Strange; 3, M. Collins.

THE Rhonda A.S. has been invited to run the second National Welsh Open Show this year and the arrangements for this are well

under way. The success or failure will of course depend not on the Club itself, but on the support from the other Clubs. For the benefit of the exhibitors the venue has been changed and the car parking facilities are excellent.

Steady progress is reported by the Club and at the meeting in November, 40 members were present. All took part in a Quiz organised by the Committee, the Ladies and Juniors team beating a strong adult section by one point. The fish on show consisted of table show for Plaies, a knock-out and a junior section, and 40 fish were shown.

The Club are booked for the following Inter-Club meetings, 16th January Swansea, and Llantwit Major on 13th February.

THE last table show of the year between the Essex East & North London Aquatic Association group, incorporating Bethnal Green A.S., Chingford A.S., Enfield A.S., Harlow A.S., Leytonstone & Stratford A.S., Tottenham A.S. and Walthamstow A.S., was held at Bethnal Green in November. F.B.A.S. judge was Mr. B. Baker, results as follows: U: 1, 2 and 3, Mrs. S. Hedges, B.G.A.S.; 4, D. Goodbody, Walthamstow. V: 1 and 4, D. Nutt, Tottenham; 2, L. Clements, Tottenham; 3, B. Martin, B.G.A.S.; W: 1 and 2, Mrs. S. Hedges, B.G.A.S.; 3, W. Dale, L. & S.; 4, Miss T. Hedges, B.G.A.S. X b-m: 1 and 2, K. Nutt, Tottenham; 3, D. Adams, B.G.A.S.; 4, R. Kerridge, Harlow. X o-: 1, K. Nutt, Tottenham; 2, R. Luggmeyer, L. & S.; 3, Master S. Adams, B.G.A.S.; 4, F. Lammas, L. & S. X u-w: 1, 2, 3 and 4: D. Nutt, Tottenham. Z: 1 and 2, A. Chandler, Walthamstow; 3, Mr. and Mrs. Baulson, Walthamstow; 4, A. Kimbley, L. & S.

Tottenham were easy winners with this evening's show but Bethnal Green were the overall winners for the year by 4 points.

AT a recent meeting of the Brighton & Southern A.S., M. Fagan (B.K.A.) gave a talk on Fish Breeding in General. He brought with him some of his own breeding stock and fish he had bred including Killifish and Labyrinths.

As it happened, the table show that evening was breeders and the Ladies' trophy judged by Mr. Peter Ginger (F.B.A.S.).

Later in the month a Bring and Buy of fish was held, where members had the opportunity of buying fish bred by other members. The Buffet Dance tickets will soon be available at a cost of £1. Names to the Secretary please. The date of the Dance is the 20th January. Secretary C. P. Corbin, 80 Marlborough Drive, Burgess Hill, Sussex.

MEMBERS of the Torbay A.S. have enjoyed the talks and film shows, given by Club member Noel Gray, who is home on leave from the Ministry of Land and Agriculture in the Solomon Islands. During his travels he has been able to follow his own interest as an aquarist and has found many varieties of fish and plants which still have no known identification. The Society wish to record thanks for the work he has done for the Club. It has been well appreciated, as also was his display of shells in the Open Show.

The next meeting will be held in new premises at St. George's Church Hall, Shipway, every second and fourth Tuesday.

THE Freelance A.S. recently had a table show for Cichlids, large and dwarf. Winners were: Large Cichlids: 1, P. Elson; 2, Marce D. Elson, jr.; 3, Mrs. S. Elson; 4, J. Miller. Dwarf Cichlids: 1 and 3, R. Burton; 2, A. Lupton; 4, J. Stamp.

TABLE SHOW results for November of the Stockton A.S. were as follows:

Big Laying Tooth Carp; 1 and 4, R. Walker; 2, T. Stevens; 3, W. Bosman; Rasboras, Danios and Minnows: 1 and 2, K. Greenley; 1 and 4, D. Keithly; Mollies: 1 and 3, A. Saunders; 2, G. Lee; 4, B. Smith. Barbs: 1, 2 and 4, G. Lee; 3, R. Pullman.

A ONE-DAY open show is being held by the **Tyne-Tees Area Association** of the P.R.A.S. on the 25th March at Longstar Hall, Seaton Carew, Hartlepool, Co. Durham. An added attraction at this show will be a section devoted to the fish which have won a best in show award in 1972 to be called the Best of the Best Fish in Show. Schedules will be available shortly.

OFFICERS elected at the Annual General Meeting of the **British Marine A.S.** were as follows: Chairman: D. Highfield; Secretary: J. Vickery; Treasurer: E. Hodgetts; Editor: G. Robertson; Services Secretary: T. Lewis; Chairman of Judging and Show Standards: L. Doubleday; Public Relations Officer: M. Strong; Discussion page: P. Carrington. The managing committee consists of the chairman, secretary and treasurer.

NEW officers elected at the Annual General Meeting of the **Penarth A.S.** were as follows: Chairman: H. John; Secretary: R. G. Newton, 35 High View Road, Penarth; Show Secretary: A. Trotman, 56 High View Road, Penarth.

IN November, the seventh Annual Close Show of the **Didcot and District A.S.** was held and the results were as follows:

A.V. Goldwasser; A. Davidson; Plants: A. Watts; Barbs: J. Brown; Cichlids: J. Davidson; Characins: J. Davidson; Guppies: R. Turner; A.O.V. Livebearer: D. Whiting; Ras, Dan, Minnow: J. Trinder; Labyrinth: J. Davidson; Cats and Loaches: A. Thimbleby; A.O.V. Tropical: Mrs. S. Davidson; Furnished Jar: Mrs. C. Geary; Breeders' Livebearers: A. Watts; Breeders' Egglayers: J. Brown; Best Fish in Show: J. Davidson; Best Junior: A. Davidson. Mr. Ben Basson of Basingstoke judged the Show and presented the trophies. The annual general meeting was held on the second meeting in the month, when the following officers were elected: Show Secretary, R. Turner; Secretary: D. Whiting; Treasurer: G. Geary. The Shield for the Aquarist of the Year was presented to D. Whiting.

New members or visitors welcome at all meetings on the first and third Fridays at 8 p.m. at the Esso Research Centre on the A34 near Abingdon.

OFFICERS elected at the **Billingham A.S.** annual general meeting were as follows: Chairman: D. Sudron; Assistant Chairman: A. Crossley; Treasurer: Mrs. J. Turner; Secretary: D. Young; Assistant Secretary: J. Ryan; Show Secretary: J. Atwell. Results of table show: Livebearers Pairs: 1, M. Kennedy; 2 and 3, J. Ryan; 4, A. Beckwith.

THE officers elected at the annual general meeting of the **GKN Pond and Aquarium Society** for the forthcoming year are: President: T. W. Lowe; Chairman: N. Soars; Vice-Chairman: Dr. P. Hammett; Hon. Secretary: A. Horne; Treasurer: V. Yarnold; Show Secretary: K. Rowley; Newsletter Editor: A. Hall; Publicity Officer: W. H. Tonks.

A WELL-ATTENDED meeting of the **Gloucester Fishkeeping & Social Club** was held at the Hucclecote Community Association in November. The chairman, Mr. R. E. H. Moulder, welcomed several new members to the club and he was then presented with a taskard by Mr. T. Collier (treasurer), in recognition of his services. The meeting agreed that the club should hold an "Open Show," details will be issued later.

During the "Home Aquaria Competition" colour slides were taken of all the tanks entered by members. These were screened at the meeting, and were enjoyed by all present. The first table show of the current year attracted the largest entry the Club has had, and gave the judges Mr. C. F. Scrivins and Mr. P. Greenwood, from Cheltenham, a difficult task. The result was: 1, T. Collier; 2, J. Pinkey; 3, H. Herbert; 4, G. Pattison.

The Club meetings are held the last Thursday each month at the Hucclecote Community Association at 8 o'clock, and all visitors are welcome.

THE **Littlehampton & Bognor A.S.** have recently had two lectures by members. Mr. R. Jones from Bognor gave a talk on Plants, and Mr. Kail gave his second evening of Practical Hints on Fishkeeping. Both meetings were very well attended. A coach-party went to the Mid-Sussex A.S. Inter-Club Show one evening, and were very well received. The evening was most enjoyable.

Plans have now been completed for a Christmas Social and Award Presentation Evening on 19th January, and following the success of last year's Summer Exhibition, members are keen to hold not only another major exhibition and Inter-Club Show at Littlehampton on 23 and 24 June, 1973, but also an exhibition at Bognor in September.

Meetings are still held at the Crown Hotel, High Street, Littlehampton, at 8.00 p.m. on the 1st and 3rd Thursday in each month. Visitors are most welcome to all meetings.

THE November meeting of the **GKN Pond and Aquarium Society** was the first in which it had been decided to hold an inter-club table show during the winter months, and support for this became obvious with the number of entries. Just two classes of Cichlids and A.O.V. were held, the results being: Cichlids: 1, R. Newell; 2, B. Bird; 3, H. Tonks. A.O.V.: 1 and 3, T. Saunders; 2, D. Rickhuus.

The night was also taken up with a competition involving scientific and common names which was enjoyed by all.

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Results of table shows were: Characins: 1, Mr. Hollis; 2, M. Pinches; 3, D. Mason. Sharks, cats, loaches: 1, B. Jones; 2, M. Pinches; 3, Mr. Ralph. Cichlids: 1, Mr. Warham; 2 and 3, Mr. Mason.

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Big Laying Tooth Carp; 1 and 4, R. Walker; 2, T. Stevens; 3, W. Bosman; Rasboras, Danios and Minnows: 1 and 2, K. Greenley; 1 and 4, D. Keithly; Mollies: 1 and 3, A. Saunders; 2, G. Lee; 4, B. Smith. Barbs: 1, 2 and 4, G. Lee; 3, R. Pullman.

A ONE-DAY open show is being held by the **Tyne-Tees Area Association** of the P.R.A.S. on the 25th March at Longstar Hall, Seaton Carew, Hartlepool, Co. Durham. An added attraction at this show will be a section devoted to the fish which have won a best in show award in 1972 to be called the Best of the Best Fish in Show. Schedules will be available shortly.

OFFICERS elected at the Annual General Meeting of the **British Marine A.S.** were as follows: Chairman: D. Highfield; Secretary: J. Vickery; Treasurer: E. Hodgetts; Editor: G. Robertson; Services Secretary: T. Lewis; Chairman of Judging and Show Standards: L. Doubleday; Public Relations Officer: M. Strong; Discussion page: P. Carrington. The managing committee consists of the chairman, secretary and treasurer.

NEW officers elected at the Annual General Meeting of the **Penarth A.S.** were as follows: Chairman: H. John; Secretary: R. G. Newton, 35 High View Road, Penarth; Show Secretary: A. Trotman, 56 High View Road, Penarth.

IN November, the seventh Annual Close Show of the **Didcot and District A.S.** was held and the results were as follows:

A.V. Coldwater: A. Davidson; Plants: A. Watts; Barbs: J. Brown; Cichlids: J. Davidson; Characins: J. Davidson; Guppies: R. Turner; A.O.V. Livebearer: D. Whiting; Ras, Dan, Minnow: J. Trinder; Labyrinth: J. Davidson; Cats and Loaches: A. Thimbleby; A.O.V. Tropical: Mrs. S. Davidson; Furnished Jar: Mrs. C. Geary; Breeders' Livebearers: A. Watts; Breeders' Egglayers: J. Brown; Best Fish in Show: J. Davidson; Best Junior: A. Davidson. Mr. Ben Basson of Basingstoke judged the Show and presented the trophies. The annual general meeting was held on the second meeting in the month, when the following officers were elected: Show Secretary, R. Turner; Secretary: D. Whiting; Treasurer: G. Geary. The Shield for the Aquarist of the Year was presented to D. Whiting.

New members or visitors welcome at all meetings on the first and third Fridays at 8 p.m. at the Esso Research Centre on the A34 near Abingdon.

OFFICERS elected at the **Billingham A.S.** annual general meeting were as follows: Chairman: D. Sudron; Assistant Chairman: A. Crossley; Treasurer: Mrs. J. Turner; Secretary: D. Young; Assistant Secretary: J. Ryan; Show Secretary: J. Atwell. Results of table show: Livebearers Pairs: 1, M. Kennedy; 2 and 3, J. Ryan; 4, A. Beckwith.

THE officers elected at the annual general meeting of the **GKN Pond and Aquarium Society** for the forthcoming year are: President: T. W. Lowe; Chairman: N. Soars; Vice-Chairman: Dr. P. Hammett; Hon. Secretary: A. Horne; Treasurer: V. Yarnold; Show Secretary: K. Rowley; Newsletter Editor: A. Hall; Publicity Officer: W. H. Tonks.

A WELL-ATTENDED meeting of the **Gloucester Fishkeeping & Social Club** was held at the Hucclecote Community Association in November. The chairman, Mr. R. E. H. Moulder, welcomed several new members to the club and he was then presented with a taskard by Mr. T. Collier (treasurer), in recognition of his services. The meeting agreed that the club should hold an "Open Show," details will be issued later.

During the "Home Aquaria Competition" colour slides were taken of all the tanks entered by members. These were screened at the meeting, and were enjoyed by all present. The first table show of the current year attracted the largest entry the Club has had, and gave the judges Mr. C. F. Scrivins and Mr. P. Greenwood, from Cheltenham, a difficult task. The result was: 1, T. Collier; 2, J. Pinkey; 3, H. Herbert; 4, G. Pattison.

The Club meetings are held the last Thursday each month at the Hucclecote Community Association at 8 o'clock, and all visitors are welcome.

THE **Littlehampton & Bognor A.S.** have recently had two lectures by members. Mr. R. Jones from Bognor gave a talk on Plants, and Mr. Kail gave his second evening of Practical Hints on Fishkeeping. Both meetings were very well attended. A coach-party went to the Mid-Sussex A.S. Inter-Club Show one evening, and were very well received. The evening was most enjoyable.

Plans have now been completed for a Christmas Social and Award Presentation Evening on 19th January, and following the success of last year's Summer Exhibition, members are keen to hold not only another major Exhibition and Inter-Club Show at Littlehampton on 23 and 24 June, 1973, but also an Exhibition at Bognor in September.

Meetings are still held at the Crown Hotel, High Street, Littlehampton, at 8.00 p.m. on the 1st and 3rd Thursday in each month. Visitors are most welcome to all meetings.

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Flett giving a talk on Malawi Cichlids and also judging the table show with the results being at the first meeting: Male Swords: 1, H. Kirk; 2, J. Kirk; 3, K. Svenssen. Breeders (Livebearers): 1, J. Kirk; 2, M. Robinson. Marines: 1 and 2, A. Metcalf. Junior: 1, T. Hughes. E. Kirk won best in show.

At the second meeting there was a slide show and quiz which proved popular. The table show was judged by W. D. Gilding of Gainsborough A.S. Pairs Mollies: 1 and 3, B. Pufford; 2, A. Metcalf. Anabantids: 1 and 2, D. Norton; 3, H. Kirk. Sharks: 1, D. Norton; 2, J. Dawson; 3, M. Robinson. Junior: 1 and 3, T. Hughes; 2, G. Wilson. T. Hughes won best in show.

THE Wrexham T.F.S. is to provide a regular water hardness testing service for members. This follows a talk and demonstration by Mr. F. Oliver clarifying the general misunderstanding between acidity, chemical elements and water hardness. He said the control of hardness was essential for the growth of fish and plant life. Mr. Cyril Prichard gave a talk on Cichlids and their behaviour, particularly during breeding. The winner of the fish competition for breeding pairs was R. Mather with both second and third prizes won by Miss Valerie Jones. Endeavour Trophy results: 1, F. Oliver; 2, Miss Valerie Jones; 3, T. Pound. Paramount Trophy awarded for best fish of the year went to F. Oliver. Conaffle Trophy for the Home Aquarium Competition: 1, F. Oliver; 2, Miss Valerie Jones; 3 Terry Pound; and Elwyn Jones.

WINNERS of the table show of Dwarf Cichlids at the first meeting in November of the **Hanbury & District A.S.** were: 1, I. Ward; 2, N. Smith; 3 and 4, E. Holmes; 5, S. Plumb. A tape lecture was also given on "Feeds and Feeding" which proved to be an interesting talking point. At the second meeting of the month, members were given an extremely informative talk with slides on Fish Photography by W. Wilson of Wallingford and would strongly recommend this talk to any other Society.

THE Basingstoke and District A.S. recently held its Annual General Meeting at which the following officers were elected: President: D. Walls; Vice-Presidents: A. Blake, T. Hery; Chairman: A. Marshall; Vice-Chairman: G. Clewer; Secretary: A. G. Harmsworth, 247 Cranbourne Lane, Basingstoke, Hants. Treasurer: R. Weston; Show Secretary: R. Rich, 93 Pinkerton Road, Basingstoke, Hants. Show Manager: M. Strange. Committee members: H. Meas, Mrs. H. Meas, D. Theobald.

In November, Mr. E. Newman gave an interesting talk to **Knowle and District A.S.** Bristol on Furnished Aquaria a competition for which is being held within the Club. The Aquaria will be photographed and the results made known at the February meeting. The table show for Swordtails and Platys was judged by Mr. Newman and cards were awarded: 1 and 2, N. Gray. 1 and 2 Novice, K. Gray; 3, R. Pople.

At the December meeting, Mr. Stan Lloyd talked about various fish foods and demonstrated various types of home-made food, emphasising the need for guarding against pollution. Mr. G. Stone judged the table show for Sharks and Loaches: Results: 1, R. Pople; 2 and 3, N. Gray. 1, Novice: R. Pople; 2, K. Gray; 3, J. Stirling.

DURING October the **Scunthorpe Museum Society Aquarist Group** held their annual Inter-Club Show. Taking part were members from five clubs, Scunthorpe, Gainsborough, Grimsby, Grantham and Doncaster and there were a total of 266 entries. Society placings were as follows: Gainsborough 91 pts., Scunthorpe 76 pts.; Grimsby 58 pts.; Doncaster

50 pts., Grantham 20 pts. The annual trophy for Best in Show was won by A. E. Robinson of Scunthorpe. Other winners were: Guppy: Mr. and Mrs. Shipman, Grantham; 2, M. Germany, Grimsby; 3, E. Kirk and Son, Grimsby. Platy: 1, Mr. and Mrs. Copley, Doncaster; 2, Mr. and Mrs. Daines, Doncaster; 3, Mr. and Mrs. Gilding, Gainsborough. Mollie: 1, J. Barnett, Gainsborough; 2, Holmes and Whitehead, Grimsby; 3, Mr. and Mrs. Shipman, Grantham. Swordtails: 1, E. Kirk and Son, Grimsby; 2, Mr. and Mrs. A. Shucksmith, Scunthorpe; 3, Mr. and Mrs. S. Pogson, Scunthorpe. Small Characins: 1, E. Kirk and Son, Grimsby; 2, A. Binns, Scunthorpe; 3, Mr. and Mrs. Daines, Doncaster. Large Characins: 1, Mr. and Mrs. Davidson, Gainsborough; 2, Mr. and Mrs. Harris, Gainsborough; 3, Mr. and Mrs. T. Walker, Grimsby. Small Barbs: 1, A. E. Robinson, Scunthorpe; 2, K. Svensson, Grimsby; 3, Mr. and Mrs. Kilvington, Doncaster. Large Barbs: 1, Mr. and Mrs. Gilding, Gainsborough; 2, Mr. and Mrs. Hatfield, Gainsborough; 3, Mr. and Mrs. D. Caldwell, Scunthorpe. Anabantids: 1, Mr. and Mrs. Hatfield, Gainsborough; 2, A. E. Robinson, Scunthorpe; 3, Mr. and Mrs. Newton, Grimsby. Killifish: 1, N. Carr, Doncaster; 2, E. Milne, Doncaster; 3, Mr. and Mrs. Harris, Gainsborough. Danios, Minnows and Rasboras: 1, J. R. Rhoades, Scunthorpe; 2, Mr. and Mrs. M. Davidson, Gainsborough; 3, E. Kirk and Son, Grimsby. Dwarf Cichlids: 1, M. Germany, Grimsby; 2, Mr. and Mrs. Shipman, Grantham; 3, A. E. Robinson. Large Cichlids: 1, Mr. and Mrs. Davidson, Gainsborough; 2, Mr. and Mrs. Gilding, Gainsborough; 3, A. Binns, Scunthorpe. Loaches, Fosses and Sharks: 1, Mr. and Mrs. Davidson, Gainsborough; 2, S. Withers, Gainsborough; 3, Mr. and Mrs. Shaw, Gainsborough. Fighters: 1 and 2, E. Milne, Doncaster; 3, Mr. and Mrs. Gilding, Gainsborough. Corydoras Catfish: 1, Holmes and Whitehead, Grimsby; 2, Mr. and Mrs. S. Pogson, Scunthorpe; 3, Mr. and Mrs. Daines, Doncaster. A.O.V. Catfish: 1, Mr. and Mrs. Copley, Doncaster; 2, Mr. and Mrs. V. Hardie, Scunthorpe; 3, Mr. and Mrs. D. Caldwell, Scunthorpe. A.O.V. Tropicoids: 1, Mr. and Mrs. McGrath, Scunthorpe; 2, Mr. and Mrs. Shipman, Grantham; 3, Mr. and Mrs. H. S. Moorewood, Scunthorpe. Breeders (Egglayers): 1, A. E. Robinson, Scunthorpe; J. R. Rhoades, Scunthorpe; 3, E. Kirk and Son. Breeders (Livebearers): 1, Mr. and Mrs. Hatfield, Gainsborough; 2, Mr. and Mrs. Davidson, Gainsborough; 3, Mr. and Mrs. Daines, Doncaster.

AT THE Derby Regent A.S. October meeting, Dr. Peter Bottomley of the Trent River Authority, gave a talk to members and friends illustrated by slides, on the work of the Pollution Control and Fisheries Department, entitled "Conservation of Water Quality".

RECENT meetings of the **Glossop A.S.** have included a lecture by Ralph Tomkinson on "Breeding and Feeding Fish for Shows", a slide lecture "An Introduction to the Cichlids" and coming next meeting "Practical Maintenance of Equipment". The monthly table show was made more interesting this month by having an amateur judging contest, "So you think you can judge?" All the members were invited to judge the show awarding the points as they thought fit and then the professional judge made his adjudication and explained to the meeting why he had placed the fishes in the order he had and the member whose points nearest matched the judges was awarded a prize. The best fish in show was won by Stewart Turner who also won the judging competition. The best pairs was won by Sylvia Hampson.

OFFICERS elected at the B.A.S.S. annual general meeting were as follows: Chairman: Dr. G. Gust; Vice-Chairman: P. Bird; Secretary: D. Cook; Treasurer: F. Keens; Committee Members: J. Cook, E. Venton, P. Utton, M. Thomas. H. J. Aylott

and P. Tomkins stood down from their respective positions of Chairman and Secretary in which both have given valuable time and service to the Society and B.A.S.S. wishes to express its appreciation of this.

The afternoon session opened with the announcement of Mr. Henry White as President for the forthcoming year. After expressing his thanks to the Society for this honour he introduced Mr. D. Armstrong of the B.K.A. who gave a lecture on Egg Laying Toothcarps. Interestingly this lecture was illustrated by live specimens. These were passed around to the audience during the course of the lecture. Mr. Armstrong also brought along foods and various other equipment useful in the keeping of this type of fish. The lecture was followed by a spirited discussion on points raised by the lecturer including nomenclature and taxonomy of Egg-laying Toothcarps.

Following this discussion Mr. R. Foeder of the B.A.S.S. Research Committee announced details of the new Toothcarp Experiment taking place. Pairs of Aphyosemon gardeni were distributed to members. The meeting closed with a visit to the London Zoo Aquaria, including going behind the scenes.

THERE were two committee changes at the annual general meeting of the **British Cichlid Association**. Jim Burtle is now Southern Area representative and L. C. Aldin became Secretary, residing at 15 Lamberhurst Walk, Furnace Green, Crawley, Sussex. The meeting was well attended with people coming from places as far away as Derby and the Channel Islands.

RESULTS of the **Doncaster & District A.S. Open Show** held in October:

Guppies: 1, 2 and 3, C. Beckersham, Oldham. Flaties: 1, M. White, Wombwell; 2, Mr. and Mrs. Garton, Doncaster; 3, T. Smith, Sheffield. Swords: 1, E. Kirk and Son, Grimsby; 2, Mr. and Mrs. Jones, Welbeck; 3, Mr. and Mrs. Charlton, Castleford. Mollies: 1 and 3, J. S. Hall, Aireborough; 2, Mr. and Mrs. Stephens, Castleford. A.O.V. Livebearers: 1 and 2, Mr. and Mrs. Toyne, Sheffield; 3, Mr. and Mrs. Davison, Gainsborough. Small Characins: 1, K. Lancashire, Doncaster; 2, Mr. and Mrs. Jowle, Derby Regent; 3, Mr. and Mrs. Daines, Doncaster. A.O.V. Characins: 1, Mr. and Mrs. Bailey, Sherwood; 2, V. and B. Booker, Meecombe Bay; 3, Mr. and Mrs. Clark, Barnsley. Dwarf Cichlids: 1, Miss J. Gullane, Buxton; 2, Mr. and Mrs. Blades, Cresswell; 3, J. Furness, Welbeck. Angels: 1, E. Kirk and Son, Grimsby; 2, Mr. and Mrs. Toyne, Sheffield; 3, Mr. and Mrs. Davison, Gainsborough. A.O.V. Cichlids: 1 and 3, Mr. and Mrs. Gilding, Gainsborough; 2, N. Ibbotson, Welbeck. Small Barbs: 1, R. A. Johnson, Ashton-U-Lyne; 2, Mr. and Mrs. Jowell, Derby Regent; 3, E. Kirk and Son, Grimsby. A.O.V. Barbs: 1, G. Gillespie, Welbeck; 2, C. Spaven, Sib. Leeds; 3, M. B. and A. Nock, Castleford. Coys: 1, Mr. and Mrs. Clark, Barnsley; 2, T. Sheperd, Doncaster; 3, Mrs. and Mrs. Kelsall, Doncaster. A.O.V. Coys: 1, Mr. and Mrs. Caldwell, Scunthorpe; 2, Mr. and Mrs. Copley, Doncaster; 3, Mr. and Mrs. Kilvington, Doncaster. Loaches: 1, H. Marshall, Oldham; 2, Mr. and Mrs. Scarle, Goole; 3, B. Dams, Skegness. Toothcarps: 1 and 2, A. Curchin, Swillington; 3, N. Carr, Doncaster. Small Anabantid: 1, Mr. and Mrs. Cohen, Castleford; 2, N. Jackson, Worksop; 3, A. Barrett, Welbeck. Fighters: 1, G. Gillespie, Welbeck; 2, Mr. and Mrs.

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Stephens, Castleford; 3, Mr. and Mrs. Milne, Doncaster. A.O.V. Anabantids: 1, Miss J. Gullane, Buxton; 2, J. Ibbotson, Keighley; 3, K. Barrett, Doncaster. Sharks and Foxes: 1, R. Posenby, Castleford; 2, J. S. Hall, Aireborough; 3, Miss Harvey and R. Holt, Goole. Rasboras, Danios, Minnows: 1, T. Smith, Sheffield; 2, Mr. and Mrs. Davison, Gainsborough; 3, D. Airton, Rotherham. A.O.V. Trop.: 1, V. and B. Brooker, Morecambe Bay; 2, G. Gillespie, Welbeck; 3, Mr. J. Snowden, York and Dist. Pairs (Livebearers): 1, Mr. and Mrs. Kilvington, Doncaster; 2, Holmes and Whitehead, Grimsby; 3, Mr. and Mrs. Blades, Cresswell. Pairs (Egg-layers): 1, G. Thickbroom, Welbeck; 2, D. Foster, Don Valley; 3, B. Banks, Thorne. Breeders (Livebearers): 1, Mr. and Mrs. Smith, Sheffield; 2 and 3, J. S. Hall, Aireborough. Breeders (Egg-layers): 1, Mr. and Mrs. Cohen, Castleford; 2, Mr. and Mrs. Parkin, Derby Regent; 3, A. Curchish, Swillington. Coldwater: 1, 2 and 3, J. S. Hall, Aireborough. Junior Livebearers: 1, P. Smith, Sheffield; 2, M. Thickbroom, Welbeck; 3, Miss K. Newbould, Welbeck. Junior Egg-layers: 1, M. Holmes, Welbeck; 2, Miss S. Clarke, Barnsley; 3, Miss K. Newbould, Welbeck. Novice Livebearers: 1, P. Lounis, Doncaster; 2, Mr. and Mrs. Charlton, Castleford; 3, Mr. and Mrs. Arkinson, Grantham. Novice Egg-layers: 1 and 2, Mr. and Mrs. Linstead, Four Star; 3, Mr. and Mrs. Charlton, Castleford. Plants: 1 and 2, Mr. and Mrs. Kilvington, Doncaster; 3, R. Holmes, Derby Regent. Furnished Jars: 1 and 2, N. Jackson, Worksop; 3, R. Harlow, Derby Regent. Numbers of entries, 763; Number of societies, 37. Best in Show: V. and B. Brooker, Morecambe Bay.

THE policy of the **Bury and District A.S.** of encouraging its own members to give lectures paid off handsomely at the November meeting. Arthur Buckley, making his debut, delivered a most interesting and informative talk on "Breeding the Siamese Fighters." A keen photographer, he produced a succession of coloured slides depicting vividly the mating behaviour and subsequent hatching and development of the fry. I forecast that here is a new lecturer who will soon have a full diary of engagements. Considering the inclement weather the Table Show was well supported and a pleasing feature was the winning of the "Fish of the Month" Class, which was for Anabantids, by a new member, Mr. Parton, with his very first attempt at showing. The monthly Grand Challenge Medal was won by Mr. and Mrs. D. Glen with a particularly good specimen of the maculatus platy.

THE November meeting of the **British Marine Aquarists Association, West Midlands Group**, began with a Table Show, the result being: 1, R. Edwards; 2, E. Hodggett; 3, J. Vickery. From 1st December last the West Midlands Group has had its own committee as follows: Chairman, H. Tonks; secretary and treasurer, R. Edwards; show secretary, A. Masby. This will make administrative matters for the West Midlands much easier for its local members. E. Hodggett, one of the members, gave a description of his new marine house and what it takes to make a marine house. The evening ended with a general discussion.

AT the October meeting the **Lincoln and District A.S.** held their annual show for the

Richard Baines Rose Bowl. The class was very varied and the result was: 1 and 2, Mrs. Sellers; 3, Mr. Portman; 4, Mr. Stiff. The meetings are held at the Liberal Club, St. Swithin's Square, Lincoln, on the third Monday in the month. All visitors are welcome.

DURING October the **Border A.S.** had an inter-club show with the Whitehaven Society, which they won by 76 points to 16 points. This was the fourth time in succession that the Border Society had won this competition. In December the Society had a party evening as well as the annual dinner. The membership during the last few months has increased, a trend which it is hoped will continue.

THE **Dorchester and District A.S.**, which was formed one year ago, is now thriving with a growing membership. Meetings are held on the second Thursday of each month at the Youth Club's premises in York Road, Dorchester. At the November meeting members heard a most interesting talk on how fishes and animals are given their scientific names, by Mr. Gledhill of the Freshwater Biological Association River Laboratory. The monthly Table Show was for Rasboras. Results: 1, T. Fitzgerald; 2, D. Norman; 3, R. Christopher; 4, R. Taylor.

RESULTS of the November Show of the **Dudley and District A.S.** were as follows: A.O.V.: 1, 2 and 3, J. Goodman; 4, W. Hickman. A.O.V. (Novice): 1, L. Hatfield; 2, M. Beckingham; 3, Mrs. R. Hickman; 4, S. Cartwright. Breeders (Egg-layers): 1 and 3, W. Hickman; 2 and 4, Mrs. J. Croft. Breeders (Egg-layers, Novice): 1, T. Mason. Breeders (Livebearers): 1 and 2, Mrs. J. Croft; 3, W. Hickman. Breeders (Livebearers, Novice): 1, Mrs. R. Hickman; 2, 3 and 4, R. Mason. Best Fish in Show: J. Goodman.

IN November **Misenden T.F.S.** held their eighth Open Show. There was a record number of 600 entries. Results: Livebearers: Guppies (Male): 1, M. Laycock (Sheffield); 2, Mr. and Mrs. Stephens (Castleford); 3, Mr. and Mrs. Beckenham (Oldham); 4, Mrs. L. C. Heap (Keighley). Guppies (Female): 1, P. Stannforth (Don Valley); 2, C. Hodgson (Misenden); 3, C. Woodough (Huddersfield); 4, M. Laycock (Sheffield). Platies: 1, Mr. and Mrs. Daines (Doncaster); 2, T. Smith (Sheffield); 3, Mr. and Mrs. Cohen (Castleford); 4, Mr. and Mrs. Garton (Doncaster). Mollies: 1, S. S. Hall (Aireborough); 2, Mr. and Mrs. Stephens (Castleford); 3, L. S. Hunter (York); 4, B. Turner (Misenden). Sweettails: 1, W. Ostrowski (Misenden); 2, Mrs. Charlton (Castleford); 3 and 4, Mr. and Mrs. Beckenham (Oldham). A.O.V.: 1, J. Furness (Wellbeck); 2 and 4, J. S. Hall (Aireborough); 3, A. Moss (Huddersfield). Barbs: Up to Nigger: 1, 3 and 4, F. E. Gregory (Oldham); 2, Mr. and Mrs. Blades (Cresswell). Over Nigger: 1, 2 and 4, L. S. Hunter (York); 3, Mr. Spavem (South Leeds). Characins (up to Bleeding Heart): 1, F. E. Gregory (Oldham); 2, J. Cartwright (Huddersfield); 3, Mr. and Mrs. Blades (Cresswell); 4, Mr. and Mrs. Case (Chessterfield). Characins (over Bleeding Heart): 1, B. and B. Booker (Morecambe Bay); 2, Mrs. P. Mulley (Independent); 3, R. Walker (Morecambe Bay); 4, J. Whitley (Aireborough). Cichlids (Dwarf): 1, M. and W. Haslop (Swillington); 2, J. Furness (Wellbeck); 3, J. Whitley (Aireborough); 4, P. Reynolds (Swillington). Cichlids (Large): 1, L. S. Hunter (York & Dist); 2, J. Whitley (Aireborough); 3, D. Grogan (Blackburn); 4, S. Peole (Misenden). Angels: 1, L. Misenden (Blakeborough); 2, Mr. and Mrs. Smith (Sheffield); 3, Mr. and Mrs. Blades (Cresswell); 4, B. Harbort (Swillington). Anabantids: 1, Mr. and Mrs. Cohen (Castleford); 2, Mr. Walker (Sheffield); 3, Mr. and Mrs. Smith (Sheffield); 4, R. Hodgson (Misenden). Fighters: 1, 2 and 3, S. Holland (Sunnybrow);

4, A. E. Heap (Blakeborough). A.O.V.: 1, P. H. Batchelor (Leyce); 2, Mr. and Mrs. Blades (Cresswell); 3, Mr. and Mrs. Armstrong (Independent); 4, J. Douglas (Misenden). Danios and Rasboras: 1, Mr. Jackson (Keighley); 2, A. Moss (Huddersfield); 3, Mr. and Mrs. Dickenson (Castleford); 4, W. Ostrowski (Misenden). Carps and Minnows: 1, Mr. and Mrs. Blades (Cresswell); 2, Mr. and Mrs. Smith (Sheffield); 3, D. Whiteside (Independent); 4, M. Laycock (Sheffield). Sharks: 1, J. S. Hall (Aireborough); 2, R. I. Payne (Merseyside); 3, T. Smith (Sheffield); 4, D. Charlton (Merseyside). Flying Foxes: 1, N. Turner (Misenden); 2, P. H. Batchelor (Leyce); 3, R. I. Payne (Merseyside); 4, A. Bradley (Misenden). Corydoras: 1, H. A. Warring (Lytham); 2, N. Turner (Misenden); 3, Mr. and Mrs. Clarke (Barnsley); 4, M. Tonge (Oldham). A.O.V. Catfish: 1, W. Ostrowski (Misenden); 2, D. Charlton (Merseyside); 3, J. S. Hall (Aireborough); 4, Mr. and Mrs. Copley (Doncaster). Loaches: 1, F. E. Gregory (Oldham); 2, Mr. and Mrs. C. Beckenham (Oldham); 3, C. Carl (Stretford); 4, T. Smith (Sheffield). Toothcarps (Any Variety): 1 and 2, J. Mosley (Keighley); 3, Mr. and Mrs. Blades (Cresswell); 4, T. Smith (Sheffield). Livebearers (Pairs): 1, J. Whitley (Aireborough); 2, Mr. and Mrs. Gabe (Chessterfield); 3, O. Ibbertson (Keighley); 4, G. Kaye (Top Ten). Egg-layers (Pairs): 1, A. Moss (Huddersfield); 2 and 3, F. E. Gregory (Oldham); 4, Mr. and Mrs. Charlton (Castleford). Breeders (Livebearers): 1, Mr. and Mrs. Smith (Sheffield); 2, J. S. Hall (Aireborough); 3, Mr. and Mrs. Daines (Doncaster); 4, J. Whitley (Aireborough). Breeders (Egg-layers): 1, D. Charlton (Merseyside); 2, Mr. and Mrs. Parkin (Independent); 3, L. Maewden (Blakeborough); 4, J. Mosley (Keighley). Any Variety Tropical: 1, B. and B. Booker (Morecambe Bay); 2, Mr. Kennedy (Keighley); 3, P. A. Batchelor (Leyce); 4, L. S. Hunter (York Dist.). Common Goldfish: 1, 2 and 3, J. S. Hall (Aireborough); 4, D. Whiteside (Independent). Fancy Goldfish: 1, 2 and 3, J. S. Hall (Aireborough); 4, G. Whitley (Accrington). A.O.V. Goldfish: 1, D. Mosley (Keighley); 2, L. P. Graham (Leyce); 3 and 4, J. S. Hall (Aireborough). Ladies: Tropical: 1, B. Booker (Morecambe Bay); 2, Mrs. Cohen (Castleford); 3, Mrs. Dickenson (Castleford); 4, Mrs. A. Gregory (Oldham). Ladies: Coldwater: 1, 2 and 3, Miss Hall (Aireborough). Juniors: Tropical: 1, C. Rushforth (Bradford); 2, S. Clarke (Barnsley); 3, A. Kaye (Top Ten); 4, A. Moss (Huddersfield). Juniors: Coldwater: 1, J. Furness (Wellbeck); 2 and 3, A. Kaye (Top Ten); 4, N. Pearson (Misenden). Furnished Jars: 1, 2, 3 and 4, D. Shields (Halifax). Best in Show: B. and B. Booker (Morecambe Bay).

FORTY members of the **C.A.S.** enjoyed an interesting talk and demonstration on Water Chemistry by Nigel Latham of Brentwood in November. Winners of the Characin class in the Table Show were: 1, J. Newiss; 2, R. Knight; 3, P. Meadows. Raffle prizes of tokens were won by Mrs. A. Beavis and D. French.

THE **Tyneside Marine Aquarists** receive a monthly newsletter and meetings are held on the last Wednesday of each month. Prospective members should contact the secretary, G. D. Brewis, 79 Newton Road, Newcastle-upon-Tyne, NE7 7HS.

MEMBERS of the **Keighley A.S.** enjoyed slide shows on "Marine Fish and Animals" and "Furnished Aquaria" at the November meeting. The results of the Table Show were: Fish of the Month (Carps, Minnows, Rasboras): 1 and 2, Mr. Hart; 3, Mr. Cook. A.O.V.: 1, D. Mosley; 2 and 3, Mr. Sagar. Novice A.O.V.: 1 and 2, D. Mosley. Junior A.O.V.: 1, Master Hollingworth; 2, Master Jones; 3, Miss Sagar.

THE **Manchester Section F.G.A.** held their Open Show early in November and while the judging was in progress the members present who had travelled from all over the country,

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were given a very interesting Slide Show by Alan Charlton. There were 166 entries on the bench with a total of 229 fish. Results were as follows: Male Classes—Delta: 1, J. Hesketh; 2, M. H. Delingpole; 3, L. Peck. Long Dorsal Veiltail: 1 and 2, A. Charlton; 3, J. Peck. Short Dorsal Veiltail: 1, Mrs. J. Croft; 2, J. Hesketh; 3, H. Baldwin. Fantail: 1, J. Peck; 2, H. Baldwin; 3, M. H. Delingpole. Topword: 1 and 2, A. Charlton. Bottomword: 1, Mrs. J. Croft; 2, T. Hallett. Doublewood: 1 and 2, M. H. Delingpole. Colour Male: 1, D. Glen. Original Veiltail: 1, Mrs. J. Croft. Pintail: 1, A. Charlton; 2, L. Peck. Cofer Male: 1, Mr. and Mrs. Warburton; 2, D. Glen. Dove-tail: 1, T. Hallett; 2, M. H. Delingpole. Scarftail: 1 and 2, J. Hesketh. Spertail: 1, Mr. and Mrs. Snowden. Female Classes—Superba: 1, J. Peck; 2, Mrs. G. Peck; 3, Mrs. J. Croft. Wedgetail: 1 and 2, D. R. Beacham; 3, Mrs. G. Peck. Natural Female: 1, D. Glen; 2, Mrs. and Mrs. Snowden; 3, Mr. and Mrs. Lowe. Cofer Female: 1, J. Hesketh. Metropolitan: 1, G. Stradman. Roundtail Female: 1, M. H. Delingpole. Colour Female: 1, D. R. Beacham; 2, J. Hesketh. Breeders Classes—Males: 1, T. Hallett. Females: 1 and 3, M. H. Delingpole; 2, R. Young. Matched Pairs: 1, R. Young; 2, Mrs. P. Young. Master Breeders: 1, R. Young. Advanced Master Breeders: 1, M. H. Delingpole. Ladies Class—Any Variety Standard Guppy: 1, Miss L. Peck. Junior Class—Any Variety Standard Guppy: 1, C. and M. Warburton; 2, K. Nicholson. Best in Show, Best Breeders: M. H. Delingpole (Breeders Females). Best Male: J. Peck (Fantail). Best Female: J. Peck (Superba).

OFFICERS elected at the annual general meeting of the **Enfield and District A.S.** for the coming year are as follows: Chairman, J. Goldman; vice-chairman, Mr. Whitaker; show secretary, D. Watts; secretary, Mrs. Barker; treasurer, Mr. Barker; P.R.O., B. Drwall; committee, Miss S. Collins, Miss C. Collins. Fish of the Year was won by Miss C. Collins with a Heterandria Formosa. The society are looking forward to a full and active 1973 and welcome all new members. They meet at 8 p.m. on the third Thursday of every month at St. Andrew's Church Hall, Enfield Town, Middx.

SECRETARY CHANGES

Erith and District A.S.: Mrs. M. Cullum, 10 Sunland Avenue, Bechtel Heath, Kent.
Penarth A.S.: R. G. Newton, 35 High View Road, Penarth.
Four Star A.S.: G. N. Douglas, 10 Michaels Estate, Grinet Lopez, nr. Barnley, Yorks.
Cannock and District A.S.: D. L. Edwards, 161 Hednesford Road, Norton Canes, Cannock, Staffs., WS11 3RU. Tel.: Heath Hayes 79790.
Lincoln and District A.S.: Mrs. R. Sellars, 24 Hawthorn Avenue, Cherry Willingham, Lincoln.
Basingstoke and District A.S.: A. G. Harmsworth, 247 Cranbourne Lane, Basingstoke, Hants.
British Clehld Association: L. C. Alchin, 15 Lamberhurst Walk, Furnace Green, Crawley, Sussex.
Rossington A.S.: A. Peasey, 20 Hills Close, Speerborough, Doncaster, DN5 7NW. Tel.: Doncaster 60702.
Glossop A.S.: Mrs. Patricia Turner, 27 Newlands Drive, Hadfield, via Hyde, Cheshire.
Sandgrounders A.S.: S. Hooton, 81 Radnor Drive, Southport.
Grantham and District A.S.: K. Street, 76 Alexandra Road, Grantham, Lincs.
Strood and District A.S.: G. King, 10 Hawthorn Rise, Westrip, Strood, Gloucestershire, GL5 4QW.

AQUARIST CALENDAR

14th January: SPECIAL EVENT. Grand Aquarist Seminar at The Playhouse, Derby. Full details on page xvii.
18th February: Rotherham and District A.S. Fourth Open Show at Brinsworth Manor

School, Brinsworth Lane, Brinsworth. Details from Secretary, Mrs. I. Airton, 9 Bent Lathes Avenue, Rotherham, Yorks S60 4BL.

4th March: Keighley A.S. Open Show, Victoria Hall, Victoria Park, Lawkholme Lane, Keighley.

17th March: Riverside A.S. Annual Open Show at St. Saviours Church Hall, Cobbold Road, W.12. Show schedules available from W. Neherall, 13 Greyhound Road, Fulham S.W.6. 1385 0276.

25th March: Nelson A.S. Annual Open Show at the Civic Centre, Stanley Street, Nelson.

1st April: Houghton and District A.S. Further details later.

7th April: Thurrock A.S. Open Show, Arthur Street School, Arthur Street, Grays, Essex. Schedules from A. L. Riddles, 2 Pym Place, Grays, Essex.

8th April: Warrington A.S. Open Show. F.N.A.S. rules. Venue later. Show Secretary: J. Higham, 42 Hood Lane, Sankey, Warrington, Lancashire. Tel.: 36939.

14th April: Independent A.S. Open Show will be held at the Public Hall, Idington Town Hall, Upper Street, Idington, N.I.

15th April: Coventry Pool and Aquarium Society Open Show, Foleshill Community Centre, Foleshill Road (A444), Coventry. Details from Show Secretary, S. Woodridge, 32 Ridgeway Avenue, Styvedale, Coventry, or Secretary, C. J. Grant, 26 Cecily Road, Cheylesmore, Coventry.

18th April: Scunthorpe Museum Society Aquarist Group Open Show. To be held at the T.A. Drill Hall, Cottagebeck Road, Scunthorpe, Lincs. Schedules available from A. Strucksmith, 3 Salmonby Road, Scunthorpe, Lincs.

21st April: Runcyde A.S. Full details later.

23rd April: Southampton A.S. Open Show, Avenue Hall, Southampton. Show secretary, P. J. Brown, 215 Spring Road, Shooting, Southampton.

6th May: Ouan A.S. Open Show will be held in the Ouan Recreation Hall, Refuge Street, Shaw, Oldham.

12th May: Port Talbot and District A.S. Annual Open Show at the Y.M.C.A. Buildings, Port Talbot. Show secretary, A. R. B. Fozzace, 3 Cross Street, Velindre, Port Talbot, Glam.

13th May: The Second Annual Open Show of the Gloucester Education and Leisure Centre, Palmwick Road. Schedules from the show secretary, Mike Brooks, 114 Melbourne Street, Gloucester, from February on.

13th May: Corby and District A.S. Open Show, at the Corby Civic Centre. F.A.B.A.S. More details later.

13th May: Creydon A.S. Open Show, full details later.

13th May: Derby Regent A.S. Open Show. Sherwood Foresters Recreation Centre (Normanton Barracks), Osmaston Road (A5111), Derby. R.A.C. sign posted. Show Secretary: R. G. Harlow, 180 Mansfield Road, Derby. Tel.: 44322.

17th-19th May: The Second National Welsh Open Show will be held at the Central Hall, Tonypanyd, Rhondda. Show secretary, M. Williams, 122 Top Trebanog, Trebanog, Rhondda, Glam.

19th May: Southend, Leigh and District A.S. Open Show, to be held at St. Clement's Hall Rectory, Grove, Leigh-on-Sea. Schedules available from Show Secretary, D. C. M. Durrant, 172 Trinity Road, Southend-on-Sea, Essex. Tel.: Southend 610576.

20th May: Yeovil and D.A.S. Open Show, the School Hall, Church Street, Martock, nr. Yeovil. Full details later.

20th May: Gode and District A.S. Open Show. Provisional date.

20th May: Merseyside A.S. Annual Open Show. The British Legion Club, Holyoake Hall,

2 Cranford Ave., Liverpool, L18 1EG.

27th May: Weymouth A.S. Open Show. Venue and details to be announced later. Show secretary, A. Worth, 67 Queens Av., Dorchester, Dorset.

3rd June: Bournemouth A.S. Annual Open Show at Kinson Community Centre, Pelham Park, Bournemouth. Show Secretary, J. V. Jeffery, 30 Braemar Avenue, Southbourne, Bournemouth, BH6 4JP.

9th June: Vauxhall Moores Aquarist Section first Open Show; in conjunction with the Vauxhall Moor Sports Day Spectacular. All enquiries to A. Philip, show secretary, 15 Hollybush Road, Luton, Beds.

9th June: Llanrwst Major A.S. Open Show, The Town Hall, Llanrwst Major. Show secretary, J. J. Edwards, "Glanafon," Mill Park, Llanblethian, Cowbridge, Glamorgan, CF7 7BG.

10th June: Lincoln and District A.S. All other details will be announced later.

10th June: G.K.N. Pond and Aquarium Society second Open Show at G.K.N. Cantren, Salisbury Street, Darlaston, Staffs. Show details available from Ken Rowley, hon. show secretary, 156 Wolverhampton Street, Darlaston, Staffs.

17th June: Swillington A.S. Annual Open Show will be held at John Smeaton's School, off Barwick Road, Leeds, 14.

17th June: Bishops Cleeve A.S. Open Show. Further details later.

17th June: Freeland A.S. Open Show, Amer-sham Community Centre, Thurlow Street, S.E.17. For details contact J. Stamp, 72 Red-mand House, Lant Street, Borough, S.E.1.

17th June: Hetton County A.S. Third Annual Open Show, at the Hetton Community Centre in South Market Street, Hetton-le-Hole. Details later.

24th June: Littlehampton and Bognor A.S. Inter-Club Show and Annual Exhibition, Western Pavilion, Littlehampton, Sussex. The Exhibition may be extended to Saturday, 23rd June. More details later.

24th June: Alfreton and District A.S. Annual Open Show, to be held at the Adult Education Centre, Alfreton Hall, Alfreton. Details from the show secretary, B. Hickling, Parkview, 13 Coppice Drive, Rastrawood, MG16 3PW. Tel.: Langley Mill 5104.

8th July: Grantham and District A.S. Fourth Open Show, at the Walton Girls County Secondary School, Kitty Briggs Lane, Grantham. Details from the show secretary, C. J. Shipman, 40, New Beacon Road, Grantham, Lincs. A "Y.A.A.S." Show.

14th July: Basingstoke A.S. Open Show.

17th July: Sandgrounders A.S. third Open Show, Cambridge Hall, Lord Street, Southport.

12th August: North Staffs. A.S.

12th August: Grimby and Cleethorpes A.S. second Open Show at the Memorial Hall, Cleethorpes. Schedules can be obtained from the Show Secretary, T. P. Walker, 51 Chesire Walk, Willows Estate, Grimby, Lincs.

9th September: Nuneston A.S. Sixth Open Show.

16th September: Grimwood A.S., Skelmersdale, Lincs. Second Annual Open Show to be held at the Quarry Bank Community Centre, Ormskirk Road, Skelmersdale. Details from J. B. Handford, secretary, 55 Thurston, Skelmersdale, Lincs. Tel. 24900.

23rd September: Torbay A.S. Open Show, at the Torquay Town Hall. Further details later.

VENUE CHANGE

Torbay A.S.: St. Andrew's Methodist Church School Hall, Torrington Avenue, Shiphay, Torquay, Devon.